History of Meteorology and Physical Oceanography Special Interest Group

Newsletter 3, 2008

SILVER JUBILEE ISSUE

It is 25 years since the History Group was formed. During this time, the Group has had four Chairmen. The picture shows three of them:

Malcolm Walker, 1989-99 and since 2007

Mick Wood (left), 1999-2005

Howard Oliver (right), 2005-07

The picture was taken at the Group's meeting in Southampton on 28 June 2008 and shows Malcolm cutting one of the Group's two birthday cakes (one iced with balloons, both delicious!). A report of the meeting appears in this Newsletter.

We begin, though, with some highlights of the Group's first quarter century …

The story actually begins on 19 February 1975, when the Council of the Royal Meteorological Society discussed a proposal put forward by Professor P.A.Sheppard that Specialist Working Groups of the Society be set up. To quote the minutes of the meeting, Council decided:

That the Society should set up its own Specialist Working Group(s) which would meet under the auspices of the Society but any opinions expressed by that Group would be those of the Group alone and not necessarily those of the Society as a whole. For the first 'experimental' Working Group it was decided that Dr.B.J.Hoskins of Reading University and Mr.A.Gilchrist of the Meteorological Office should be invited to set up a Specialist Working Group on Numerical Modelling.

The Group was duly set up and called the Specialist Group on Dynamical Problems. Aksel Wiin-Nielsen chaired it, and the other members of its steering committee were Andrew Gilchrist, Brian Hoskins and Peter White. Two more Specialist Groups were set up in 1976: one concerned with Surface-Based Remote Sensing Techniques, the other with Air-Sea Interaction. The former was chaired by David Axford, the latter by Peter Taylor.

The idea of a Specialist Group concerned with the history of meteorology was approved in principle by the Society's Council on 20 October 1982. The idea had been put forward by Professor Philip Drazin of Bristol University's School of Mathematics, and we read in the minutes of the Council meeting that:

The President [Henry Charnock] offered to approach the Challenger Society with a suggestion for a combined group on the History of Marine and Atmospheric aspects of Meteorology. The President agreed to write to Professor Drazin making this suggestion and giving Council's support for the formation of a Specialist Group in some form or another if Professor Drazin could find a Secretary and Chairman to run it. Suggestions of Miss [Jill] Austin (Secretary) and Dr.D.H.McIntosh (Chairman) were made.

The minutes continued as follows:

Some concern was expressed about the effect on Society membership of the increasing number of Specialist Groups. It was thought by some Members [of Council] that scientists may obtain all they want from these Groups without joining the Society. It was agreed that this was a

subject which should be discussed by the Development Committee. It was noted that this Committee as constituted at present consisted only of the Officers of the Society. It was agreed that there was a need to broaden its membership and the President would consider what action should be taken to achieve this.

In order to help the Development Committee in its discussions, the Executive Secretary should obtain from all Specialist Groups an estimate of the proportion of their Members who are also Members of the Royal Meteorological Society.

These estimates showed that no action needed to be taken *pro tempore*, as the minutes of the Council meeting on 15 December 1982 show. In the words of these minutes:

A paper presented showed that the percentage of those attending Specialist Group meetings who were Members of the Society varied from 35% to 81%. It appeared that on the average these figures did not differ much from similar ones for the Society's Wednesday meetings. It was agreed that attendances by Members and guests at all meetings should be reviewed regularly.

Further progress towards the formation of a History Group was made at the Council meeting on 15 December 1982, when it was resolved that:

Mr [Robert] Ratcliffe should be asked to form a Steering Group and appoint a Secretary to plan a first meeting at which a permanent Chairman would be appointed.

The first meeting of the Steering Group (hereinafter called Steering Committee) was held on 28 January 1983, and the History Group's Terms of Reference were approved by Council on 16 February 1983.

In fact, a discussion meeting to gauge interest in the formation of a History Group had been held in the Met Office at Bracknell in October 1982, on "The History of Meteorology". This meeting, to quote the minutes of the Steering Committee's meeting on 28 January, had "aroused great interest". However, there had not been enough time for the meeting "to appoint a committee to run the affairs of the new specialist group", so "the President of the Society had asked Mr Ratcliffe to form an *ad hoc* committee to arrange future activities". This committee agreed to submit a formal proposal to Council, which it duly did, in time for it to be discussed at the Council's meeting on 15 December.

At the meeting of the Steering Committee held on 28 January 1983, the following agreed to serve as Officers of the History Group:

- Chairman: Mr Robert Ratcliffe (formerly Met Office and then, from 1977-82, Executive Secretary of the Royal Meteorological Society)
- Secretary: Dr Jill Austin (Science Museum)
- Treasurer: Mr (later Dr) Jim Burton (Met Office)

In addition, the following agreed to serve as Ordinary Members of the Committee:

- Professor Philip Drazin (Bristol University)
- Professor Eric Forbes (Edinburgh University)
- Mrs Margaret Seward, née Deacon (Southampton University)
- Mr Malcolm Walker (The University of Wales Institute of Science and Technology, Cardiff)

Anita McConnell joined the Committee in September 1983, and the Committee was further enlarged at the Group's first Annual General Meeting, on 28 April 1984, when Eric Harris and Dick Ogden were elected members. Sadly, Professor Forbes died suddenly in November 1984.

Robert Ratcliffe (1917-94)
Chairman of the History Group 1983-89

From the outset, the intention of the Committee was that the Group would hold at least two meetings per year and undertake projects concerned with the history and development of meteorology and physical oceanography. Such projects were seen as including:

- the interviewing of eminent present-day meteorologists and oceanographers so that their achievements and life stories would be archived for posterity;
- the production of a complete archival record of British meteorologists from the earliest times;
- the cataloguing of Royal Meteorological Society archive material.

It was hoped that History Group members would be able to obtain small grants from the Society's Legacies Fund to undertake well-defined projects of this kind.

The Group was initially called the "Specialist Group on the History of Meteorology and Oceanography". However, "Oceanography" was changed to "Physical Oceanography" in 1985; and all of the Society's Specialist Groups became Special Interest Groups in 2003.

The History Group's first meeting was held on 21 May 1983 in the Science Museum, London, on "Great Meteorologists", and the second on 26 November 1983 in the National Maritime Museum, Greenwich, on "Early observations and problems in ocean navigation".

By the end of 1983, there were 50 members of the Group, including several foreign members, and Jill Austin was able to report in a circular to members that the Group had been "working actively on the Society's archives and advising Council on a future policy for archives". Moreover, the first tape-recorded interviews of distinguished meteorologists had taken place and transcripts produced.

The interview programme has continued and the number of interviews carried out by or for the Group has now reached 27. Tapes and transcripts are held by the National Meteorological Library and Archive at Exeter, and the recordings have recently been digitised.

The idea of extending the Archive Interview Programme to include people who have been active at a working level rather than the higher echelons of meteorological or oceanographic research and administration was considered by the Committee in 1989 but rejected. Rather, it was felt, such people should be encouraged to publish their recollections in publications such as *Weather*, *Meteorological Magazine* and *The Marine Observer*. The recorded interviews, the Committee agreed, should be restricted to people who were deemed eminent by virtue of their personal achievements.

Pen portraits of Presidents of the Royal Meteorological Society have been published in *Weather* since 1992, another idea stemming from, and co-ordinated by, the History Group. Over the years, pen portraits of almost all of the Presidents who are deceased have been published, and the few remaining pen portraits have been commissioned. A fascinating aspect of the Presidents is that many of them keenly pursued hobbies, pastimes or other interests outside meteorology or oceanography (though many were all too single-minded!).

The Group's Committee also put forward to the Editorial Board of *Weather* in the early 1990s the idea of publishing profiles of meteorologists and oceanographers who had never reached the heights of FRS or Royal Meteorological Society President but had nevertheless pursued interesting careers. About two dozen of these have now been published.

