Australian Institute of Geoscientists

AIG NEWS

Quarterly Newsletter No 87 February 2007

Science and Pseudo-Religion

Liberally adapted from Dr. Don E. Scott's book "The Electric Sky", published by Mikamar Publishing, 3336 NE 72nd Portland, Oregon 97213, ISBN 0-9772851-1-1, Plasma and electricity in space.

Don E. Scott is a retired professor Electrical Engineering, and published his 730 page textbook "An Introduction to Circuit Analysis" in 1987 - he is also a life-long amateur astronomer.

WHAT MAKES A PERSON a scientist? Scientists are distinguishable from artists, poets, musicians, and others in that they use what is known as the scientific method or the empirical method. It is not that inspiration or "the muse" is not valuable in science, it is — but it is not the starting point of what we call science.

In today's world, many people call themselves scientists. But only those who carefully adhere to the scientific method deserve that title. The scientific method is like a three legged stool. The legs are observation, theory and experiment. Take away any one of those supports, and the stool falls over. Because astrophysicists deal with things far, far away and long, long ago, (as in the case of archaeologists and historical geologists) they cannot perform "in situ" experiments. So, it is proper for us to ask whether astrophysicists are actually able to employ the full scientific method. And if not — what, if anything, can they do about it.

The empirical method is defined by a set of rules — observation, form the hypothesis from the observations and then test it by experiment. It is a constant referring to and testing against experience.

Consider how legitimate hypotheses are formed. We are all familiar with the cartoon character with a light bulb that switches on over his head. There is more to it than that.

Inspiration comes to knowledgeable people. The most successful leaps in science and engineering are often made by investigators who are well versed in two or more areas of study. The light bulb goes on when they see how those two bodies of knowledge can be connected. They realise an interrelationship — an applicability of parts of one of those areas in the other field - that has not been recognised previously.

Often hypotheses can be nothing but a "what if" out of thin air. This first — possibly wrong — concept can then serve as the basis for other 'what ifs'. A sequence of "what if" hypotheses can be cantilevered onto the first one until eventually a conglomerate of pseudo-explanatory proposals is built up. Often this is so enticing that people forget that the fundamental basis of the entire edifice was only a "what if?" — not a verifiable fact.

It comes as a surprise to most people that theories can never be **proved** — that is impossible to do as described by Karl Popper. No matter how good a theory appears to be, some other still undiscovered mechanism may be the real cause of the observed phenomenon. New data may come in tomorrow that will demolish today's most well-accepted, elegant theory. Therefore theories can never be proved correct.

However, they can be **disproved** if they fail to predict the outcomes of future experiments. Popper pointed out that the line between science and pseudoscience lies in the willingness of real scientists to make **testable** predictions based on their

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theories and then give up thoses theories if and when they fail any such test. Popper said, "Good tests kill flawed theories; we remain alive to guess again.". A disproved theory is also called a **falsified** theory.

T.H. Huxley called this giving up of a favourite hypothesis "The great tragedy of science — the slaying of a beautiful theory by an **ugly fact**." Or as physicist Richard Feynman said, "It doesn't matter how beautiful your theory is, it doesn't matter how smart you are; if it doesn't agree with experiment, it's wrong."

Most present day scientists give at least lip service to the empirical method. But in the sciences that deal with things that happened far, far away and long, long ago, the **deductive method** has crept into use. The deductive method derives theories from assumed generalisations about the universe. This is the method used in mathematics.

Aristototle (384-322 B.C.) and his teacher Plato (427 - 347 B.C.) argued about the method man must use in order to learn. Aristotle favoured the idea that truth lies outside of ourselves and can be discovered by using our senses. It is to him that the present-day empirical method can be traced.

Plato disagreed. He, and others, believed that truth and knowledge are to be found within us. They believed that truth is discovered by self-reflection and rational thought. In this process one starts with a presumed law of nature — an obviously correct (accepted) generalisation about the way things work — and **deduces** (works out, derives) its logical consequences.

A hypothesis arrived at via this deductive method is promoted to the status of being a theory when and if a large enough body of experts accepts it. This is an application of the Socratic Method, also sometimes called the "dialectic method." Socrates (469-399 B.C.) believed that truth was discovered through intense conversations with other informed people. Thus in this method, a vote of the experts determines when and if a theory is correct. Once such a theory has been accepted, it is not easily rejected in light of conflicting evidence. It is, however, often modified — made more complicated. When over timea theory becomes officially accepted, the essence of the matter has been settled and fixed. Modifications to the fine points of the theory can then be proposed and debated, but the backbone structure of the theory is set. That framework has already been firmly established.

An inherent flaw lurking in this method is: What if your "obviously correct," basic, starting point-presumption is wrong?

Science places first priority on the empirical method. The deductive method is (should be) secondary — used to derive testable consequences from empirically generated hypotheses. Inverting these priorities makes science into a pseudo-religion. In religion, revelations of the truth take precedence over worldly observations of fact.

In those scientific circles where the deductive method reigns supreme, theory takes precedence over empirical facts. Albert Einstein reportedly once said, "If the facts don't fit the theory, change the facts."

Stephen Hawking was frank about his view of the interdependence of reality and theory: "If what we regard as real depends on our theory, how can we make reality the basis of our philosophy? …We cannot distinguish what is real about the universe without a theory… [I]t makes no sense to ask if it corresponds to reality, because we do not know what reality is independent of a theory." He — and the theoretical physical sciences — apparently failed to notice that the repeated application of the empirical method is how this interdependence is refined and reality becomes known. This oversight that placed deductive assumptions beyond question has gained theoreticians the stature of priests but at the expense of losing touch with reality.

Contrast this with Nobel Laureate Hannes Alfven's comment about the continuing failure of deductive theoreticians to produce controlled nuclear fusion: "They have shown that many of the conclusions which were drawn from classical plasma theory were wrong and once again demonstrated that science is basically empirical. Theory is of value **only when developed in close contact with reality.**" And: "We have to learn again that science without contact with experiments is an enterprise which is likely to go completely astray into imaginary conjecture."

To state it differently: Reality is that which, when you stop believing in it, doesn't go away. It's just there. Use it — or get over it. Come to grips with it. But, ignore it at your peril. Those who refuse to acknowledge that reality exists, independent of any theory, ought not to sit on railroad tracks.

Peer review is one mechanism that maintains the primacy of deduced theory in present-day astrophysics. Any article submitted to a scientific publication must be reviewed and approved by other scientists working in the field. All research proposals submitted to funding organisations are reviewed and then either accepted or rejected by peer-review committees. Some research labs even have internal-review committees to which proposed papers must be submitted prior to their being sent to outside journals.

It seems reasonable — even essential — that scientific publications and funding agencies not be swamped with "I just thought it up" ideas. So they have set up a system wherein a scientist's peers first examine and then pass judgement on whether his work ought to be funded and his results published. It sounds eminently reasonable.

But there is a hidden danger in peer review. If experts who have collectively accepted a deduced theory control both the funding of future research and what results get published, their self-interest may lure them to reject competing hypotheses. There may be little chance for any legitimate alternative viewpoints to develop. Reviewers may judge a submission not on its scientific merit but on whether it conforms to the reviewers' beliefs. Because of this conflict of interest, the peer-review system has also been called "competitor review." It can take the atmosphere of an "old boys club," wherein newcomers with new ideas are scrutinised more rigorously than established members.

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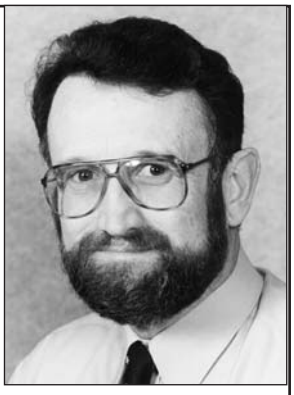
From Your President



A WARM NEW YEAR GREETINGS from the AIG Council to all members. Most of you would already be working at a frenetic pace both in Australia and overseas as the welcome increase in exploration expenditure appears longer than predicted.

With the exception of gold and diamond, the increase in exploration expenditure is spread broadly across commodities and geographically. Capital raising for exploration is showing unexpected resilience so those of you in the exploration industry, and particularly "competent persons" under the JORC Code or "expert" under the VALMIN Code, need to maintain the generally high quality of reporting being demonstrated. This will help ensure the public, analysts and banks maintain confidence in the industry.

This issue of The News has a slight focus on JORC matters because in 2007 the Committee will reinforce its education role in an attempt to further improve knowledge of the Code in the industry.

New AIG News column on complaints

Starting with this issue, a hopefully short new column in The News will summarize issues that are working their way through AIG's revamped complaints management system. It may also feature some general observations on the quality of public reporting of exploration results and resource information.

Details of complaints, including names, will not be included in the column unless, in very serious offences, the Ethics and Standards Committee requires publication of a member's name as a form of punishment.

Overwhelming response to vote on Articles changes

Many thanks to the over 170 members who either returned postal/fax votes or voted in person last November to amend AIG's articles and Code of Ethics. Voting was almost unanimously in favour of the three proposals to:

- facilitate election of office-bearers by the Council rather than directly by members
- revamp AIG's complaints management system
- allow, on a case by case basis, Council to admit graduates who do not have undergraduate geoscience majors. Examples include physics, mathematics and chemistry graduates who undertake higher degrees in geophysics, geostatistics and geochemistry.

Good response to expressions of interest for JORC and other committees

Council was heartened to receive eight applications for the AIG vacancy on JORC with most of these applicants also indicating that should they not be successful in their application for JORC they would be willing to serve on either the new Complaints panel or the Ethics and Standards Committee. One of the amendments to AIG's Articles made it possible for AIG to extend its "officers" insurance cover to non-Councillors serving on Permanent Committees.

I am pleased to announce that Chris Cairns, Managing Director of Integra Mining Limited, was chosen to fill the vacant AIG position on JORC. Other AIG representatives on JORC are Bob Beherts, Chris Roberts and Gerry Fahey. Bill Shaw, long term AIG stalwart, is JORC's South American liaison representative.

For the Complaints panel, from which relevant specialists are drawn to investigate individual complaints, it is heartening to see that applicants spanned a wide cross-section of commodities and experience.

This excellent response shows that AIG members are willing to volunteer in a period when all of us are working harder and longer. Council will be approaching applicants for the AIG committees during February and the formal announcement of appointees will be made in the next AIG News.

Discussions underway on options for amalgamation

After a long festive season hiatus, AIG and GSA representatives are planning to get together to discuss options for closer relationships between our two organizations. In WA, closer links are being forged by holding joint events such as the 2008 Australian Earth Sciences Convention. In the meantime, AIG's membership continues to increase, now breaking the 1700 mark.

Cheers

Rick Rogerson

Science and Pseudo-Religion

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Peer-review committees are anonymous. They do not allow the applicant representation or a say in the selection of the jury. This anonymity of review committees can become an irresistible opportunity for reactionaries to censor **any** innovative ideas. Inertia tends to keep a body or institution moving in the same direction as in the past. An unintended consequence of the peer-review system is that it can keep science permanently locked into the presently accepted paradigm. The selection for publication of only the data that supports a presently accepted theory is the likely result of this system. Little if any research that challenges accepted scientific models will get substantial funding — so it will almost never get performed or its results published.

Even more dangerous than the suppression of new ideas that are not supportive of accepted theory is the reflexive acceptance for publication of pseudoscientific results that concur with accepted theory.

Peer review works well in areas such as engineering, chemistry, and applied physics — areas where erroneous ideas are easily falsified experimentally because they quickly result in obvious failures. But in research areas wherein no real-world testing of hypotheses is possible, it can completely obstruct progress. It can also prolong the life of accepted but unsound paradigms.