An early achievement of the History Group was the acquisition of financial support from the Manpower Services Commission (MSC) for a project which produced full bibliographies and biographies of British people who were notable in meteorology up to and including 1920. The work was carried out in 1985-86, most ably directed by Robert Ratcliffe and Eric Harris, and the credit for the idea of the project is due to Professor Forbes, who pointed out at the very first meeting of the Steering Committee on 28 January 1983 the possibility of MSC support for History Group projects. The products of the MSC project were:

- A set of sixteen large loose-leaf volumes containing detailed listings of all books and articles identified as being written by British meteorologists up to the year 1920;
- A further volume of some 300 pages which contains references to all authors with fifteen or more entries to their names in the main catalogue, together with brief biographies where none was published at the time.

The volumes are in the National Meteorological Library. Microfiche copies of the key volume were sold by the Society for some years.

Another suggestion made at the first meeting of the Committee also bore fruit. Professor Drazin suggested, to quote the minutes, that "'Collected Papers of L.F.Richardson' could possibly be published by Cambridge University Press" (CUP). Oliver Ashford took on the task and the papers were published by CUP in 1993. A further suggestion made by Professor Drazin at that first meeting has not, alas, been followed up. He suggested that a history of the Royal Meteorological Society was needed.

Whilst on the theme of publications, we may note that six monographs have been published by the History Group in a series called *Occasional Papers on Meteorological History*. All are available in paper form and online (see http://www.rmets.org/about/history/index.php) and more are planned.

Over the years, there have been many History Group meetings, all of them full of interest and all successful; and more than a few have borne fruit in the form of talks written up as articles published in *Weather*. Moreover, several of the Group's meetings have been adopted as "main" Society Wednesday or Saturday Meetings. Quite a number of the Group's meetings have been held outside London, among them summer outings to places of historical meteorological or oceanographic interest.

In addition, proceedings of conferences organized by the Group have been published, notably the papers presented at the conferences on "Meteorology and World War II" held in Birmingham in 1986 and 1988 and the conferences on observatories and observations held in Durham in 1991 and 1994. Copies of these proceedings can still be obtained from the Royal Meteorological Society.

One of the greatest success stories of the History Group has been the recovery of the Royal Meteorological Society's archive material which had been sold in 1974 to the Harry Ransom Humanities Research Center of the University of Texas at Austin, USA. This is not the place to tell the unfortunate story of how the material came to be lost in 1971, when the Society moved from South Kensington to Bracknell, or the happier story of how it was recovered. Suffice to say that the material was purchased by the Society from the Research Center in 1993 and is now cared for by the National Meteorological Archive in Exeter. It includes all of the Society's Council and Committee minutes from 1850 to about 1960, so if anyone is thinking of writing the history of the Society there is plenty of source material available. It also includes copies of incoming and outgoing correspondence back to the 1820s, when the first Meteorological Society of London was founded. Much of this is very valuable not just for the light it sheds on meteorological developments behind the scenes but also for correcting what is recorded in Annual Reports of the Society!!

Sadly, a very keen and generous supporter of the Group, Professor Jehuda Neumann, died in 1993; and in his memory, the Group's Jehuda Neumann Memorial Prize was instituted. It is awarded biennially and was first awarded in 1995, to Professor Robert Marc Friedman for his book *Appropriating the weather: Vilhelm Bjerknes and the construction of a modern meteorology* (Cornell University Press, 1989). The Prize is given to the person whom the Committee of the History Group considers to have made the most outstanding contribution to the study of meteorology or physical oceanography during the preceding five years. It is a prestigious prize and is presented at the Royal Meteorological Society's awards ceremony jointly by the Society's President and the History Group's Chairman.

A full account of the History Group's activities would occupy many pages. The foregoing is no more than a summary, but I hope it has served to provide a flavour of what the Group has achieved in its first quarter century. The Group is in good shape, with 75 members, and looks set for another 25 years of success.

Malcolm Walker

MEETING REPORT
by Howard Oliver
Photographs by Diane Walker

COMBINED HISTORY GROUP AND ROYAL METEOROLOGICAL SOCIETY NATIONAL SATURDAY MEETING

28 June 2008

Advances in Southern Ocean meteorology and physical oceanography: the exciting work of the 1920s and 1930s and why it is still important today

This meeting, which marked the 25th anniversary of the formation of the History Group, was held at the impressive location of the National Oceanography Centre, Southampton. It concentrated on work during the 1920s and 1930s and was introduced and chaired by Society vice-president Professor Alan O'Neil. Fittingly, the first paper was given by Malcolm Walker, founder member and past and present Chairman of the group. Historical publications, memorabilia and other items relating to the topic were also displayed for those attending to examine during the lunch and afternoon tea breaks. Malcolm and the previous two chairmen carried out a 25th anniversary cake-cutting ceremony during the lunch break (see page 1 of this Newsletter) and the cakes were then consumed by the 30 who attended the meeting.

Malcolm Walker presented an introduction and overview called *An unfolding story of discovery in the 1920s and 1930s*, his use of the word "discovery" being a reference not only to the increases in knowledge and understanding which occurred during the period in question but also to the research vessels called *Discovery*.

After a summary of the geography of the Antarctic area and a history of early exploration, he summarised key meteorological progress made during the fifteen over-wintering expeditions in the period 1898 to 1918. The first permanent meteorological station was set up on Laurie Island in the South Orkneys in 1903. Low-level inversions were first noted in 1911. By 1914 tentative south polar circulation barometric pressure plots had been produced, and the first attempts at synoptic weather-map analysis had been made by 1920. The first flight in the Antarctic was made in 1928 and the first transpolar flight in 1935. Radiosondes were first used in the Antarctic in 1940.

In the latter stages of his talk, Malcolm focused on Admiral Byrd's expeditions to the Ross Ice Shelf between 1928 and 1941 and the *Discovery* investigations of the 1920s and 1930s, highlighting the pivotal work of George Deacon which had led to his key publications on the hydrology of the Southern Ocean. Malcolm stressed that many of the efforts of Deacon and others were important in the development of current models of the whole ocean-atmosphere system, in particular a global-scale oceanic thermohaline circulation known as "the global oceanic conveyor belt".

Dr Stephen Palmer (Rector of the Falkland Islands 1991–96) gave a both informative and moving talk on the science and exploitation of some of the natural resources of the Falklands and South Georgia.

He outlined the history of discovery, occupation and plunder of the islands and the surrounding seas from the time of the first whalers to 1982. Indigenous wildlife, both plant and animal, had been made extinct or decimated by the introduction of introduced species such as rats and cats and the erosion caused by vast numbers of sheep and pigs. There had been a tally of over 20 million seals, 1.7 million penguins and at least the same number of whales. Anything up to 800 ktons of fish were being taken per year although this is now reduced to 300 ktons. Controls are far better than in the past but the islands are still in a precarious state and threatened by future oil exploration. As appropriate for a parson, he ended with a biblical quotation (Ezekiel 34, 18):

Are you not satisfied with grazing on the best pastures, that you must also trample down the rest with your feet? Or with drinking clear water, that you must also muddy the rest with your feet?