The acceptance of the primacy of theory over experiment in astrophysics has led reviewers reflexively to accept just about anything that supports established theory. Inevitably this has lured some astrophysicists into publishing statements that ought to be embarrassing for a legitimate scientist. For an example, in an old college debating technique trick one side challenges the other to disprove the existence of something that doesn't exist — "Prove to me there isn't a rhinoceros under this table. It is an invisible, unsmellable rhino, and you can't feel it — it has no mass. But it is THERE. Prove to me it isn't." Such debating techniques should not be used in science.

Obviously it is impossible to falsify a non-falsifiable hypothesis such as this one. Earlier we pointed out that a hallmark of a pseudoscience is that is poses non-falsifiable hypotheses. When this happens, a red flag should go up in our minds. We must reject quickly and forcefully any demand that we falsify a non-falsifiable theory. Non-falsifiable theories are, by definition, not scientific.

Consider the following example:

Dr. John A. Wheeler, emeritus professor of physics at Princeton University and originator of the concept of black holes, said:

"To me, the formation of a naked singularity [a black hole] is equivalent to jumping across the Gulf of Mexico. I would be willing to bet a million dollars that it can't be done. But I can't prove that it can't be done."

What he is actually saying is — **YOU** can't prove that black holes don't exist, so I am free to use the concept as often as I like.

It is a non-falsifiable hypothesis. It is the fallacy of argumentum ignorantiam, or arguing that something must be true, simply because it has not been proved false.

People have great confidence in science these days. Recent advances in medicine, communications technology, computers, chemistry, genetics, and information science have made our lives better. We look at the achievements in these fields of human endeavour and acknowledge them with admiration. "These scientists, doctors and engineers **really** know what they are doing."

Today most people have cell phones. New surgical procedures, hospital techniques, instrumentation, and medicines are saving, prolonging, and improving the quality of our lives. We have digital devices we can put in our pockets that hold 6000 books, more than most people would read in a lifetime. Through GPS receivers we can tell exactly where we are anywhere on the Earth. The latest stock market report is available to us while we are mountain climbing in Asia. We flew to the Moon decades ago and we have sent landers to Venus and Mars. We have sent probes which orbited Jupiter and Saturn and visited several of their moons. Presently another of our interplanetary probes is on it way to Pluto. Four deep-space probes are now near the outer limits of the Sun's reach — the heliopause. We have orbiting , computer driven telescopes that can see thousand times better than the largest earth bound optical observatories of only a few decades ago.

We have put our faith in scientists and engineers, and it has clearly paid off — except in astronomy (and possibly archaeology and geology).

Why would we want to single out these fields and cast doubt on their results?

The answer is because there are no tangible, usable products from which we can judge the validity of theories emanating from sciences that deal with events that happened long, long ago and far, far away. Professional astronomers judge their success by the degree to which other astronomers believe and accept their ideas. They do not produce results that we, the public, can physically evaluate: They just send up rockets, take pictures of the night sky, write papers, and tell us impressive stories about how it supposedly works and how it supposedly got there. Most of their recent explanations are counterintuitive and almost impossible to understand. This does not mean that everything they claim is necessarily wrong, but how can we actually verify what they are telling us?

The same question can be said about archaeologists: They dig holes in the world, they look at bones and shards, they write papers, and they tell us impressive stories about mankind's history. Theoretical geologists also tell impressive stories about how the continents have shifted and when the mountains formed.

Both these groups are considered successful if other archaeologists and geologists accept their hypotheses. Popular versions of their theories are published in Scientific American, Discover and National Geographic. None of these fields (archaeology, geological history, and astronomy) is able to produce results that can be tested experimentally.

So how can these researchers judge the correctness of their conclusions without considering a range of possible explanations that are based on different assumptions?

Fred Hoyle pointed out some time ago if enough money and scientific expertise is directed at a problem, eventually all its major issues are solved and it becomes essentially an engineering exercise. On the other hand when equally large amounts of money and scientific expertise is directed at a problem that remains controversial for a long period of time and subject to continued disputation, then it is entirely likely that the ideas used to explain the problem are wrong. ▲▲

PROFESSIONAL DEVELOPMENT TRAINING

MARCH TO MAY 2007

Six Sigma Green Belt - 3 two-day sessions start	**6-7 March**	**Brisbane**
Six Sigma Black Belt - 4 one-week sessions start	**19-23 March**	**Perth**
Introduction to Geostatistics	**19 March**	**Brisbane**
	26 March	**Perth**
Grade Control and Reconciliation	**20-23 March**	**Brisbane**
	27-30 March	**Perth**
Practical Statistical Analysis using Minitab	**26-27 March**	**Brisbane**
Change-of-Support - getting to the high grade	**19-20 April**	**Perth**
Resource Estimation	**30 April-4 May**	**Perth**
Six Sigma Green Belt	**First session starts 3-4 May**	**Adelaide**
Six Sigma Black Belt	**First week starts 21 May**	**Adelaide**
Assessing Confidence in Coal Resource Estimates	**17-18 May**	**Brisbane**
Geology for Non-geologists	**25 May**	**Perth**
Mining and Exploration Project Management	**28-30 May**	**Perth**

PROFESSIONAL DEVELOPMENT PROGRAMMES

To help address the skills shortage, Snowden can design personalised training and mentoring programmes to help your team achieve their professional development goals as effectively and efficiently as possible.
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Comment on Article by E.-G. Beck (2006)

By Douglas R. Mason

THE ARTICLE BY BECK (2006) uses published local determinations of atmospheric CO_2 abundances over the period 1812 to 1961 to calculate average annual atmospheric CO_2 levels. He shows that these differ greatly from (mostly higher than) the Antarctic ice-core and Moana Loa curve, and concludes that the historical atmospheric data discount the validity of the suggested post-industrial increase of atmospheric CO_2 (IPCC, 2001).

There is no reason to doubt the accuracy of the atmospheric CO_2 measurements used by Beck (2006). However, there is every reason to suggest that he has made inappropriate use of good data, and his conclusions are in error regarding evaluation of global atmospheric CO_2 abundance.

It is well-known that atmospheric CO_2 abundance varies over a very wide range at any one location, attributable to local short-term (hours to days) and medium-term (months to yearly) climatic variability. A good example is provided by the Physics Laboratory at Lycée Classique de Diekirch, Luxembourg (see http://meteo.lcd.lu/), where atmospheric CO_2 measurements repeated every 30 minutes from January 2002 to the present show that average CO_2 over that period is 405 ± 29 ppm, higher than the Mauna Loa, Hawaii average for the same period of 376 ppm (http://meteo.lcd.lu/papers/co2_patterns/co2_patterns.html) and a similar value for well-mixed air at Cape Grim, Tasmania (http://www.deh.gov.au/soe/2006/publications/commentaries/atmosphere/climate-change.html). Further, wind speed is a broad predictor of atmospheric CO_2 abundance at Diekirch: mostly 400-500 ppm but up to 550 ppm CO_2 for wind speed <1 m/s, contrasted with mostly ~375-400 ppm but down to 350 ppm CO_2 for wind speed >1 m/s, with asymptotic approach at high wind speed to a baseline value of ~385 ppm which is close to the Moana Loa value at end 2006. Thus well-mixed air at Dierkirch has CO_2 abundance close to values measured at the remote Moana Loa and Cape Grim observatories. An example of variability over a 1 week period (13-20 January 2006, as displayed by the laboratory's web site at time of writing) shows mostly high (390-475 ppm CO_2) for 13-17 January during stable mild weather, then wide fluctuations from 0-380 ppm CO_2, with short periods of stable CO_2, for 18-20 January over a period of inclement weather. Historically it is likely that people chose good weather (sunshine, low wind speeds, poorly-mixed air) rather than inclement windy weather to obtain their air samples to determine atmospheric CO_2 measurements. Such samples would be biased toward higher values compared with a truly global average atmospheric CO_2 value in well-mixed air. This wide variability at any one location is precisely why the IPCC chose ice-core data in the remote atmosphericallly well-mixed environment of Antarctica as a best estimate of global atmospheric CO_2 measurement over time.

Thus relatively high historical atmospheric CO_2 values as illustrated by Beck (2006) most likely were obtained because air samples were taken under mild non-windy conditions in poorly-mixed continental air. They are likely to be significantly higher than the average global atmospheric CO_2 value at the time. Any average value for a lengthy period of time at a given land-locked location (eg Diekirck) is likely to provide a higher value compared with a global well-mixed atmospheric average (eg Antarctica, Cape Grim). At best, Beck's (2006) work is poor science, and at worst it serves to cloud the important issues relating to atmospheric CO_2 abundance and global warming. It would be wise for the biologists (pace Beck) and the geologists (me too!) and sundry others including novelists to return to the work we are qualified to do, let the climatologists do their science, and accord their results the respect they are due. ▲▲

References

Beck E.-G. 2006: 180 years of Accurate CO_2 - Gas Analysis of Air by Chemical Methods. AIG News, No. 86, November 2006, p.6-7.

IPCC, 2001: Massen F. et al. (Jan 2007): Seasonal and Diurnal CO_2 Patterns at Diekirch, LU. (http://meteo.lcd.lu/papers/co2_patterns/co2_patterns.html).

Answers by E.-G. Beck (2006) to Comment by Douglas. R. Mason

Ernst Beck

Citation Mr. Mason:

"There is no reason to doubt the accuracy of the atmospheric CO_2 measurements used by Beck (2006)."

Such a statement can only be made when an evaluation of the results in the historical references had been done. One goal of my investigation was to do this and further test the evaluation of historical data done by Callendar, Keeling and succeeding institutions (e.g. IPCC). Of cource accuracy can be doubted because of systematical and methodical errors of the equipment, procedure, influences of location and lack of available calibration information.

Citation Mr. Mason:

"However, there is every reason to suggest that he has made inappropriate use of good data, and his conclusions are in error regarding evaluation of global atmospheric CO_2 abundance."

According to climate science these "good data" do not exist. Callendar, Keeling and IPCC clearly state that, with exception of Reiset (1872-80) and Müntz (1880-1910), prior to Keeling's Mauna Loa measurements that started in 1958 there are no accurate CO_2 measurements therefore they took icecore proxies.

My study reveals that there are at least 90,000 single values with accuracy of 3% or better. Out of these 90,000 values sampled mostly in the northern hemisphere I selected 138 yearly averages in an evaluation process, testing methods, locations and calibrations, sampling conditions (not still published because of limited space) and the criterion of reproducing known seasonal and diurnal variation accompanied by weather data at measuring time to get reliable data.

I do not claim to have found new data, rather the data I compiled was, and ignored by climate science, are representative and spread over a large part of the Northern Hemisphere, as well as one location in Antarctica.

Citation:

"It is well-known that atmospheric CO_2 abundance varies over a very wide range at any one location, attributable to local short-term (hours to days) and medium-term (months to yearly) climatic variability. A good example is provided by the Physics Laboratory at Lycée Classique de Diekirch, Luxembourg (see http://meteo.lcd.lu/), where atmospheric CO_2 measurements repeated every 30 minutes from January 2002 to the present show that average CO_2 over that period is 405 ± 29 ppm, higher than the Mauna Loa, Hawaii average for the same period of 376 ppm (http://meteo.lcd.lu/papers/co2_patterns/co2_patterns.html) and a similar value for well-mixed air at Cape Grim, Tasmania (http://www.deh.gov.au/soe/2006/publications/commentaries/atmosphere/climate-change.html). Further, wind speed is a broad predictor of atmospheric CO_2 abundance at Diekirch: mostly 400-500 ppm but up to 550 ppm CO_2 for wind speed <1 m/s, contrasted with mostly ~375-400 ppm but down to 350 ppm CO_2 for wind speed >1 m/s, with asymptotic approach at high wind speed to a baseline value of ~385 ppm which is close to the Moana Loa value at end 2006. Thus well-mixed air at Dierkirch has CO_2 abundance close to values measured at the remote Moana Loa and Cape Grim observatories. An example of variability over a 1 week period (13-20 January 2006, as displayed by the laboratory's web site at time of writing) shows mostly high (390-475 ppm CO_2) for 13-17 January during stable mild weather, then wide fluctuations from 0-380 ppm CO_2, with short periods of stable CO_2, for 18-20 January over a period of inclement weather. Historically it is likely that people chose good weather (sunshine, low wind speeds, poorly-mixed air) rather than inclement windy weather to obtain their air samples to determine atmospheric CO_2 measurements."

Once again Mr. Mason has obviously not inspected historical references. According to my above mentioned selection criteria we find several systematicly conducted sampling series (every day, same time despite of weather, well ventilated locations using precise gas analysers). CO_2 analyses by chemical methods used in my compilation included measurements over 24 hours (predominantly during the 19th century) to measurements of only a few minutes duration (Kresutz, 1940).Double determinations were made. Dependence of wind, rain, snow, fog or continental or marine wind direction was investigated and discussed and compared between different authors.

Citation:

"Such samples would be biased toward higher values compared with a truly global average atmospheric CO_2 value in well-mixed air. This wide variability at any one location is precisely why the IPCC chose ice-core data in the remote atmosphericallly well-mixed environment of Antarctica as a best estimate of global atmospheric CO_2 measurement over time."

Nearly all measurements are local, of course in Antarctica, Mauna Loa and marine locations as well as continental locations. e.g. Mauna Loa data are freed from volcanic degassing by inspection, automaticly freed from unwanted deviations and further processed.

A well ventilated location is only one of several criteria relevant for atmospheric gas concentrations. Marine and snow covered area sucked up a fraction of atmospheric CO_2 in the order of 10 ppm and more because of solubility in water, snow and ice. Comparing air over such locations lacking abundant sinks and sources (soil respiration, vegetation) to continental air is illegitimate.

Furthermore ice-core proxies of CO_2 cannot be compared to direct measurements of CO_2 of air. Calibrating leaf stomata response of plants that absorb local CO_2, and hence an unmixed background CO_2, to ice-core records is illegitimate for CO_2 concentrations greater than 350 ppm.

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Answers by E.-G. Beck (2006) to Comment by Douglas. R. Mason

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My study reveals that the IPCC has ignored available accurate data in the 20th as well as in the 19th centuries. Furthermore the data used by Keeling and Callendar that was sampled by old French authors was up to 20 ppm too low because of a systematical error. In conclusion the postulated pre-industrial CO_2 concentration of 285 ppm is highly doubtful.

My compilation of 138 data series show good agreement with seasonal and diurnal variation at sampling locations including apparent fluctuations that appear linked to lunar phases hitherto unpublished in the literature.

Citation:

"Thus relatively high historical atmospheric CO_2 values as illustrated by Beck (2006) most likely were obtained because air samples were taken under mild non-windy conditions in poorly-mixed continental air."

Contradicted above.

Citation:

"At best, Beck's (2006) work is poor science, and at worst it serves to cloud the important issues relating to atmospheric CO_2 abundance and global warming."

I do not doubt MWP (Modern Warm Period), it is obvious but CO_2 plays a minimal role in heat balance in atmosphere, it´s action is highly overstated.

My study shows why, because Anthropogenic Global Warming (AGW) as a single explanation of warming in the mid 20th century cannot be held. AGW is based on faulty data, and selective science in favor of a pre-postulated hypothesis. (Ed: A good example of the deductive method at work.)

Citation:

" It would be wise for the biologists (pace Beck) and the geologists (me too!) and sundry others including novelists to return to the work we are qualified to do, let the climatologists do their science, and accord their results the respect they are due."

Biology and chemistry have a scientific background of some 200 years, including dozens of Nobel Prize awards concerning natural science and the elucidation of the laws of nature.

The affinity of CO_2 to biological processes is confirmed a thousandfold times.

Climatotologists rely on 50 years of generally speculative computer modelling. We look forward to the first law of nature and the Nobel Prize in that discipline.

The role of CO_2 in climate processes is essentially speculation. ▲▲

References:

See upcoming publication of a condensed version of my study in Energy & Environment UK including 95 sources.

Online Alternatives to the Establishment Academic Journals

Sourced from a web discussion group — Ed.

SCIENTISTS FRUSTRATED by the iron grip that academic journals hold over their research can now pursue another path to fame by taking their research straight to the public online. Instead of having a group of hand-picked scholars review research in secret before publication, a growing number of Internet-based journals are publishing studies with little or no scrutiny by the authors' peers. It's then up to rank-and-file researchers to debate the value of the work in cyberspace. The Web journals are threatening to turn on its head the traditional peer-review system that for decades has been the established way to pick apart research before it's made public.

Next month, the San Francisco-based nonprofit Public Library of Science will launch its first open peer-reviewed journal called PLoS ONE, focusing on science and medicine. Like its sister publications, it will make research articles available for free online by charging authors [$750.00] to publish. But unlike articles in other PLoS journals that undergo rigorous peer review, manuscripts in PLoS ONE are posted for the world to dissect after an editor gives them just a cursory look. "If we publish a vast number of papers, some of which are mediocre and some of which are stellar, Nobel Prize-winning work — I will be happy," said Chris Surridge, the journal's managing editor.

It's too early to tell how useful this open airing will be. Some open peer-reviewed journals launched in the past year haven't been big draws. Still, there appears to be enough interest that even some mainstream journals like the prestigious British publication Nature are experimenting. Democratizing the peer-review process raises sticky questions. Not all studies are useful and flooding the Web with essentially unfiltered research could create a deluge of junk science. There's also the potential for online abuse as rogue researchers could unfairly ridicule a rival's work.

Supporters point out that rushing research to the public could accelerate scientific discovery, while online critiques may help detect mistakes or fraud more quickly. The open peer review movement stems from dissatisfaction with the status quo, which gives reviewers great power and can cause long publication delays. In traditional peer review, an editor sends a manuscript to two or three experts — referees who are unpaid and not publicly named, yet they hold tremendous sway.

Careers can be at stake. In the cutthroat world of research, publishing establishes a pedigree, which can help scientists gain tenure at a university or obtain lucrative federal grants. Researchers whose work appear in traditional journals are often more highly regarded. That attitude appears to be slowly changing. In 2002, the reclusive Russian mathematician Grigori Perelman created a buzz when he bypassed the peer-review system and posted a landmark paper to the online repository, arXiv. Perelman later won the Fields Medal this year for his contribution to the Poincare conjecture, one of mathematics' oldest and puzzling problems.

Editors of traditional, subscription-based journals say the peer-review system weeds out sloppy science. The traditional process isn't designed to detect fraud (referees rarely look at a researcher's raw data), and prestigious journals have unwittingly published bogus work. Last year, for example, Science retracted papers on embryonic stem cell research by a South Korean cloning scientist who admitted falsifying his results.

Work submitted to PLoS ONE, for instance, is debated after publication by colleagues who rate the research based on quality, originality and other factors. Commenters cannot alter the paper, which becomes part of the public record and is archived in databases. If there is disagreement, authors can respond to comments. To prevent abuse, the site is monitored for inflammatory language and the postings can't be anonymous. "The fact that you get published in PLoS ONE isn't going to tell you whether it's a brilliant paper. What it's going to say is that this is something worth being in the scientific literature, but you need to look at it more closely," Surridge said.

Another open peer-reviewed journal, Philica, launched earlier this year takes a more radical approach. Authors are responsible for uploading their research to the Web site at no cost and without any peer review. Comments are anonymous, but users whose identities have not been verified by site administrators are flagged with a question mark next to their comments. The journal, still in the trial stage, has published about 35 papers so far. About a third still needs to be critiqued. Philica co-founder and University of Bath psychology professor Ian Walker said the system discourages authors from publishing fake studies because others can rat them out. "Imagine if somebody puts up absolute garbage, you will have plenty of reviews that will say, 'This is terrible, terrible, terrible,'" he said.

Academics are eyeing the open peer-review experiment with interest. Andrew Odlyzko, a mathematician who heads the University of Minnesota's Digital Technology Center, is encouraged by the growing number of online journals. Whether they will work — he's not sure. Some researchers might only post unhelpful one-liners for fear of reprisal. Granting anonymity may boost participation, but could lead to "malicious postings from cracks," Odlyzko said.

Even some mainstream journals are toying with a tame form of open peer review. This summer, Nature allowed authors whose papers were selected for traditional peer review to have their manuscripts judged by the public at the same time. Editors weigh both sides when deciding whether to publish a paper, and rejected research can be submitted elsewhere. Linda Miller, the journal's U.S. executive editor, said she was encouraged by the participation. More than 60 papers have been posted on Nature's site for open peer review as of mid-September including one that has been accepted for publication. Several others are on the path to being published. Miller said Nature's experimentation with the Internet is just another way the journal is trying to reach out to the public. Two of its specialized journals on neuroscience and genetics already offer a blog-like forum for researchers to post their thoughts on published articles, though they have attracted little attention, she said. "If we don't serve the community well, we will become irrelevant," she said. ▲▲

(It is in the nature of the internet that links sometimes tend to disappear so the source for this comment no longer exists. That said, it is still relevant — Ed)

Ancient Crash, Epic Wave

The New York Times, by Sandra Blakesee

AT THE SOUTHERN END of Madagascar lie four enormous wedge-shaped sediment deposits, called chevrons, that are composed of material from the ocean floor. Each covers twice the area of Manhattan with sediment as deep as the Chrysler Building is high.

On close inspection, the chevron deposits contain deep ocean microfossils that are fused with a medley of metals typically formed by cosmic impacts. And all of them point in the same direction — toward the middle of the Indian Ocean where a newly discovered crater, 18 miles in diameter, lies 12,500 feet below the surface.

The explanation is obvious to some scientists. A large asteroid or comet, the kind that could kill a quarter of the world's population, smashed into the Indian Ocean 4,800 years ago, producing a tsunami at least 600 feet high, about 13 times as big as the one that inundated Indonesia nearly two years ago. The wave carried the huge deposits of sediment to land.

Most astronomers doubt that any large comets or asteroids have crashed into the Earth in the last 10,000 years. But the self-described "band of misfits that make up the two-year-old Holocene Impact Working Group say that astronomers simply have not known how or where to look for evidence of such impacts along the world's shorelines and in the deep ocean. Scientists in the working group say the evidence for such impacts during the last 10,000 years, known as the Holocene epoch, is strong enough to overturn current estimates of how often the Earth suffers a violent impact on the order of a 10-megaton explosion. Instead of once in 500,000 to one million years, as astronomers now calculate, catastrophic impacts could happen every few thousand years.

The researchers, who formed the working group after finding one another through an international conference, are based in the United States, Australia, Russia, France and Ireland. They are established experts in geology, geophysics, geomorphology, tsunamis, tree rings, soil science and archaeology, including the structural analysis of myth. Their efforts are just getting under way, but they will present some of their work at the American Geophysical Union meeting in December 2006 in San Francisco. This year the group started using Google Earth, a free source of satellite images, to search around the globe for chevrons, which they interpret as evidence of past giant tsunamis. Scores of such sites have turned up in Australia, Africa, Europe and the United States, including the Hudson River Valley and Long Island.

When the chevrons all point in the same direction to open water, Dallas Abbott, an adjunct research scientist at Lamont-Doherty Earth Observatory in Palisades, N.Y., uses a different satellite technology to look for oceanic craters. With increasing frequency, she finds them, including an especially large one dating back 4,800 years.