Left: *Bell from the Royal Research Ship* William Scoresby*, outside the lecture theatre in the National Oceanography Centre, Southampton. It is sounded when lectures are about to begin.*

Below: Discovery *and* Discovery II *logbooks and other memorabilia on display outside the National Oceanography Centre's Library.*

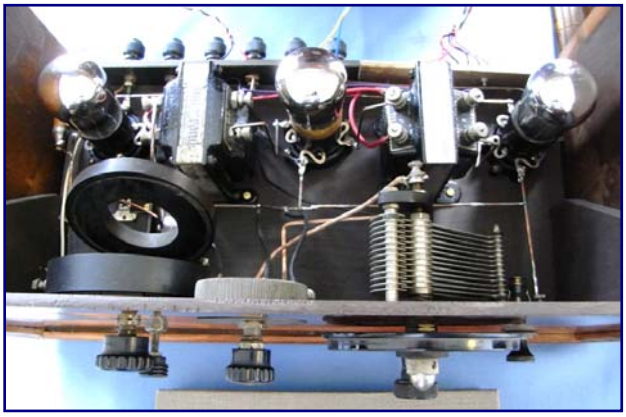
The local organizer of the meeting, **Professor Gwyn Griffiths (National Oceanography Centre, Southampton)**, outlined the development of wireless communications for science down South from 1911 to 1939 and its contribution to navigation, data transmission, co-operative working and rescue. He also provided a fascinating display of contemporary radio systems.

Radios were first used by both Sir Douglas Mawson and whalers in 1911. By 1913 meteorological data transmissions and communication from Antarctica were established. In 1921-22, the Shackleton-Rowett expedition received time signals from 9000 miles away. In 1926, *Discovery* used a 1.2 kW transmitter which could broadcast over 1000 miles using the "continuous wave" system. By 1929, international agreements for

meteorological observations at sea were completed. The radio station at Cape Town was established to deal with the rather limited number of ships and land-based sites in the Southern Ocean, but the dawn of regular international weather reports had begun.

Above: *Wireless apparatus displayed by Professor Griffiths.*

Below: *The circuitry of the Cromwell III three-valve receiver on the left of the above picture.*

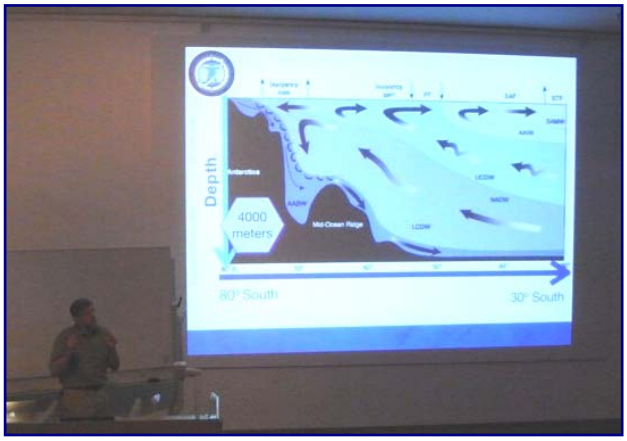


After the lunch break, **Dr Tom Lachlan-Cope (British Antarctic Survey)** described the Antarctic meteorological stations and their available datasets.

The key long-record sites were Orcadas, established by Bruce on Laurie Island in the South Orkneys in 1904 and run by Argentina since 1905, and the South Georgia station operated from the same date but with a gap from 1985–2000. Data had been collected for shorter periods at a series of other locations by expeditions or at relatively short-term sites. The long runs of data show a variable amount of warming over the 20th century as the trends are very location dependent. It was felt that isolated short periods of data for single areas are of little use for future climate studies but all had helped towards the development and expansion of polar science.

Dr David Carlson (Director of the 2007–08 International Polar Year International Programme Office) outlined the research programmes of the current IPY.

He briefly described the "Plates and Gates" project on the history of polar areas over geological timescales and then went on to discuss modern research. The IPY programme was vast, so just a few example studies were described. Ships were used for a range of ocean, climate and ecosystem research. Float tracking under the ice and ocean drifters were being used to investigate shelf-slope and ice edge processes. There was a census of Antarctic marine life, and seals were being used to carry sensors as they dived to up to 1 km. Full details of all the projects can be obtained via **http://www.ipy.org/.**



Dr Carlson explaining the circulation of the South Atlantic Ocean.

After the tea break and a final look at the displays, **Dr Dennis Wheeler (University of Sunderland)** described ships' logbooks of the pre-instrumental period and explained what they can tell us about past climates.

By the time of Beaufort, there were a thousand vessels with logbooks recording hourly information, those of the Royal Navy all including wind force and direction and current weather. They were kept for navigation purposes to enable the correct course to be computed taking account of the effects of wind and current. He showed examples of the reports and explained that from 1600 to 1945 there were of the order of 22 million days of data. Procedures for data harmonisation and integration were being developed and used in the "CLIWOC" programme (Climatological Database for the World's Oceans). In addition, logbooks were also maintained by the East India Company from 1603–1838, some including

temperature and atmospheric pressure. An extensive data base will be prepared following completion of the digitisation by NOAA. Details of the "RECLAIM" project can be found on **http://icoads.noaa.gov/reclaim/index.html.**

Dr Rob Allan (Met Office Hadley Centre) then described the recovery and digitisation of Antarctic and higher latitude southern hemisphere meteorological observations from historical observations which were being carried out under the auspices of the "ACRE" initiative (Atmospheric Circulation Reconstructions over the Earth).

The aim was to incorporate temperature and pressure information to produce 3D world weather data for the 19th and 20th century and also for the North Atlantic from 1750–1800. Global surface observational coverage currently ranged from 30% to 80% from 1850 to 2000. A major funding initiative was enabling new records of many types to be digitised, including late 19th and early 20th century Antarctic published books and logbooks. A large number of ships' and base-station records are currently being processed, including those from the 1910–13 *Terra Nova* Ross Sea expedition. Details of the ACRE programme can be found on **http://brohan.org/hadobs/acre/acre.html.**

More Discovery *memorabilia on display outside the National Oceanography Centre's Library.*

Queries and suggestions for locations of further meteorological datasets can be sent directly to **rob.allen@metoffice.gov.uk/.**

Dr Holly Titchner (Met Office Hadley Centre) presented the final paper, co-authored with Dr Nick Rayner, covering sources of Antarctic sea-ice observations over the twentieth century and their use to help to understand and monitor climate change.

She described the "HadISST1" scheme, producing monthly complete global sea-surface temperatures and ice coverage on a one degree grid, and showed examples of sea-ice extent plots obtained. The new "HadISST2" scheme will cover the period from 1850 to the present and incorporates any available information using such sources as BAS maps, base charts, historical atlases and student sea-ice extent research data. More suggestions for sources of sea-ice information for the Antarctic prior to 1979 are still required. One suggestion was the use of whaler positions to indicate the maximum extent of continuous sea ice.

The overall conclusion of the meeting was that the much appreciated efforts of the presenters and organisers had resulted in an excellent day. Many useful aspects of Antarctic and related studies had been discussed but there was obviously a lot of work still to do before the Antarctic processes and their role in past, current and future climate can be properly understood.

CONGRATULATIONS …

… to Professor Julia Slingo of the University of Reading, who has secured a place in history as the first woman elected President of the Royal Meteorological Society. Not only that, she has been appointed Chief Scientist of the Met Office, another first, for no woman has hitherto held that post. She will serve as President for two years from 1 October 2008 and take up her post in the Met Office the same day.

MEETING REPORT
by Anita McConnell

ICHO VIII – THE HISTORY OF OCEANOGRAPHY IN THE MEDITERRANEAN

ICHO VIII, the Eighth International Congress on the History of Oceanography, was held at the Stazione Zoologica Anton Dohrn in Naples, from 26 to 29 June. During these days, Naples was enduring a heat-wave. Temperatures of 32°C and 90+% relative humidity meant that Vesuvius was barely visible, its cone dimly emerging above the atmospheric pollution. This famous institution, built in 1873/4, occupies a prime seafront location in what was then the royal park. Its founder was the wealthy Prussian Anton Dohrn (1840–1909), whose ambition was to establish a research institute where marine biologists from any nation could rent a 'table', which brought with it facilities for collecting specimens from the Gulf of Naples, the use of a fully-equipped and staffed laboratory, and an aquarium which is now the oldest 19th century aquarium still functioning, as well as the only one dedicated exclusively to Mediterranean fauna. As a privately-owned yet international institution, offering facilities for advanced research, the Stazione Zoologica was a great success, attracting scientists from many countries. It was handed over to Italian administration in 1916.

The nationalities of the speakers reflected the numerous states bordering on the Mediteranean. Spain, France, Italy, Greece, Romania, Croatia and Egypt were all represented. Russian delegates reported on earlier Russian biologists working at Naples and Villefranche, and we had other papers on the Baltic, Black and Red Seas. I can mention here only a few choice plums pulled from a varied and tasty pudding.

Two excellent papers dealt with recently acquired archives. Maria Gambi described the card database assembled by Professor Moncharmont (1913–2000) which documented and illustrated 4695 local species, some collected over a century ago and thus casting light on environmental and climatic changes. Deborah Day delivered a fascinating account of the American biologist Charles Kofoid's tour round 73 European marine biological stations, from UK and Scandinavia to Naples, in 1908/9. His copious notes, travel documents, and his collection of 253 photographs were recently acquired by Scripps Institution of Oceanography in California. Your reporter is now determined to read Kofoid's published account of this remarkable journey (just think of the different currencies and the languages he had to deal with at each frontier).

Three papers on the origins of oceanography in Spain, and one on the development of oceanography as a profession in post-war Greece, demonstrated the problems of continuing maritime research during times of war and political disinterest. Further east, a most informative paper by Mira Zore-Armanda covered the hydrography and oceanography undertaken by the Austro-Hungarian Navy between 1850 and 1918 from its base at Pola in Croatia. The results and the apparatus employed were published regularly. And despite the frequent political changes in this region, the good news is that the archives remain at Pola. The congress and its various refreshments proceeded smoothly and enjoyably under the capable organisation of Christiane Groeben, archivist at the Stazione, and her staff. It is hoped to publish the conference papers, together with other submitted texts whose authors were unable to attend.

THE MILLENNIUM PROJECT

History Group member Dennis Wheeler (University of Sunderland) is currently taking part in the Millennium Project.

This project is funded by the European Union (Framework 7 round of funding) who have supported it with over 12,000,000 euros, making it one of the most ambitious climate change projects currently operating.

The principal objective of the project is to produce a 1000-year climate record for Europe with emphasis being given to both precipitation and temperature. To achieve this, the project is calling upon expertise in four specific areas on which the constituent sub-groups are based. These include dendrochronology, marine sediments, terrestrial sediments (including ice) and documentary and instrumental sources.

Dennis Wheeler is co-leading the last of these groups, contributing through his expertise with logbook data and his work with the long-term climate record for Gibraltar.

The project is led by the Geography Department of Swansea University, and the website can be found at **http://geography.swansea.ac.uk/millennium/**

Work began in 2006 and is due for completion in 2010 when the full data, based on instrumental and multi-proxy calibrations will be available. Meanwhile, the documentary group are preparing a series of papers based on their researches that will form a special themed edition of the journal *Climatic Change*, and is expected to be published in mid-2009.

NAMED AFTER …

- James Glaisher's son was called James Whitbread Lee Glaisher, after two of the ten gentlemen who founded the British (later Royal) Meteorological Society, namely Samuel Charles Whitbread and Dr John Lee. However, Lee Glaisher, as he was known, was born in 1848, two years before the Society was founded, so it is clear that Glaisher senior was close to Samuel Whitbread and Dr Lee well before 1850.

  Whitbread and Lee were both members of the network of weather observers established by Glaisher in the 1840s. The meeting at which the Society was founded, on 3 April 1850, was held at Dr Lee's home, Hartwell House, near Aylesbury, and at that meeting Whitbread was elected President, Glaisher Secretary and Lee Treasurer.

  Like his father, Lee Glaisher (1848-1928) became a Fellow of the Royal Society. He was a very distinguished mathematician and contributed particularly to number theory. Like his father, he was a Fellow of the Royal Astronomical Society, but he never joined the British (later Royal) Meteorological Society.

- Mathematician and meteorologist Francis John Welsh Whipple (1876-1943) was named after a Superintendent of Kew Observatory, John Welsh (1824-59), who held that post from 1852 until his death in 1859. Welsh was Godfather of Whipple's father, another Superintendent of Kew Observatory, George Mathews Whipple (1842-93), who was Superintendent from 1876 to 1893. He joined the staff of the Observatory as a boy of 15 and never worked anywhere else.

  G.M.Whipple married, in 1870, Elizabeth Martha Beckley, daughter of Robert Beckley, who was Kew Observatory's Mechanician from 1854 to 1872 and became well-known as an inventor and improver of meteorological instruments. F.J.W.Whipple also became Kew's Superintendent, from 1925-39.

  Quite a Kew connection!

BALLOONING CAN BE BAD FOR YOU
by Malcolm Walker

Welsh and Glaisher both made meteorological balloon ascents. Welsh made all four of his in 1852, and on one of them reached a height of 22,930 feet (very nearly 7,000 metres).

Famously, Glaisher and Coxwell established a new world record for altitude on 5 September 1862, but neither of them could say what height was reached. During the ascent, Glaisher passed out at 29,000 feet. However, he was able to resume observations during the descent and believed, from his calculations based on temperatures, pressures and rates of ascent and descent, that the balloon must have reached 36,000 or even 37,000 feet. The story of this ascent is well known and will not be repeated here. It can be found, for example, in Glaisher's book *Travels in the Air*, published in 1871 by Richard Bentley.

As meteorologists, we have all heard of James Glaisher, but who was Henry Coxwell?

Glaisher and Coxwell

He was Henry Tracey Coxwell (1819-1900), an English aeronaut, who was, in fact, educated for the Army but instead became a dentist. As a boy, he was interested in ballooning but did not make an ascent until 1844. He became a professional aeronaut in 1848 and made numerous public ascents, many of them on the Continent. By 1862, he had made more than 400 ascents, and he went on to become the first person to make 1,000. He made more than 1,100 in his career, the last of them in 1885. He had a balloon factory in Seaford, Sussex, and there is a memorial to him in St Peter's Church,

East Blatchington, East Sussex. To find out more about Coxwell, see his book *My Life and Balloon Experiences*, published in 1889.

The story of the ascent by Glaisher and Coxwell on 5 September 1862 has recently attracted some interest in the medical world.

In Volume 60 of the journal *Neurology*, for example, 2003, pp.1016-1018, Michael J.Doherty has published a paper called "James Glaisher's 1862 account of balloon sickness". His Abstract reads as follows:

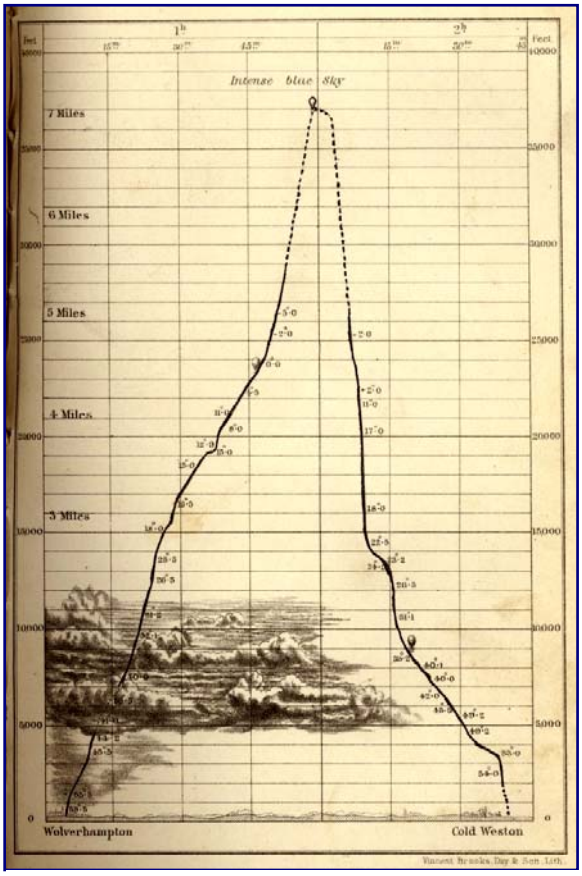
In 1862, James Glaisher and Henry Coxwell ascended to 29,000 feet in an open hot-air balloon. During the ascent, Glaisher described marked neurologic compromises: appendicular and later truncal paralysis, blindness, initially preserved cognition, and subsequent loss of consciousness. The author examines Glaisher's account of balloon sickness by comparing it with other balloonists' observations and discussing it in the context of altitude sickness, decompression injury, and hypoxemia.