So far, astronomers are skeptical but are willing to look at the evidence, said David Morrison, a leading authority on asteroids and comets at the NASA Ames Research Center in Mountain View, California Surveys show that as many as 185 large asteroids or comets hit the Earth in the far distant past, although most of the craters are on land. No one has spent much time looking for craters in the deep ocean, Dr. Morrison said, assuming young ones don't exist and that old ones would be filled with sediment.

Astronomers monitor every small space object with an orbit close to the Earth. "We know what's out there, when they return, how close they come," Dr. Morrison said. Given their observations, "there is no reason to think we have had major hits in the last 10,000 years," he continued, adding, "But if Dallas is right and they find 10 such events, we'll have a real contradiction on our hands."

Peter Bobrowski, a senior research scientist in natural hazards at the Geological Survey of Canada, said "chevrons are fantastic features" but do not prove that megatsunamis are real. There are other interpretations for how chevrons are formed, including erosion and glaciation, Dr. Bobrowski said. It is up to the working group to prove its claims, he said. William Ryan, a marine geologist at the Lamont Observatory, compared Dr. Abbott's work to that of other pioneering scientists who had to change the way their colleagues thought about a subject.

"Many of us think Dallas is really onto something," Dr. Ryan said. "She is building a story just like Walter Alvarez did." Dr. Alvarez, a professor of earth and planetary sciences at the University of California, Berkeley, spent a decade convincing skeptics that a giant asteroid wiped out the dinosaurs 65 million years ago.

Ted Bryant, a geomorphologist at the University of Wollongong in New South Wales, Australia, was the first person to recognize the palm prints of mega-tsunamis. Large tsunamis of 30 feet or more are caused by volcanoes, earthquakes and submarine landslides, he said, and their deposits have different features. Deposits from mega-tsunamis contain unusual rocks with marine oyster shells, which cannot be explained by wind erosion, storm waves, volcanoes or other natural processes, Dr. Bryant said. "We're not talking about any tsunami you're ever seen," Dr. Bryant said. "Aceh was a dimple. No tsunami in the modern world could have made these features. End-of-the-world movies do not capture the size of these waves. Submarine landslides can cause major tsunamis, but they are localized. These are deposited along whole coastlines."

For example, Dr. Bryant identified two chevrons found over four miles inland near Carpentaria in north central Australia. Both point north. When Dr. Abbott visited a year ago, he asked her to find the craters. To locate craters, Dr. Abbott uses sea surface altimetry data. Satellites scan the ocean surface and log the exact height of it. Underwater mountain ranges, trenches and holes in the ground disturb the Earth's gravitational field, causing sea surface heights to vary by fractions of an inch. Within 24 hours of searching the shallow water north of the two chevrons, Dr. Abbott found two craters. Not all depressions in the ocean are impact craters, Dr. Abbott said. They can be sink holes, faults or remnant volcanoes. A check is needed. So she obtained samples from deep sea sediment cores taken in the area by the Australian Geological Survey.

The cores contain melted rocks and magnetic spheres with fractures and textures characteristic of a cosmic impact. "The rock was pulverized, like it was hit with a hammer," Dr. Abbott said. "We found diatoms fused to tektites," a glassy substance formed by meteors. The molten glass and shattered rocks could not be produced by anything other than an impact, she said.

"We think these two craters are 1,200 years old," Dr. Abbott said. The chevrons are well preserved and date to about the same time. Dr. Abbott and her colleagues have located chevrons in the Caribbean, Scotland, Vietnam and North Korea, and several in the North Sea. Heather Hill State Park on Long Island has a chevron whose front edge points to a crater in Long Island Sound, Dr. Abbott said. There is another, very faint chevron in Connecticut, and it points in a different direction. Marie-Agnès Courty, a soil scientist at the European Center for Prehistoric Research in Tautavel, France, is studying the worldwide distribution of cosmogenic particles from what she suspects was a major impact 4,800 years ago.

But Madagascar provides the smoking gun for geologically recent impacts. In August, Dr. Abbott, Dr. Bryant and Slava Gusiakov, from the Novosibirsk Tsunami Laboratory in Russia, visited the four huge chevrons to scoop up samples.

Last month, Dee Breger, director of microscopy at Drexel University in Philadelphia, looked at the samples under a scanning electron microscope and found benthic foraminifera, tiny fossils from the ocean floor, sprinkled throughout. Her close-ups revealed splashes of iron, nickel and chrome fused to the fossils.

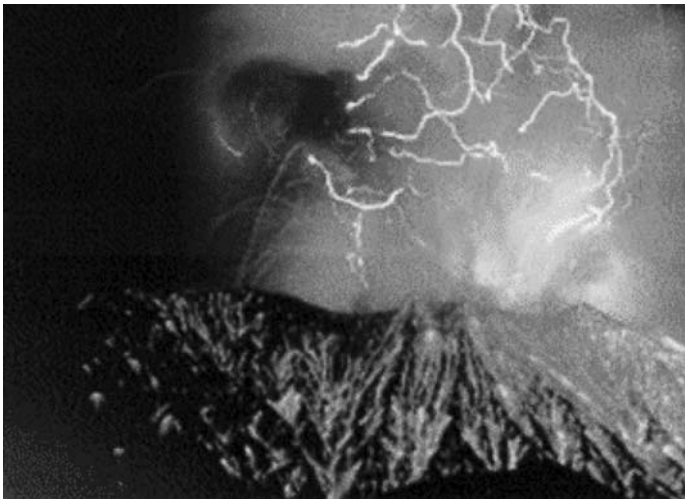
When a chondritic meteor, the most common kind, vaporizes upon impact in the ocean, those three metals are formed in the same relative proportions as seen in the microfossils, Dr. Abbott said.

Ms. Breger said the microfossils appear to have melded with the condensing metals as both were lofted up out of the sea and carried long distances. About 900 miles southeast from the Madagascar chevrons, in deep ocean, is Burckle crater, which Dr. Abbott discovered last year. Although its sediments have not been directly sampled, cores from the area contain high levels of nickel and magnetic components associated with impact ejecta. Burckle crater has not been dated, but Dr. Abbott estimates that it is 4,500 to 5,000 years old. It would be a great help to the cause if the National Science Foundation sent a ship equipped with modern acoustic equipment to take a closer look at Burckle, Dr. Ryan said. "If it had clear impact features, the nonbelievers would believe," he said. But they might have more trouble believing one of the scientists, Bruce Masse, an environmental archaeologist at the Los Alamos National Laboratory in New Mexico.

He thinks he can say precisely when the comet fell: on the morning of May 10, 2807 B.C. Dr. Masse analyzed 175 flood myths from around the world, and tried to relate them to known and accurately dated natural events like solar eclipses and volcanic eruptions. Among other evidence, he said, 14 flood myths specifically mention a full solar eclipse, which could have been the one that occurred in May 2807 B.C. Half the myths talk of a torrential downpour, Dr. Masse said. A third talk of a tsunami. Worldwide they describe hurricane force winds and darkness during the storm. All of these could come from a mega-tsunami. Of course, extraordinary claims require extraordinary proof, Dr. Masse said, "and we're not there yet." ▲▲

Volcanic Lightning

Electric Plasma Site WWW.Thunderbolts.info



Sakurajima volcanic lightning, May 18, 1991. Credit: Sakurajima Volcananological Observatory

THE CAUSE OF volcanic lightning is not completely understood. Geologists assume that the cause is similar to the cause of lightning in thunderstorms. From the plasma universe point of view, the Earth is a small charged body moving in a large cell of plasma, and there is charge waiting for a connection to it.

More than 150 times in the past two centuries, volcanic eruptions have been accompanied by spectacular displays of lightning. Sometimes broad bolts of lightning streak across the sky. Other times St. Elmo's fire cascades from above. Sometimes volcanoes produce branching displays such as at Sakurajima (see photo above.) The 1981 eruption of Mt St Helens featured a spectacular display of sheet lightning, with truck-sized balls of St Elmo's fire seen rolling along the ground 29 miles north of the mountain. Other well-known volcanoes that produced lightning include Vesuvius (1944), Krakatau (1990's), Surtsey, the new volcanic island in Iceland (1963), and Paracutin, the cinder cone that grew out of a farmer's field in Mexico (1940's.)

The cause of volcanic lightning is not completely understood. Geologists assume that the cause is similar to the cause of lightning in thunderstorms, which is also not completely understood. [For discussion of lightning, see TPOD Sept 17, 2004, Weather: Fair, Foul and Electric] For years, geologists have talked about charge separation caused by volcanic dust particles colliding and building up static charges. Recently a new theory has been proposed that relies on the water content of magma.

From an electric universe point of view, the Earth is a small charged body moving in a large cell of plasma. Because of this, explanations of all physical phenomena in, on, and near the Earth must take the electrical behavior of plasma into account. The Physics of the Plasma Universe by Anthony Peratt describes magma as a plasma, a medium containing moving charges. So we should expect volcanoes not only to exhibit electrical behavior but to have that behavior connected with the larger plasma environment, that is, to be elements in a larger electrical circuit.

But why do some volcanoes produce lightning while others don't? More curious, why do some volcanoes with large dusty plumes produce little or no lightning and others with small or mediocre plumes produce much lightning? The simple answer could be that all volcanoes are electric but that the lightning displays happen only when the resistance to the volcanic current is high. You have a good example of this in your home. The electric wires that carry the current from the wall socket to your lamp don't produce heat or light. But when that same current encounters the high resistance of a tungsten filament, it does produce heat and light.

By studying the electrical component of volcanoes on Earth, plasma geologists can gather clues about the mysteries of Earth's volcanic geologic history. For example, it may help to explain why volcanism in the past — the great basalt floods — was hotter and more voluminous than in the present. And it may even help explain why Mars has volcanoes that are many times larger than any found on Earth today. Were Earth and Mars subjected to more powerful plasma interactions in the past? ▲▲

Upcoming Conferences

22 March 2007
GEOPHYSICAL IMAGE PROCESSING , Sydney NSW
Introductory course on the use of ER Mapper. Presented by Cooperative Research Centre for Spatial Information (CRC•SI).
http://www.crcsi.ecampus.com.au/course/view.php?id=24
training@crcsi.com.au

5 April 2007
RISK ANALYSIS AND ECONOMIC EVALUATION OF MINE PROJECTS, Brisbane Qld
Short course presented by the Australian Centre for Geomechanics
http://www.acg.uwa.edu.au/events_and_courses/current_courses

27 April 2007
APCOM 2007 - 33RD INTERNATIONAL SYMPOSIUM ON THE APPLICATION OF COMPUTERS AND OPERATIONS RESEARCH IN THE MINERALS INDUSTRY
Santiago, Chile
The University of Chile Mining Engineering Department is pleased to invite mining executives, professionals and technicians to participate in APCOM 2007
http://www.apcom2007.com/
info@apcom2007.com

4 May 2007
ADVANCED GROUND SUPPORT FOR UNDERGROUND MINES, Perth WA
Short course presented by the Australian Centre for Geomechanics
http://www.acg.uwa.edu.au/events_and_courses/current_courses

25 May 2007
ALTA NICKEL/COBALT, COPPER AND URANIUM INTERNATIONAL CONFERENCE, Perth WA
Presented by the ALTA Metallurgical Services
http://http://www.altamet.com.au

The Myth of Magnetic Reconnection

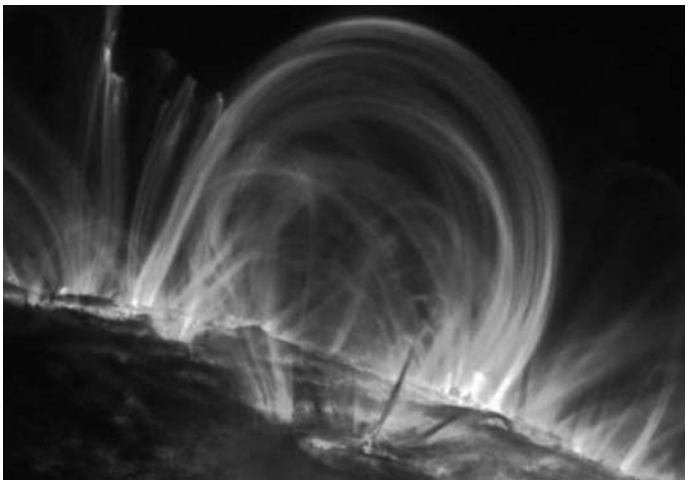
Sourced from the Electric Plasma web site.