In a paper by John B.West published in Volume 5 of the journal *High Altitude Medicine & Biology*, however, 2004, pp.453-456, some of Doherty's findings have been disputed. In the words of West's Abstract:

Glaisher reported paralysis of his arms and legs and sudden loss of sight. Coxwell also lost the use of his hands and could only open the valve of the balloon to initiate its descent by seizing the cord with his teeth. These symptoms are unusual for acute hypoxia, and in a recent article Michael J.Doherty suggested that they may have been caused by decompression sickness. However, this seems unlikely based on many reported cases of sub-atmospheric decompression sickness.

Medical interest in the ascent made by Glaisher and Coxwell on 5 September 1862 (and, indeed, other ascents made by Glaisher) is nothing new. On 13 December 1862, for example, there appeared in the *British Medical Journal* (pp.625-626) an article entitled "Mr.Glaisher's balloon ascents", in which he published "an account of the effects observed on the pulse and respiration in his balloon ascents". From this, we learn that one of Glaisher's companions for an ascent made on 21 August 1862 was his thirteen-year-old son Lee, whose pulse was found to be 89 at 11,000 feet (while Glaisher senior's was 88).

Glaisher was quite matter-of-fact about his experiences and always showed the precision of reporting expected of a scientist. His experiences on 5 September 1862 did not deter him in any way, for he made many more balloon ascents in the period 1862 to 1866. Thanks to the clarity of his accounts of ascents, not only meteorologists but also medical specialists have reason to thank him for his exploits.



The path of Glaisher and Coxwell's balloon ascent and descent on 5 September 1862, with temperatures plotted against height.

COMMENT
by Julian Mayes

The Roehampton tornado of 15 October

I was interested to read in Newsletter 2, 2008 Alan Heasman's account of the publication describing this probable tornado of 15 October 1780 and especially that he thought that it merited a mention in *Weather*. In fact, it was mentioned in a letter written by Eric Harris in the July 1988 issue (**43**, 272-73) and this included one of the illustrations from the original article showing quite dramatic damage on Roehampton Lane.

This made quite an impression on me at the time (summer 1988, not 1780…) as I was just about to take up a post of lecturer in climatology and meteorology at Roehampton Institute London (now Roehampton University). The

main campus is on the part of Roehampton Lane where the damage took place. As you can well imagine, I used this as a case study quite frequently in lectures whenever I mentioned 'the other' storm of 15/16 October 1987.

As regards the suggestion of a more comprehensive discussion of the 1780 tornado in *Weather*, I am sure that the editor would look kindly upon any submission!

FURTHER NOTABLE STORMS ON 15 OCTOBER

by John Kington, Visiting Fellow, Climatic Research Unit, University of East Anglia
www.cru.uea.ac.uk/cru/people/kington

Besides the three storms that occurred on 15 October in 1780, 1886 and 1987 reviewed by Alan Heasman in Newsletter 2, 2008, details of five further storms that struck the British Isles on or around this date are given below.

15 October 1570

A depression inferred in the North Sea, apparently severe probably north-westerly gales, together with a high tide intensified by heavy rain, combined to produce a storm surge that caused severe sea flooding in eastern England, no extant reports of people being drowned but 20,000 sheep and cattle perished in the area, the flooding extended from the Humber to the Straits of Dover and affected the Thames estuary up-river as far as Erith, five miles east of Woolwich.

15 October 1571

Severe to storm-force gales again affected eastern England, severe sea flooding in Lincolnshire and the Fens, many shipwrecks, houses destroyed, cattle drowned.

16 October 1779

Strong winds and heavy rain affected southern England.

15 October 1780

A depression (ex-tropical hurricane), severe gales (inferred), England, much damage in many areas, including the Channel coasts, Lancashire and London, an associated tornado affected south-western districts of the capital.

13-14 October 1829

A depression over the North Sea moved slowly south, severe gales over north-east England during the night of the 13-14th, heavy continuous rain, Tyne and Tees greatly swollen following morning, nearby low-lying ground inundated, flood waters penetrated cellars of Newcastle Quay-Side and Close, severe north-easterly gales over north-east Scotland on the 14th, many shipwrecks.

13-15 October 1881

A deep depression (ca 960 mb) moved north-east across northern Ireland and southern Scotland into the North Sea, storm-force east to north-easterly gales over eastern Scotland ahead of the low, followed by widespread severe westerly gales, eight people killed in London, over 100 shipwrecks, great loss of life at sea, including 129 drowned in the Eyemouth, Berwickshire fishing fleet disaster, much damage also on land, especially in southern Scotland and northern England, great destruction of trees in Scotland and hundreds blown down in England.

14-16 October 1886

A small but intense depression (969 mb) moved south-east across Ireland, Wales and England, severe westerly gales, heavy rain, severe river flooding, bridges swept away, widespread damage, electric railway swept away at Brighton, many trees blown down in Ireland, and southern and central England, great loss of life at sea especially off the coasts of south-west England and South Wales.

15 October 1987

An already well-documented storm.

REFERENCE

Kington, J.A. New Naturalist *British Climate and Weather*, HarperCollins, London (in press)

ROTHAMSTED REPRISED…

by Alan Heasman

On 14 July 1948, coaches left the Society's HQ in Cromwell Road, London, to take the majority of more than 80 Fellows and their friends, led by the then President Dr. (later Professor) Gordon Dobson, on the Society's 'Summer Outing' to Rothamsted Experimental Station, Harpenden, Herts. According to the account of the visit in *Weather*, **3** (8), August 1948, pp.250-252, "an exceedingly interesting and instructive day was spent" and ended with a welcome tea. Weather observations were started at Rothamsted Manor as long ago as 1684 by Sir John Wittewronge. More intensive agricultural research began in

the early 19th century by John Bennet Lawes and this has continued at the same site ever since. The Society has made several visits to Rothamsted over the years and in June 2009 there will be another chance to have a 'grand day out' when the Society has another Summer Visit, organized by the History Group. It is hoped to have several speakers with a background in agricultural meteorology and representatives from the current Rothamsted staff.

If any readers have any experience in this field (pun intended) and would be willing to participate, I would be pleased to hear from them. More details will be issued in due course but in the meanwhile please make a note in your 2009 diary for Saturday 6 June.

Alan Heasman
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or alanj_heasman@btinternet.com

FORTHCOMING MEETING

The History Group's next meeting is a Royal Meteorological Society National Meeting organized by the Group. Its title is: ***See-saws, oscillations and seasonal foreshadowing: the pioneering work of Sir Gilbert Walker and modern understanding of climatic variability***

The meeting takes place at **Reading University** on **Wednesday 19 November 2008** and there is no charge for attending. It takes place in the Madjeski Lecture Theatre (Agriculture Building), near the University's Earley Gate. For details of how to find the lecture theatre, see: **http://www.reading.ac.uk/about/find/about-findmap.asp**

The meeting programme is as follows:

14:00 – INTRODUCTION
Professor Julia Slingo (President of the Royal Meteorological Society)

14:10 – ROB ALLAN (Hadley Centre, Met Office, Exeter)
The classic papers of Walker and Bliss
This presentation follows the nature and scientific impact of the classical papers on the Southern Oscillation phenomenon, named by Sir Gilbert Walker and developed in a series of papers both by him alone and in conjunction with Ernest Bliss. These works are put into perspective following a brief overview of the scientific knowledge prior to Walker and Bliss's activities.

14:40 – MALCOLM WALKER (Chairman, Royal Meteorological Society's History Group)
Unravelling tropical circulations
This presentation reviews endeavours to understand the meteorology of the tropics and subtropics from Walker's time to the advent of mathematical modelling.

15:10 – ERIC GUILYARDI (The Walker Institute, University of Reading)
El Niño understanding and modelling: progress and challenges
Since the pioneering work of Walker, much progress has been achieved in understanding tropical variability and El Niño. If the ability of climate models to simulate El Niño has largely improved in the recent years, many intertwined issues regarding its dynamics, impacts and predictability remain unresolved.

15:40 – TEA

16:00 – TIM OSBORN (University of East Anglia, Norwich)
The North Atlantic Oscillation: internal climatic variability and the influence of external forcing
The North Atlantic Oscillation (NAO) has proven to be a convenient descriptor of the inter-annual variability of climate in the North Atlantic region, but how useful is it for describing longer-term changes? Analysis of observations, together with diagnosis of NAO behaviour simulated by climate models, will be presented to illustrate current understanding of some aspects of the NAO. In particular, how might external climate forcings influence the NAO, and can observations confirm that such influences are real?

16:30 – ADRIAN MATTHEWS (University of East Anglia, Norwich)
Intraseasonal variability in the tropics: The Madden-Julian Oscillation
The hitherto unsuspected existence of prominent swings in the tropical atmospheric circulation was discovered by Madden and Julian in 1971. In the following four decades, many advances have been made in the understanding of the Madden-Julian oscillation, and its reach has been shown to extend far beyond the tropics.

17:00 – TIM PALMER (ECMWF, Reading)
The Status of Seasonal Forecasting. From Basic Science to Key Applications
The status of operational seasonal forecasting will be summarised, with a focus on El Niño. A number of key applications of seasonal forecasting will be discussed, from prediction of epidemic malaria to the validation of climate-change projections.

125 YEARS AGO

We saw in the opening pages of this Newsletter that the Royal Meteorological Society's History Group was formed in 1983. Let us now review what the Society was doing a century earlier, using as our source the "Report of the Council for the Year 1883", published in the 1884 volume of the *Quarterly Journal of the Royal Meteorological Society* (Vol.10, pp.87-114).

The highlight of the year came in September 1883, when Queen Victoria granted the Society permission to adopt the prefix 'Royal'. In the Council's Report, we find, not surprisingly, that the royal recognition took pride of place. In the second paragraph, we read:

At the meeting of the Council in October, the President [J.K.Laughton] announced that, through the support of the Earl of Dalhousie, K.T., he had received a letter from the Home Secretary informing him that Her Majesty had been graciously pleased to grant to this Society permission to assume the prefix "Royal". In consequence, the Society has become, and will henceforth be called, the "Royal Meteorological Society", and its Fellows will be designated by the letters F.R.Met.Soc., the more simple F.R.M.S. being already in use by the Fellows of the Royal Microscopical Society. In formally placing these changes on record, the Council congratulate the Fellows on this royal recognition of the value of the Society's work.

The Report went on to say that there was a "very general feeling that the income of the Society was insufficient to meet the expense of the work it had undertaken, and that its usefulness was likely to be seriously curtailed by want of funds". Accordingly, the Council had convened a General Meeting of the Society on 19 December 1883 to consider the matter, and the following had been agreed:

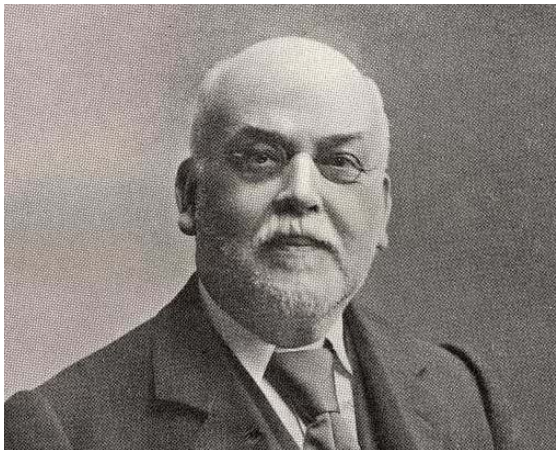
- that the annual subscription be doubled, to £2;
- that each Fellow would pay, when elected, an entrance fee of £1;
- that any Fellow, as it was put in revised By-Law 15, "may, on his election, or at any subsequent time (all sums then due, including the entrance fee, being first paid), compound for all future annual payments by a single payment of £21".

At the end of 1883, there were 568 members of the Society, made up of 130 Life Fellows, 419 Ordinary Fellows and 19 Honorary Fellows. The Earl of Dalhousie was elected a Fellow on 21 November 1883.

During 1883, several committees assisted the Council, these being the:

- General Purposes Committee
- Editing Committee
- Exhibition Committee
- Experimental Research Committee
- Decrease in Water Supply Committee
- Increase of Subscription Committee
- Thermometer Screen Committee

The Report noted that the last-mentioned of these committees had been investigating the most suitable size for a Stevenson Screen and the best positions for the thermometers inside it. The results of their investigations had shown that differences between old and new types of screen were so small that the Committee did not feel justified in giving a preference to one screen over another. However, agreement had been reached that the internal dimensions of the standard screen to be used by the Society's observers should be: width 18 inches, depth 11 inches, height 16½ inches; and no internal measurement should be more than four inches from the new pattern. The Committee recommended that maximum and minimum thermometers be placed in the screen in front of the dry- and wet- bulb thermometers, as advised in *Hints to Meteorological Observers* by William Marriott, the Assistant Secretary of the Society.



William Marriott (1848-1916)
Assistant Secretary of the Meteorological, later Royal, Meteorological Society from 1872 to 1915

During 1883, Marriott had visited most of the Society's stations in Wales and the northern half of England and found them "generally in an efficient state". His inspection report was included in the Council's Report as Appendix II and provided some insight into shortcomings he did come across.

At Aberystwyth, for example, the station had been established by the Town Council in 1875, when the observations had been promised to the Society. However, no returns had ever been forwarded. Marriott said he had "copied out, while there [on 16 July], the observations for the first six months of 1883" but regretted that no further returns had yet been received.

At Alnwick, the barometer was in a small wooden shed and, said Marriott, "subject to a considerable range of temperature during the day", so he had asked the observer to remove the instrument to a room in his house.

At Belper, the screen required painting and the rain gauge was too close to trees, so Marriott had asked the observer to move the gauge fifteen feet.

At Bolton, Marriott had found, the observer was using a home-made screen which was unsatisfactory in a number of respects. His instruments also left something to be desired, not least the minimum thermometer, which "had been oiled all over, and was in a dirty condition".

At Leaton, the observer was away from home when Marriott called and the butler had been left in charge of the instruments. He had, said Marriott, received insufficient instruction and was therefore not making accurate observations. However, Marriott considered, he would make an excellent observer if properly trained. And the screen required painting, too!

At Macclesfield, the screen had been painted green until about a fortnight before Marriott's visit but was now white.

At Ross, "the covering for the wet-bulb was very dirty and had not been changed for a long while". Not only that, but rose bushes were growing up near the rain gauge and would "have to be kept down".

And at Wakefield, "the screen was nearly black and urgently required painting. Owing to the great prevalence of smoke", said Marriott, "the screen requires frequent painting".