ELECTRICAL ENGINEERS AND plasma cosmologists will tell you that magnetic reconnection is one of the most contradictory ideas that astronomers ever derived from the mistaken belief that there are no electric currents in space.

Astronomers today are taking pictures of something they call "magnetic reconnection" on the Sun, and space probes are measuring something else in the Earth's magnetosphere that has also been given the same name. If you ask a plasma cosmologist about these, he'll tell you that the astronomers don't know what they're talking about. They're looking at well-understood plasma phenomena, exploding double layers and electric discharge, not magnetic reconnection.

Which side will triumph? Here's how it's shaping up. Now that astronomers are looking at real phenomena rather than elegant equations, they realize that their equations aren't as predictive as they had hoped. The magnetic reconnection equations called for a slow discharge of energy lasting for years, but the solar flares discharge in minutes with much more energy than expected. But astronomers have also noticed that whenever magnetic reconnection happens, there seem to be regions of electron-depleted space associated with it [plasma cosmologists call them electric currents.] The electron-depleted atoms are traveling at speeds of up to 1000 km/sec [which plasma cosmologists recognize as one of the "characteristic velocities" of plasma in the lab.] And astronomers find that during the magnetic reconnection process, a two-layer flow of particles is created that speeds the release of energy [plasma cosmologists call them double layers.]

The only problem astronomers still need to solve is why so much more energy than they were expecting is produced by the process. Hannés Alfvén could help them here: In the mid-1960's, he was called by the Swedish Power Company to solve a similar problem on a more down-to-Earth scale. The company was using large rectifiers to convert electrical power from AC to DC for easier transport from the generators in the north to the cities in the south. But every once in a while the plasma in the rectifier would explode, causing considerable damage. The problem turned out to be exploding double layers, like those found in "magnetic reconnection" on the Sun. The explosions expended more energy than was contained by the plasma in the rectifier because the energy from the whole length of the circuit flowed back into the break. In Sweden, this was over 600 miles of electric wires. On the Sun -- well, we don't know yet how long those circuits are.



Courtesy: M. Aschwanden et al. (LMSAL), TRACE, NASA

The astronomers will no doubt solve the problem of too much energy released by magnetic reconnection, and the answer will no doubt depend on the dimensions of the "electron-depleted regions." But the question for historians is this: who will be remembered? Will this still be called magnetic reconnection (although it hardly resembles the original theory at all)? Will its discovery be credited to early 21st century astronomers? Or will history remember that plasma researchers like Jacobson and Carlqvist were explaining solar flares as exploded double layers 50 years ago? ▲▲

23 May 2007
AUSTRALIA'S URANIUM CONFERENCE 2007, Darwin NT
http://www.ausimm.com/events/upcoming.asp
dedwards@ausimm.com.au

13 June 2007
MINE WATER MANAGEMENT
Short course presented by the Australian Centre for Geomechanics
http://www.acg.uwa.edu.au/events_and_courses/current_courses

15 June 2007
PLANNING FOR MINE CLOSURE, Perth WA
Short course presented by the Australian Centre for Geomechanics
http://www.acg.uwa.edu.au/events_and_courses/current_courses

20 June 2007
PROJECT EVALUATION CONFERENCE 2007
Hamburg, Germany.
www.geo.tu-freiburg.dehttp://www.ausimm.com/events/upcoming.asp
dedwards@ausimm.com.au

24 July 2007
FOURTH SOUTHERN AFRICAN BASE METALS CONFERENCE, Swakopmund, Namibia
Presented by the South African Institute of Mining and Metallurgy SAIMM
http://www.saimm.co.za
lara@saimm.co.za

22 August 2007
IRON ORE 2007
Salt Lake City, Utah. www.geosociety.orgPerth WA
Presented by AusIMM and CSIRO
Link: http://www.ausimm.com/events/upcoming.asp
Contact: dedwards@ausimm.com.au

Interesting Reviews spotted in New Concepts in Global Tectonics

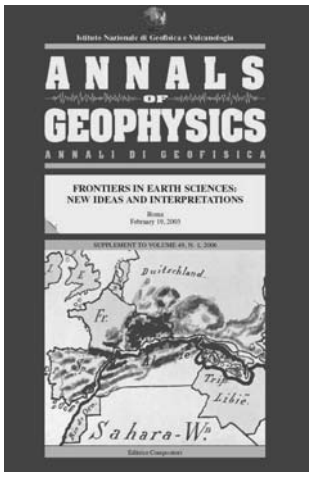
Review 1:

FRONTIERS IN EARTH SCIENCES: NEW IDEAS AND INTERPRETATIONS

(Editors: G. Lavecchia & G. Scalera)

Annals of Geophysics, Supplement to Vol. 49, n°1, pp. 319-514.

(Special Volume PDF can be downloaded as anonymous FTP at ftp://ftp.ingv.it/pub/scalera)



(From the Preface) On the need for an open debate on alternative and conventional theories in the Earth sciences

A ONE-DAY SYMPOSIUM on new and conventional ideas in plate tectonics and Mediterranean geodynamics was held in Rome on February 19, 2003 at the headquarters of Instituto Nazionale di Geofisica e Vulcanologia (INGV). It was decided to also invite people with a more conventional approach to geodynamics, especially those involved with seismic tomography.

In the last few years, high-resolution mantle tomographic models have been widely used to unravel the geometry of subduction zones. A turning point in the field, however, was a review paper written by Fukao et al. (*Rev. Geophysics*, 39, 291-323, 2001) showing that there was no clear evidence for slab subduction down to the core-mantle boundary, thus posing a major problem on the balance between the lithosphere subducted at consuming plate margins and the large amount of oceanic lithosphere accreted at diverging plate margins. This prompted the need to re-evaluate the nature of subduction and plate margin evolution. Accepting the theory of plate tectonics, many problems remain open, especially those regarding plate driving mechanisms and their possible link with the forces developed at the core-mantle boundary. Might these forces trigger pulsating tectonic and magmatic activity, with mantle upwellings and large-scale emission of CO_2, capable of causing dramatic changes in the composition of the atmosphere and changes at the Earth's surface? Could these lead to major catastrophic changes in Earth history?

During the one-day symposium, a stimulating discussion took place involving different interpretations of observations, especially those relating to the geodynamics of the Mediterranean region. Although the papers in this collection do not provide unique solutions, they do, however, provide new insights into some problems and in some cases suggest new interpretations. Many questions also arise about the relationships between the tectonics of the lithosphere and the deep mantle processes. May the denser portions of the inner parts of the Earth transform into shallower, lighter chemical phases, with a possible increase in the Earth's volume? May the asthenosphere above growing plume heads be capable of dragging the overlying lithosphere?

May mantle plumes be wet rather than hot? Some papers consider gravitation to be a driving mechanism for the nucleation of contractional belts and others even doubt the compressional origin of orogens. Finally — as a link to fundamental physics — an original mechanism of energy conversion from gravitons to photons is proposed as a supply of energy for global tectonic processes.

Obviously, because of an often diverse philosophical and scientific background, it is difficult for the ideas presented in this supplement to be shared by all readers and contributors. But we hope that these ideas will help to encourage critical evaluations of some commonly accepted concepts in modern plate tectonic theory. European geoscientists have available to them an exceptional natural laboratory — the Mediterranean and surrounding orogens — complete with all of its paradoxes and contradictions. In this natural laboratory, we hope that new evidence and new solutions to a variety of problems outside of the Mediterranean region will be found! ▲▲

Giusy LAVECCHIA and Giancarlo SCALERA

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Review 2:

VOLCANO, EL NINOS, AND THE BELLYBUTTON OF THE UNIVERSE

Author: Dan Walker. Published by Xlibris, 2000.

I MET A MAN WHILE living in Hawaii through Bruce Leybourne. Bruce had been working on possible causes for the ENSO/El Nino events. Interestingly, on his front lanai on the North Shore, Dan Walker gave us a copy of his last book, *Volcanoes, El Ninos, and the Bellybutton of the Universe.* This is very appropriate to a paper in last month's NCGT Newsletter about El Nino, so I decided to re-read and critique Dan's book, published by Xlibris in 2000.

Walker spent his entire career on soft money at the Hawaii Institute of Geophysics (HIG) doing earthquake seismology around the Pacific basin. He would go in, set up a station on such remote sites as Marcus, Wake, Midway, and Easter Islands, and collect information for whatever time intervals he was allowed. From these data he kept collecting, aside from the P-, S-, and T-phase information, "mystery" noise which was indeterminate. Dan kept this noise in mind throughout his entire career, never really figuring out what to make of it. He did figure that when sea-floor spreading was occurring on the East Pacific Rise (seismology) that it was usually accompanied by an El Nino event (oceanography). Eventually he tied this in to a decrease in pressure over Easter Island during such events (meteorology) and published these data three different times in Eos, an AGU journal subscribed to by over 30,000 earth scientists.

Surely someone would take interest. Much to his dismay, nobody ever picked up on what he was showing. Seismic information stations have never been located in many remote places, so we have not a clue as to whatever kinds, and the magnitudes of, any events occurring out of "normal shipping channels." In retirement, he published this little book outlining his life's work. His final word was that maybe some young ostrich would get his head out of the sand and expand on his preliminary work.

Well, that happened at Stennis Space Center when Bruce Leybourne placed this data in a surge tectonic framework and tied it all together. However, he is also being ignored. The "scientists" of the world do not seem to be able to cross interfield boundaries, an unfortunate fact Bruce discovered when trying to apply for admission into PhD courses of study at various universities. So, it seems that one of our group of 300 group of 300 plate tectonics sceptics will have to make the cross-over to help Dan's original ideas come to fruition, whatever the final scenario may be. New Concepts are difficult at best to get off the ground! ▲▲

(Some clarifications added — Ed)

Chris SMOOT, ncsmoot@yahoo.com

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Complaints, Complaints, Complaints

THIS IS THE FIRST in a series of regular columns in the AIG News that summarize the work of the new Complaints Committee and Ethics and Standards Committee.

Until now, the handful of complaints dealt with each year by the Ethics and Standards Committee have been completely confidential, to the extent that most members probably think that no complaints are received. This column will attempt to redress this situation so that at least some statistics and the broad outline of a complaint and its resolution is described so that other members can learn from the process. Along the way, the column will also comment on any trends the Complaints panel sees in public announcements of exploration results and mineral resources and reserves.

Complaints received

In the last three months, two complaints have been received. One involved an allegation that a member breached the AIG Code of Ethics by his behaviour in the workplace. The file on this complaint was closed after the complainant did not provide further particulars of the allegations when requested to do so.

The second complaint concerned allegations that a member had breached Clause 17 of the JORC Code in a report to the ASX that appeared to be highly promotional but lacked details on the nature of the mineralization and its distribution. Currently, this complaint is still working its way through the system.

Promotional announcements and sloppy nomenclature

A number of recent ASX announcements and press releases by ASX-listed entities appear to be promotional in nature but appear to lack the exploration results that would support the conclusion that the deposit in question was the biggest in the world, or the best discovery in 2006 etc. In early October 2006, the Australian Securities and Investments Commission released a report that concluded that up to 4% of small- and mid-cap exploration and mining stocks could be using Australian Stock Exchange announcements to ramp their share prices.

Another trend has been a number of competent persons appearing to use nomenclature very loosely such as using "ore body" when they really mean "deposit" or writing "ore" when they are dealing with "mineralization". The Complaints panel is beginning to take a closer look at announcements of this type. ▲▲

For the latest in Geoscientist news, views, codes, events, employment and education visit the AIG website:

www.aig.org.au

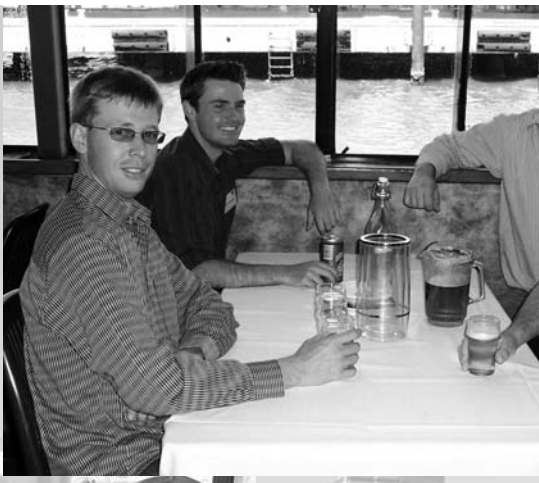
2006 AIG WA Branch Xmas River Cruise

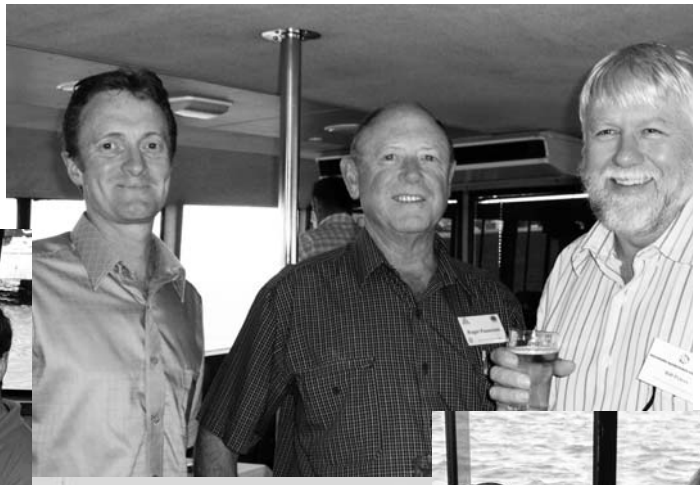
THERE'S NOTHING LIKE THE Swan River on a typical perfect spring Perth day in late November - blue water, dolphins pacing the boat, a gentle zephyr from the southwest.

This was the scene on Friday 24 November for the annual joint AIG-GSA Xmas River Cruise. About 120 participants from both GSA and AIG joined the four hour long cruise down to Fremantle and back.

Besides the usual AIG and GSA demographic, there was a healthy number of younger members of either GSA or AIG who joined the oldies for the day. This was extremely heartening because at long last we have found something to attract younger members.

Once again, Southern Geoscience Consultants (www.sgc.com.au) generously sponsored the event, with some of their senior exploration consultants on hand to contribute to the conviviality.





2006 AIG NSW Branch Xmas River Cruise

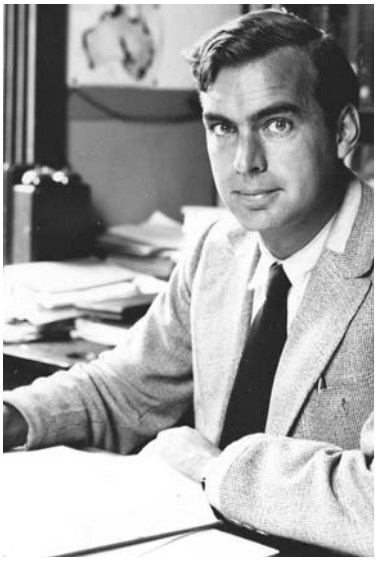
AIG SYDNEY CRUISE, otherwise known as, these days, the pensioner cruise - or PC Cruise.

The Battle for the Curtis Trophy

It appears that the Curtis Trophy is awarded to those on the AIG NSW Branch Sydney Cruise who win at a game of Quoits — an arcane game in which small hoops of rope or other stout fibre are thown at a small vertical pole, the purpose of which is to throw all one's quoits onto the pole, thereby winning.

Variants are throwing horseshoes at said pole.

Obituary: Rhodes Whitmore Fairbridge



Rhodes W Fairbridge, Department of Geology, The University of Western Australia, 1951.

by Phil Playford

RHODES WHITMORE FAIRBRIDGE, a world-renowned Australian geologist, died on 8 November in Amagansett, New York, aged 92.

Rhodes Fairbridge was born in Pinjarra, Western Australia, on 21 May 1914, the first child of Kingsley and Ruby Fairbridge. He had two siblings, a brother, Wolfe, and a sister, Elizabeth. In 1912 his father had founded the Fairbridge Farm School at Pinjarra, for disadvantaged child migrants from Britain. He brought them up in a healthy and homely environment while training them for employment in the agricultural industry. Kingsley Fairbridge, originally from South Africa, named his son after that much-admired English colonist, Cecil Rhodes.

After the premature death of his father in 1924, Rhodes Fairbridge received his schooling in England, before graduating as a geologist with degrees from Queen's University (Ontario) and Oxford University. He received a Doctor of Science degree from The University of Western Australia (UWA) in 1942. His first job, before World War II, was in oil exploration in Iraq. During the War he served in the Royal Australian Air Force as an intelligence officer. He was appointed as a Lecturer in Geology at UWA in 1946 and remained there until 1955, when he was appointed as Professor of Geology at Columbia University, New York. At the time of his death he held the position of Professor Emeritus at the Centre for Climate Systems Research at Columbia. Although much of his work was carried out outside Australia, Professor Fairbridge never gave up his Australian citizenship.

While at UWA Rhodes became very interested in the evidence for recent sea-level and climate change that is so well displayed along the South West coast, and especially on Rottnest Island. That interest never left him, as he became an international expert on climate change. He always maintained that the best evidence for recent variations in global sea level (controlled by changing climate) is to be seen on Rottnest Island.

It is an amazing coincidence that on the day of his death an international geological excursion (for the AAPG meeting in Perth) was visiting Rottnest to examine the evidence seen there for recent sea-level and climate change. The first place that participants visited on the island was Fairbridge Bluff, which I had named in honour of Rhodes Fairbridge in 1976, where a coral reef from the last interglacial period is well exposed.

In 1949-51 the academic staff of the Department of Geology at UWA consisted of only three lecturers, Professor Rex Prider (head of the department), Rhodes Fairbridge, and (from 1950) Alan Wilson. At that

time more than 20 students graduated each year with BSc or BSc Honours degrees in geology. It is a measure of changes that have occurred since then that in 2006 only seven students graduated at UWA with equivalent degrees in Earth Science, whereas the academic staff (many engaged in research only) had risen to more than 35.

Opinions are divided among UWA geology graduates regarding Rhodes Fairbridge's ability as a teacher. Some, including me, found him to be inspirational, but others were less impressed by his rather relaxed approach to student instruction and his devil-may-care field excursions that often turned into riotous adventures! Fairbridge always graded his students on his intuitive opinion of their worth as scholars, rather than on their examination results alone. This approach complemented that of Professor Prider, an excellent lecturer who took his teaching responsibilities very seriously and placed major emphasis on exams.

Rhodes Fairbridge's lectures were a lot of fun, delivered casually, off-the-cuff, but many lacked information that could usefully be recorded in lecture notes. His students gained many laughs and interesting perspectives from those lectures, but no notes! For example, one of his memorable second-year palaeontology lectures dealt with the sex life of dinosaurs.

I feel sure that Rhodes Fairbridge's approach to teaching resulted from the example of his father, Kingsley Fairbridge, who left school at the age of 11, but recommenced his education ten years later, on his own initiative and with limited help from tutors. He passed his examinations with distinction, and was eventually awarded a Rhodes Scholarship. At Oxford he earned a degree in forestry and a blue in boxing. This example of his father's initiative must have had a deep effect on Rhodes. Accordingly he encouraged students to study independently, while stimulating their interest in geology as a science, rather than simply feeding them facts. In this way the students largely taught themselves, and I feel sure that they emerged from that experience as better geologists.

In 1950 there was no scientific institute in Australia dedicated solely to geology and geologists. Although geology was one of the sub-disciplines of The Australian Institute of Mining and Metallurgy, that institute also represented many other professions associated with mining. Rhodes Fairbridge concluded that a new institute should be established for Australian geologists, catering not only for the professional interests of geologists, but also for academic aspects of the science. Consequently he proposed, at a meeting of the Western Australian Geology Club in 1950, that an Australian Institute of Geology be established. This was agreed on unanimously at the meeting, but subsequently it was rejected in the Eastern States, where most geologists were based at that time. Some powerful academics in the east maintained that Fairbridge's proposal resembled a 'Geologists' Union' and that instead a learned society should be established purely to promote the science of geology in Australia,. This resulted in the Geological Society of Australia being founded in 1952. However, the need for a body that could also cater for the professional interests of geologists remained, and consequently The Australian Institute of Geoscientists was established in 1981. It has recently been suggested that the two organizations should be merged, and I am sure that such an action would have been strongly supported by Rhodes Fairbridge.

Geology IIIB class, The University of Western Australia, 1950:

Left to right, back: Leo Goldflam (demonstrator), Malcolm Pryce, John Anderson, Les Nixon, Jim Lissiman, Tony Hall, Bill McArthur, Dick Haines, Jack Harvey, Doug Smith, Bryan Drew, Jim Parry, Gordon Baker, Michael Frost, Jack Lorimer; *Middle:* John Firman, Bill Compston, Angus McKinnon, Brian Fitzpatrick, Len McKenna, Jim Cundill, Jean Tulloch, Margaret Redman, Des Rowston, Rhodes Fairbridge (Senior Lecturer); *Front:* Ken Summers, Ian McPhee, Aub Hosking

Rhodes always had an encyclopaedic knowledge of topics that interested him. This was first expressed in his book 'Australian Stratigraphy', a comprehensive compilation of what was known in 1953 about the sedimentary rocks of the continent. It remains a valuable source book today. After moving to Columbia University, Professor Fairbridge accepted a commission to edit a series of encyclopaedias on various aspects of geology and related sciences, completing more than 30 excellent volumes over the next 45 years. He was working on his latest encyclopaedia, dealing with palaeoclimatology, when he passed away.

In Rhodes Fairbridge's last paper on climate change, published in August 2006, he emphasized that the earth's climate is always changing naturally, and sometimes very abruptly. He pointed out that there is no proof that the current phase of global warming is primarily linked to human rather than natural causes, although he agreed that carbon-dioxide emissions are having adverse effects on the world's climate. The main question that remains is how much of the present warming trend is due to natural rather than human causes. Rhodes Fairbridge quoted an eminent U.S. senator, chairman of the Senate Environment Committee, as stating that 'man-made global warming is the greatest hoax ever perpetrated on the American people'. Rhodes Fairbridge concluded that 'whatever the present trend, the last word will always be political'. He also pointed to the large number of little-understood variables that control world climate, and to the fact that many of these cannot be modelled adequately through existing computer programs. In other words he believed that we currently have no reliable means of predicting trends for the immediate future of the world's climate.