The Council's Report noted that observations had been made at Boston Church during 1882 with an electrical thermometer placed at the disposal of the Society by the late Sir William Siemens. Temperature measurements had been made at 4 feet, 170 feet and 260 feet above the ground, and the conclusion reached from analyses was that differences between the temperatures at 4 feet and 260 feet seemed to be "chiefly regulated by the amount of cloud, and by the relation of the temperature of the surface of the ground to the general body of air passing over it". A grant from the Government Grant Fund had facilitated the work, and the results of the study had been embodied in a paper by G.J.Symons read before The Royal Society and printed in the *Proceedings* of that Society (1883, Vol.35, pp.310-319).

We read also in the Report of Council that the Rev G.Morrison of Foula had offered to observe for the Society, "if supplied with the necessary instruments". The Council considered that a station on that remote Atlantic island west of Shetland's mainland would be of great value and accordingly lent Mr.Morrison a set of thermometers and a Stevenson screen.

The annual exhibition of instruments at the March meeting of the Society had been "specially devoted to meteorological instruments which had been designed for, or used by, travellers and explorers". A complete list of the exhibits appeared on pp.174-179 of the 1883 *Quarterly Journal* (Vol.9) and showed that the instruments on display included some used by Dr.Livingstone during his last journey, as well as maximum and minimum thermometers and a deep-sea thermometer used during the 1839-43 Antarctic Expedition of James Clark Ross, a siphon barometer by Newman believed to have been used by Edward Sabine on his Arctic voyage of 1827, Gay Lussac's mountain barometer, a Fortin barometer used by Palliser in the British North American Boundary Expedition in 1857, a siphon barometer used by Captain J.P.Basevi in Tibet in 1873, Negretti and Zambra's Portable Set of Meteorological Instruments for the use of Travellers, and much else, 78 items in all.

The Council's Report noted that a new and revised edition of *Instructions for observations of Phenological Phenomena* had been published in the early part of 1883 and a "Report on the Phenological Observations for 1883" drawn up by the Rev T.A.Preston (published in the *Quarterly Journal* in 1884, Vol.10, pp.52-66).

There were seven Appendices to the Report:

- Report of the Thermometer Screen Committee.
- Report of the Assistant Secretary on the Inspection of the Stations during 1883.
- Abstract of Receipts and Expenditure for the Year ending December 31st, 1883.
- Obituaries (Charles Greaves, Sir William Siemens, and Professor Henry John Smith).
- List of books purchased.
- Donations of books, reports and other publications presented by societies, institutions and individuals during 1883.

- Reports of the work of the Meteorological Office and observatories, namely the ones at Greenwich, Edinburgh, Kew, Cambridge, Oxford and Stonyhurst.

It is clear from the Council's Report and from the *Quarterly Journal* that in 1883 the Society was much concerned with observations and instruments. It is clear too, though, as the existence of an Experimental Research Committee suggests, that a spirit of scientific enquiry was emerging, and this augured well for the future.

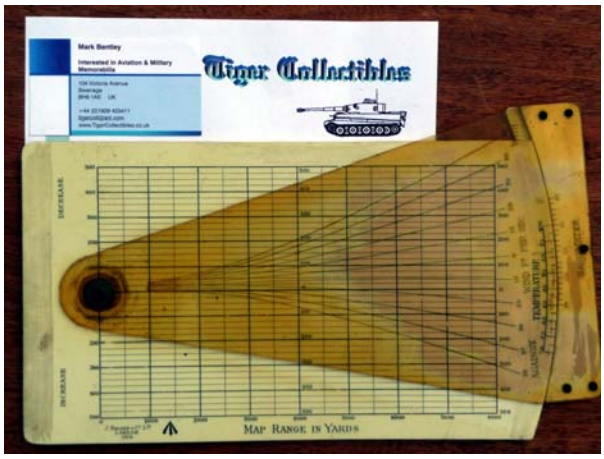
The Decrease in Water Supply Committee was set up in 1875 at the request of the Imperial Academy of Sciences in Vienna and was a joint committee of the Meteorological Office and the Royal Meteorological Society. Its remit was to investigate water levels in springs, wells, streams and rivers and relate them to periods of drought and wet weather, river improvements, extraction of water from aquifers, changes in cultivation practices, etc. As to whether or not water levels were indeed decreasing, as some people believed, the results of the investigation proved inconclusive. See the Committee's Report, published in the *Quarterly Journal* in 1885 (Vol.11, pp.216-223).

WORLD WAR 1 METEOROLOGY – A PS
by Howard Oliver

As described in my talk at a previous World War 1 meeting, the role of meteorology gradually increased through 1915 to 1918. The service provided support for general and gas warfare as well as flying. In addition, it provided vital information for "map shooting" – gunnery where the target was not visible.

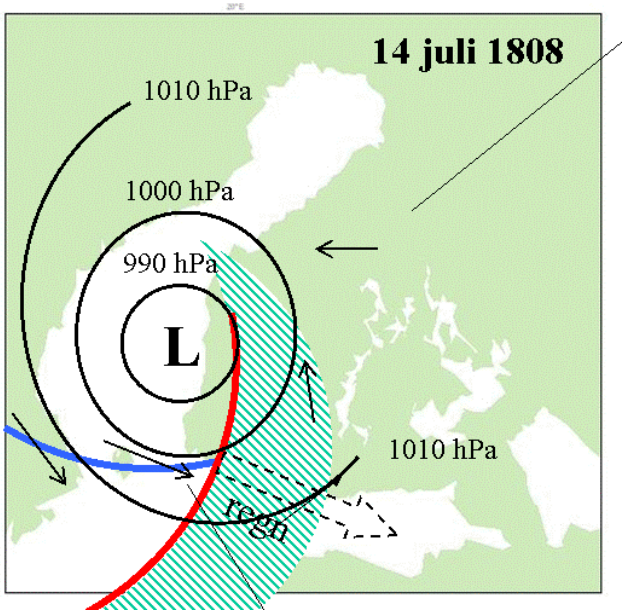
To gain accuracy, it was necessary to correct for shell weight, charge amount, barrel wear plus the effect of air resistance. The meteorological corrections became gradually more sophisticated, but basically involved adjustment for air density using atmospheric pressure and temperature, and adjustment for the effect of the wind. Later schemes took humidity into account to provide an "effective temperature" and adjusted the wind factor for wind speed profile, direction, flight-time and trajectory height.

I now live in Swanage and I noticed that our local war memorabilia dealer, Tiger Collectibles, was advertising a "gunnery computer" for sale. The owner, Mark Bentley, kindly allowed me to examine and make this photograph of it. It was for 18 pounders and was made in London in 1916 for war service. The transparent scale is simply set for the appropriate pressure and temperature readings, and the curve matching the wind speed is then used to determine the positive or negative range correction required for any target distance. A nice item if anyone has £75 o.n.o. available.