Fairbridge died as a result of a brain tumour. He is survived by his wife, Delores, his son Kingsley, and one grandson. In an e-mail message to me last year he observed that his grandson was studying classical pottery in Japan and that 'the madness gene of the Fairbridges is alive and kicking'. ▲▲

Intensive Variables

Louis Hissink

ONE OF THE LESSER known facts about physical variables is the distinction between intensive and extensive variables, and surprisingly few scientists seem to know how to deal with them, despite learning about them at University. So what are they and what is so special about intensive variables.

My own experience with colleagues and other scientists is one of embarrassing forgetfulness. I had a long debate with an emeritus professor of electrical engineering who finally cottoned onto the fact that intensive variables cannot be subject to isolated mathematical manipulation - a clear case of the slap on the forehead reaction.

Put simply, extensive variables depend on the amount of physical material they are associated with. Typical examples are length, area, volume and the derived extensive variable, mass. These variables can be added, subtracted, multiplied and divided into physically meaningful numbers.

Intensive variables do not depend on the amount of physical material present and typical ones are density, temperature, or percent mass among the more obvious ones. These variables can be mathematically manipulated in isolation but the results of such manipulations can be physically meaningless despite being computationally correct.

The intensive variable % mass might be assayed from some iron ore samples and adding two assays such as 45% Fe + 78% Fe will produce the mathematically correct sum of 123% but this number is physically impossible, unless one were a dedicated super athlete where such numbers might have applicability. This is because intensive variables are essentially numerical ranking measurements rather than quantities. It also means one cannot sensibly add intensive variables to obtain a sum which is then divided by the number of samples to yield a statistical mean. Numerically the result is correct but physically it isn't because intensive variables cannot be sensibly added.

Find it hard to understand? I asked a young honours geophysics student what is the result of adding 3 degrees Celsius to 3 Degrees Celsius - quick as a flash he said 3 Degrees Celsius i.e. 3 + 3 = 3. Somewhat counterintuitive one suspects but it is a common error made when intensive variables are subject to statistical analysis. Ideally the temperature should used as a factor to represent a 'countable" physical quantity of thermal energy.

One of the principal reasons geological ore reserves involve the weighting of ore blocks by the assigned block assay assay is precisely for the reason that assays are intensive variables. Intensive variables are valid measurements of some physical attribute but they have to then be APPLIED to their associated extensive variables to yield countable and physically meaningful numbers. Hence ore assays of 3% Ni are used to factor the block of ore to yield a countable extensive variable, mass of nickel.

The mining industry knows from experience that simply averaging assays to produce a mean assay multiplied by the total mass of ore will produce the wrong result when mining is completed.

However there is one situation when intensive variables can be subject to mathematical manipulation in isolation and that is when the "sample support" is identical for each sample that an assay is derived from. And to make matters even more interesting one can introduce the situation of sample-volume variance as an extra source of error.

Sample support is important in earth science statistics because unlike the more usual application of statistics to understanding human demographics for example, where the mathematical annotation 'N" is an integer, no such naturally occurring "individuals" exist in earth science. We are familiar with discrete objects - billiard balls, persons, melons, apples, pears and so on but there are no such equivalents in earth science. Objects are essentially numbered as integers that cannot be divided into smaller parts.

Sample	Diamond Grade								Mean	SD	Var
1	150								NA	NA	NA
1/2	140	160							150	14.14214	200
1/4	130	150	150	170					150	16.32993	266.6667
1/8	120	140	140	160	140	160	160	180	150	18.5164	342.8571

Table 1

Consider a discrete mineral deposit, say a kimberlite diatreme with a diamond content of 150 carats per 100 tonne. This is ore grade of the pipe but it is not the statistical mean of the ore body because one kimberlite pipe cannot have a statistical mean of any measured property.

Say the pipe has a tonnage of 50 million tonnes, and let's cut this pipe into two identical halves of 25 millions tonnes. Now according to the central limit theorem, the diamond assays should be uniformly distributed around the mean, and that could mean that either the two halves have the same assay or if one is 140 cpht, then based on the fact that the final grade is 150 cpht, the other half must have a grade of 160 cpht.

Now divide the two halves to produce 4 quarters. Again the central limit theorem applies and we might have the following grades for each quarter - 130, 150, and 150, and 170. Note that the mean of 130 and 150 is 140 which is the ore grade of the now divided previous half. The same procedure applies to the division of the other half, where the arithmetic mean of 150 and 170 is 160. This division could be extended almost infinitely but let's limit it to 10 divisions - the results of which are summarised in Table 1 for 3 divisions of the orebody. Note that the ore-grade remains constant at 150 cpht but the standard deviation (SD) and variance increase as the sample volume becomes smaller. Populations are statistically defined by a unique mean and a unique SD, and those with the same mean but different variances are statistically different clearly, in the case described here, this is certainly not the case physically. Statistically yes and in the sample-volume variance problem statistically means we are dealing with apples, oranges and pears.

Earth science eliminates this problem by collecting equal volume samples so that meaningful statistics can be derived. This is also the fundamental definition of "sample support". It means you cannot combine assays from different sample volumes to derive a final ore grade by simply calculating the arithmetic mean of the assays. You can if the sample support is uniform, so that the factoring required for the usage of intensive variables is a constant.

Of course there is physically no such thing as an average grade if one is describing the chemistry of a single ore body, but is if one is summarising statistically samples taken from that ore body, then sure, that mathematical summary is possible, but somewhat ambiguous physically. In any case, it shows that the mixing of different sample volumes, or masses, is a JORC no no.

Temperature is an intensive variable but its measurement poses an additional factor. Temperature sensu strictu is defined as thermal state of an object. Say our weather thermometer will show 18 Degrees Celsius and informs us that both our measuring instrument, the thermometer, and an unspecified volume of air, are in thermal equilibrium. The problem here is what does the measured temperature relate to?

Both. So when a statistical mean of temperatures is computed which object does it refer to?

Both.

It might be worthwhile thinking about the thermal effect of a million tonnes of ice as an ice-berg and the effect one ice-cube from the refrigerator - both are at 0 degrees Celsius but the thermal effect of the ice-berg would be slightly more significant than the smaller ice-cube, so temperature tells us nothing about the magnitude of thermal effect. Instead the product of mass times specific heat times temperature will show that the ice-berg will have a greater effect than the ice cube.

In the case here where by the very act of measuring two physical objects in thermal equilibrium to produce one temperature, one must complete the next step to produce a physically useful thermal property. Take the following small table (Table 2) of hypothetical temperatures for various parts of some predefined mass of material that has been divided into 10 different masses as the result of estimating its thermal state.

Cont. Overleaf

Sample	Mass Body	Mass Therm	Temp deg C	ThermoQ
1	1200	10	12	14400
2	356	10	4	1424
3	899	10	23	20677
4	4566	10	38	173508
5	23	10	9	207
6	199	10	23	4577
7	4356	10	27	117612
8	234	10	12	2808
9	8998	10	10	89980
10	8768	10	2	17536
Totals	29599	100		442729
Sub Means		10	16	
Temp	14.95757			

Table 2

Intensive Variables

Cont. from Page 25

Here the mass of each divided part of the body is listed in column "Mass Body", the mass of the individual thermometers in column "Mass Therm", the measured temperature in column "Temp deg C" and the computed thermal quantity by multiplying mass times temperature in the column "ThermoQ for the body mass." (Specific heat is assumed to be 1 for simplicity and ignored here.)

Two temperatures can be computed from these data - the thermal state of the body which is 14.95757 degrees Celsius obtained by multiplying each sub-mass by its corresponding temperature, then adding all of these together and dividing by the sum of the masses (29599) to obtain the final temperature of the body. This is the correct application of using an intensive variable to factor a corresponding extensive variable.

A similar procedure is adopted for the measuring thermometers which all have the same mass, and the mean temperature is 16 degrees Celsius. Note in this case because the sample support is uniform, simply taking the average of the 10 thermometer temperatures is the same as factoring the thermometer masses themselves with the intensive variable "temperature".

The value of 16 is then the average temperature of 10 individual thermometers but is not the temperature of the mass of matter that produced the measured temperatures for it has a different temperature of 14.95757 degrees Celsius. Also note that the arithmetic mean of 16 degrees Celsius is higher than the real thermal state of the mass of matter, except when the two means become equal when identical masses are associated with each temperature.

One wonders what other estimates of temperature have been calculated by the misapplication of intensive variables? ▲▲

Say that again?

This comment was spotted on the internet and challenged the editor's scientific sensibilities.

"Greenland isn't melting as fast as we feared. It was big news when the rate of melting suddenly doubled in 2004 as ice sheets began moving more quickly into the sea. That inspired predictions of the imminent demise of Greenland's ice - and a catastrophic rise in sea level. But a paper published online this afternoon by Science reports that two of the largest glaciers have suddenly slowed, bringing the rate of melting last year down to near the previous rate. At one glacier, Kangerdlugssuaq, "average thinning over the glacier during the summer of 2006 declined to near zero, with some apparent thickening in areas on the main trunk."

Reference: http://tierneylab.blogs.nytimes.com/2007/02/08/greenlands-glaciers-take-a-breather/).

Now when ice sheets start to move more quickly into the sea, then that is called 'calving' and is evidence of a tremendous deposition of snow at the source areas of the glaciers or ice sheets pushing the older, distal ice into the sea. It is essentially an increase in ice production. (There is also the view that increasing meltwater at the base facilitate mass down-slope movement and might be an alternative explanation for the observed data).

Yet one gets the vague impression from reading the above that ice calving is being confused with melting. Glaciers melt by receding up stream.

One suspects that science is not working too well in this area of geoscience. Perhaps members might ponder on this peculiar understanding of glacier geology inferred from the scientific literature cited above..

When The Antarctic Was Warm

THE ANALYSES OF OCEAN-FLOOR sediments deposited recently by melting Antarctic ice sheets reveal that these ice sheets are *only* about 2,000 years old. The evidence is in the rocky debris scraped up from inland Antarctica and then transported out to sea, where it drops to the sea floor as the ice melts.

The grains of rock settle into the ocean sediments which contain biological debris that can be carbon-dated. (Marine life beneath the ice sheets is surprisingly abundant and varied despite the near-freezing temperatures.)

However, the news that the Antarctic Peninsula's ice shelves may have come and gone at least once since the end of the last ice age, about 11,000 years ago, suggests that people may not be fully to blame for the disappearance now underway.

Supporting foregoing evidence are studies of Antarctic lake sediments and ancient abandoned penguin rookeries. Everything points to a warmer, more humid Antarctica between 2,500 and 4,000 years ago.

(Perkins, S.; "Antarctic Sediments Muddy Climate Debate," *Science News*, 160: 150, 2001.)

Ed: *And we assume that the Vostok Ice-cores go back 140,000 years?*

From the Editor's Desk

This AIG News looks briefly at the difference between empirical and deductive science, and who actually should be described a scientist.

We received a comment on Beck's article from Issue 86, including Beck's reply.

The AIG Christmas cruises are featured and all one can conclude is that Sydney branch seems to be dominated by old types while West Australia with the young'uns - so there is hope for us yet! As usual a few controversies are thrown in to get the grey cells working.

Editor's Change of Email Address

The editor has moved his email service to a small Australian IT provider, Telstra, and now uses Telstra Microsoft Exchange Server for email. All editorial contributions should be sent to aignews@fgservices.biz.

He hopes that in the future there will be a reduction in server failures, probably due to global warming! His direct email is lhissink@fgservices.biz.

Honours Thesis Abstract: Illite Crystallinity and Evolution of the Western Lachlan Fold Belt, Australia

Alex Farrar
University of Melbourne
2006 Terra Search-AIG Bursary Winner

THE HYPOTHESIS THAT A Proterozoic continental crustal block or the 'Selwyn Block' forms the basement to central Victoria is controversial. The proximity of the majority of Victoria's major 440Ma gold deposits to the inferred western margin of this block makes understanding this structure critical to the success of future gold exploration in Victoria.

This research report utilised the methods of Illite Crystallinity (IC) and b lattice parameter spacing (b0) of illite to measure the peak thermal and barometric conditions respectively of the rocks in the western Lachlan Fold Belt, in the region proximal to the inferred western margin of the Selwyn Block. This was done in the hope to better define the western margin of the Selwyn Block. The IC and b0 data collected support the presence of the Selwyn Block, due to major thermal and barometric trends observed in the western Lachlan Fold Belt. Higher grade (Epizone) sediments were found to lie to the west of the Whitelaw Fault whilst lower grade (Anchizone) sediments were found to lie to the east of the Whitelaw Fault. The change from Epizone conditions to Anchizone conditions was found to be extremely sharp, and occurs over the distance of a few hundred metres. It was therefore determined that this thermal boundary represents where the western margin of the Selwyn Block existed at the time of peak deformation at ~440Ma, as the Selwyn Block would have shielded its overlying sediments from peak deformation.

The barometric data suggest the presence of thickened lithosphere to the west of the Selwyn Block. This is interpreted to have formed in a compressional setting between the converging Selwyn Block and the Australian Craton. Late in the Benambran Orogeny the orogenic belt is thinned from erosive processes resulting in asthenospheric upwelling, which produced the Early Devonian I-type granites. The later deformation of the Melbourne Zone and production of Late Devonian S-type granites is attributed to the formation of a decollement along the top of the Selwyn Block. ▲▲

Education Report

Kaylene Camuti (Chair, Education Committee)

Student Bursaries

The 2007 bursary application form is being prepared at the moment and will be available around late March. The application form will be distributed to students and academics throughout Australia; the form will also be available on the AIG web site and from the AIG secretariat.

In this issue of AIG News we include an abstract from 2006 student bursary winner, Alex Farrar. Alex, who completed his honours project on "Illite Crystallinity and Evolution of the Western Lachlan Fold Belt" at Melbourne University last year, was awarded the 2006 Terra Search-AIG Bursary. Alex has since started work with Xstrata in Mt Isa.

Conference of the Australian Science Teachers Organisation

I'm pleased to report that there will be a significant geoscience presence at CONASTA, to be held in Perth in July. Greg McNamara (GSA Education Officer) will be running a GSA booth, and has organised six speakers on geoscience topics and three geoscience workshops. For further information on the geoscience content at the conference please contact Greg at geoservices@geoed.com.au. ▲▲

SMEDG-AIG Bursary Presentation - 2006

Sam Lees [AIG], Ed Saunders [Bursary Recipient] & Kim Stanton-Cook [SMEDG]

L to R: Joe Schifano, Kim Stanton-Cook, Charlie Seabrook, Ian Pringle, Rob Harley, Ed Saunders, Charmaine Thomas, David Clappison and Steve Collins

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Noticed in the Vol. 20,No 4 Journal of Scientific Exploration, Editorial:

THEORIES ARE EITHER DEDUCTIONS, or they are inductions. One cannot deduce without having an absolutely certain theoretical starting point, and humankind does not have that.

All scientific theories, therefore, are inductions from facts, inferences from observations. It should be obvious that no set of facts can be known to exclude the possibility that, at some future time, some new fact might become known that vitiates any given theory. The standard illustration for this is this. "all swans are white" was obviously true -- for Europeans, for a time, until they were disillusioned following the discovery of Western Australia with its black, red-beaked swans. Similarly, Newton and his contemporaries had no conceivable reason to anticipate that facts about very high speeds or very short distances would make Newtonian mechanics and gravity "no longer operative", to borrow a phrase from another sphere of human activity. History of science teaches that we should expect that, at some time, Einsteinian mechanics and gravity will become no longer operative.

Know Your Councillor: Graham Jeffress

DID YOU HEAR ABOUT the Scottish driller, the Irish drilling company and the Welsh project paid for by the Australian-American company? No, not the start of a joke, just the latest adventure in geology for AIG Councillor Graham Jeffress — turning a hard rock geo into someone who can make sensible comments about coal bed methane.

Graham grew up in deepest, darkest, suburban Sydney, where the only rocks were road metal from Prospect quarry (which Graham was later to learn was a picritic dolerite), the Wianamatta Shale having a very retiring & shy nature.

A chance encounter with some speccy rocks at a lapidary club display at a church fete, and love of bushwalking, led Graham to try his hand at engineering geology at UNSW. Whilst at uni, the gold boom happened and Graham was the only one of his final year of 13 studying hard rocks and sparkly minerals — the engineering option having evaporated along the way.

Companies were all over the unis touting for employees and Graham accepted an offer from CRA — liking the idea of going to PNG to look for gold. He ended up as far away from Sydney as you can get and still stay in Australia, in the Pilbara, but ironically looking for iron ore and then uranium rather than gold. Here he learnt useful things, like not to light fires in spinifex at the base of hills, that bulldozers have decelerators not accelerators and that you really can cook an egg on an outcrop of haematite.

Two years later Graham moved a bit closer to Sydney — Madang on the north coast of PNG. A few days after he arrived, CRA indulged in a little deep cultural immersion and accelerated Pidgin by dropping him into a camp in the mountains above Wau where he was the only 'masta' and nobody spoke English (in fact most couldn't even speak Pidgin); at least he had the HF radio — when it worked. PNG was a great experience, exploring all over the highlands including a quite few stints at Mt Kare during the height of the gold rush there. Graham remembers his first day at Mt Kare flying into the camp from Porgera over the muddy ant trail of people walking to Kare, the 10,000 odd people (some very odd indeed) digging into what looked like the battlefield of the Somme, to be greeted by a full on tribal battle that resulted in a dead body being deposited at the camp to be flown down to Porgera.

Following Madang, Graham moved to Townsville and built on his PNG experience chasing epithermal gold, porphyry copper and breccia gold from Alpha to Cape York with lots of trips back'o'Cairns, where Graham became an almost permanent resident of the Georgetown Hotel. Townsville also enabled Graham to continue his scuba diving — a prominent recreation activity whilst in Madang.

1990 beach on Karkar island

After nine years in grass-roots exploration, Graham moved to Mt Isa to get some advanced project experience working at Dugald River. Unfortunately this was mid-1990s, and Graham soon experienced the dark side of the mining industry — downturns in metal prices and cost cutting decisions made by remote corporate offices. Over the next six years Graham managed to accumulate four retrenchments from various companies that no longer exist — CRA, RGC, Aurora Gold and New Hampton; move to Perth; and be introduced to the pleasures of self-employment and short term contracts. Still, it enabled him to meet a lot of great people and add new pages to the resume covering Proterozoic base metals, Archaean gold and even mine geology.

Whilst in Perth, Graham got involved with the local AIG branch — a chance conversation with Jocelyn Thomson leading to Graham ending up organising a geochemistry conference. No long after that Leigh Bettenay applied rule number one of the AIG — "you can't quit till you replace yourself" — and Graham found himself Secretary of the Federal Council and a WA Councillor. Following Rick Rogerson's application of Rule No.1, Graham ended up as Federal Treasurer.

The dotcom bubble and downturn of the mining sector after 2000 left Graham with plenty of time to help out with the AIG until, returning to his roots, he joined Hamersley Iron for a stint babysitting a rig drilling iron ore.

A year's worth of BIF chips left Graham with an appetite for something different. So an offer to join a very small junior explorer focussing on South Australia and IOCG led Graham to his current role with Tasman Resources.

Tasman is very eclectic company with interests in gold-silver, base metals, nickel, diamonds uranium and possibly coal. In mid-2006 Tasman span out Eden Energy — a company with interests in hydrogen fuel technologies, natural gas, coal bed methane and geothermal energy. Graham now spends much of his time on the CBM and geothermal projects; though he still gets his hands dirty on the mineral projects.

Graham managed to acquire a lovely wife, Kara, in 1996, even though he was in Townsville and she was in Sydney. He immediately moved her to Mt Isa, Perth, Cue and then Perth again in quick succession. They now have a passionate five year old daughter and a five month old son. After 20 years of vertical blinds in rented houses Graham finally took the plunge and bought a 93-old house in North Perth and never wants to see another vertical blind again. ▲▲

RPGeo Approval and Applicants

CANDIDATES APPROVED BY AIG COUNCIL IN FOURTH QUARTER 2006

Mrs Katarina David of Toongabbie, NSW, in the field of Hydrogeology,

Mr Vladimir David of Toongabbie NSW, in the three fields of Mineral Exploration, Mining and Regional Geology.

Mr Graham Jeffress of North Perth, WA, in the field of Mineral Exploration.

Mr Bruce Hargreaves of Eight Mile Plains, Qld., in the field of Geotechnical and Engineering.

Mr Rowland Hill of Epsom, near Bendigo, Victoria, in the two fields of Mineral Exploration and Mining,

Mr Paul Quigley of Bendigo, Victoria, in the two fields of Mining and Mineral Exploration.

Mr Trevor Smith of Karana Downs, Queensland, in the additional field of Geotechnical and Engineering

NEW CANDIDATES PUBLISHED FOR PEER REVIEW BY THE MEMBERS OF THE AIG

Dr Dennis Arne of Bright, Victoria, in the field of Geochemistry

Mr Howard Golden of Mosman Park, WA, in the fields of Mineral Exploration, Geophysics and Regional Geology

Ms Deborah Green of Armadale North, Victoria in the field of Hydrogeology

Mr Richard Philpott of Greenslopes, Qld. in the field of Geotechnical and Engineering

Membership Update

New Members and Upgrades at the January Council Meeting 2007

FELLOWS

JOHNSON	Geoffrey	Ian

MEMBERS

BASCOMBE	Lisa	
BROOKER	Murray	Ronald
CUNNINGHAM	Alison	
EDWARDS	Robert	Graham
FORD	Penelope	Catherine
FRIKKEN	Peter	Harmen
GODFREY	Matthew	Stephen
GORDON	Ricky	James
GRIFFIN	Kerry	Francis
HEYWOOD	Rosemary	
HOGG	James	Nicholas
JACKSON	Peter	Gilbert
JONES	Sarah	Anne
LLORCA	James	P
LOTFOLAH HAMEDANI		Mohammad
MACRAE	Gregory	Paul
MARSHALL	Luke	Anthony
McKNIGHT	Stafford	William
PAINTER	Matthew	Graham
REID	Ronald	John
SAWYER	Llyle	Mark
SHUGG	Kevin	Graham
SILVIO	Nathaniel	
URBANIAK	Suzy	
VAN DER WESTHUIZEN		Carel
VARKEY	Mohan	
WALDING	Daniel	
WILSON	David	
WILLSON	Marcus	
WITHAM	William	John
WONG	Hee	Henn

GRADUATE MEMBERS

GRANT	Matthew	Lloyd
RUSSELL	Johnathan	Ross

We welcome new members to the AIG.

AIG FEDERAL COUNCIL FOR 2006 – 2007

AIG NEWS

CONTRIBUTION DEADLINES

AIG News is published quarterly, in February, May, August and November.All items for inclusion in the newsletter for a particular issue should reach the Editor by the end of the preceding month. Avoid disappointment by contacting the Editor at least several days beforehand to advise submission of items for the newsletter.

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