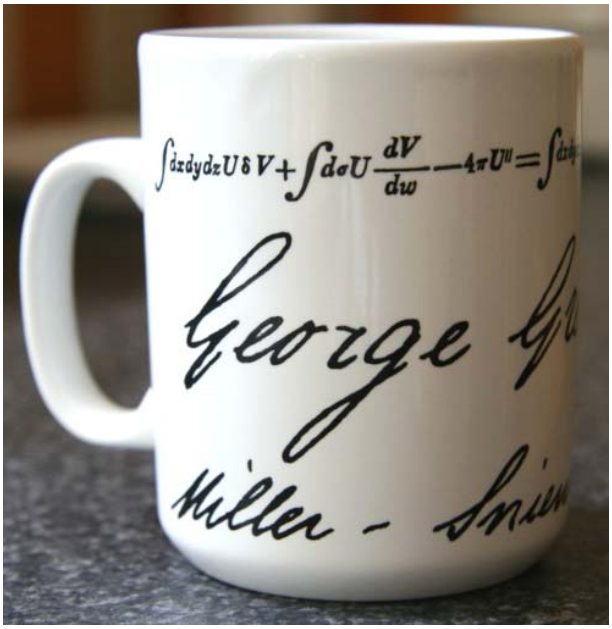
200 YEARS AGO IN FINLAND
by Anders Persson

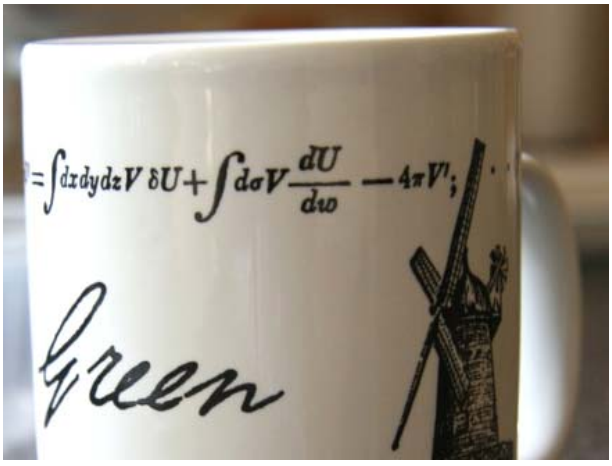
Finland and Sweden commemorate this year and the next their divorce in 1808-09 after the war with Tsarist Russia. Observations from Finland, Sweden and Estonia provide quite a good material for drawing twice daily maps for both years. One of the important battles took place in Central Finland on 14 July 1808 (the Swedes won that one). There are no observations from that part of Finland, but we know that the Russians set fire to a village and the smoke drifted westward. . . .



THE MILLER OF SNEINTON
by Malcolm Walker

Have you ever heard of George Green? I am ashamed to say that I probably would not have had I not been brought up in Nottingham, where, in a suburb called Sneinton, there is Green's Mill. A mug which I purchased in the Mill's shop provides a clue to his significance in meteorology. It's certainly no run-of-the-mill mug (sorry about the pun!), showing, as it does, a formidable-looking mathematical formula.





The formula comes from Green's first and greatest work, his *Essay on the Application of Mathematical Analysis to the Theories of Electricity and Magnetism*, which was published in March 1828 and distributed to 51 subscribers, who each paid 7s.6d. for their copy, a sum then roughly the equivalent of the weekly wage of a poor working man. It is thought that fewer than a hundred copies were printed and that hardly anyone who received a copy of the essay understood anything in it.

There was, however, one exception, Sir Edward Bromhead, baronet, of Thurlby Hall (between Newark and Lincoln). He befriended and encouraged Green and helped him get his work published in prestigious journals, notably:

- In 1833, in *Transactions of the Cambridge Philosophical Society*, "Mathematical Investigations concerning the Laws of the Equilibrium of Fluids analogous to the Electric Fluid, with other similar Researches";
- In 1835, in *Transactions of the Cambridge Philosophical Society*, "On the Determination of the Exterior and Interior Attractions of Ellipsoids of Variable Densities";
- In 1836, in *Transactions of the Royal Society of Edinburgh*, "Researches on the Vibrations of Pendulums in Fluid Media".

Bromhead also helped Green gain a place in his old College at Cambridge, Gonville and Caius, which was remarkable, not just because of the difference in rank and fortune of the two men but also because Green was forty when he became a student at Cambridge and had previously received rather little education.

Green was born in 1793 and baptised on 14 July of that year in St Mary's Church, Nottingham. He started school when he was eight, attending Goodacre's Academy, the best and most expensive school in Nottingham. Robert Goodacre wrote textbooks on arithmetic and used in his school a wide range of scientific instruments, including a barometer and thermometer, an air pump and an orrery. He also had an astronomical observatory on the roof. George excelled in mathematics and soon possessed, so his cousin William Tomlin said, a "profound knowledge in the mathematics" which exceeded his schoolmaster's.

After only four terms at Goodacre's Academy, George left school. Green senior had decided that his son had learnt all his schoolmasters could teach him! So, aged nine, George started work in his father's mill, which he continued to do until a short while after his father's death in 1829. Then, he let the mill. He had never liked being a miller. But after he left school, he obviously worked at his mathematics, in all probability encouraged and assisted by the Rev John Toplis, Headmaster of Nottingham's Free Grammar School, who was a Cambridge mathematics graduate and very enthusiastic advocate of the new French mathematics of Laplace, Poisson, Biot and others.

At Cambridge, Green first passed examinations in Latin, Greek and ecclesiastical history and then, in 1837, graduated Fourth Wrangler. He remained in Cambridge after graduation, pursuing his research, and in October 1839 gained a Perse Fellowship at Gonville and Caius. However, he returned to Nottingham in early 1840, "indisposed", William Tomlin said, "after enjoying many years of excellent health in Sneinton". He died of influenza in 1841 and was buried with his parents in the north-east corner of St Stephen's churchyard, close to the mill where he had worked for so much of his life. The epitaph on his gravestone reads:

Also George Green Esq, B.A.
Fellow of Caius College, Cambridge
(Son of the above George and Sarah Green)
who departed this life on the
31st May 1841
Aged 47 years.

William Thomson (Lord Kelvin) came across a reference to Green's Essay in 1845. Locating a copy proved difficult, but when he did obtain one he was greatly excited and stimulated by what he read and thenceforth extolled Green's concepts and techniques whenever and wherever he could. Among those he impressed were two giants of 19th-century science, James Clerk Maxwell and George Gabriel Stokes.

The importance of Green's Essay has been summarised thus by D.M.Cannell, in *George Green, Miller and Mathematician, 1793-1841* (City of Nottingham Arts Department, 1988):

Its ideas and concepts were in advance of their time. Even now for all but the most able mathematicians and physicists, it is still very difficult to understand. In the Essay, Green applied mathematical analysis, or calculation, to the contemporary theories of electricity and magnetism. It was one of the first attempts to apply mathematical theory to electrical phenomena and was of such importance that it has been described as 'the beginning of mathematical physics in England'. In it, Green effectively introduced the concept of electrical potential which has proved such an invaluable tool in the development of electromagnetic theory. The Essay is particularly valuable for the introduction of mathematical techniques, or processes, for solving problems. These tools, now known as Green's functions and Green's Theorem, are useful in that they can be applied to problems in various areas of physics, not only electricity and magnetism, but also sound and light and the motion of fluids such as water.

The concepts introduced in Green's Essay have proved fundamental in theoretical meteorology and oceanography – from the work of Kelvin and Stokes relating vorticity at a point to the circulation about a line around the point, through the work of Vilhelm Bjerknes on the way circulation develops in geophysical fluids, to modern work on potential vorticity and ocean-atmosphere circulation anomalies. Another meteorological strand of Green's work is related to his study of the influence of boundary effects, and concerns the determination of the jump in the velocity across a front by the high vorticity in the front.

Green's Mill was abandoned in the 1860s and remained derelict until 1919, when acquired by a local solicitor, Oliver Hind, who carried out renovations in 1923 and then let it to a firm which made furniture and boot polish. Alas, it caught fire on 10 July 1947and thereafter stood a sorry ruin for three decades, an empty brick shell. Then, happily, it was restored and on 6 July 1985 reopened, as Green's Mill and Science Centre. The mill's sails turned once again on 2 December 1986.

Left *Green's Mill June 2008*

Right *A modern work: Green's Theorem Fountain In the yard of Green's Mill*

To find out more about the Miller of Sneinton, see: *George Green: mathematician and physicist, 1793-1841, the background to his life and work*, by Doris Mary Cannell (Second Edition, 2000, Society for Industrial and Applied Mathematics, Philadelphia).

For assistance over Green's importance to meteorology and oceanography, I am indebted to Professor Julian Hunt and Professor Sir Brian Hoskins.

OBITUARY – DR JIM BURTON

We are very sorry to report that Jim passed away on 30 July 2008, a victim of Alzheimer's Disease. He was a founder member of the History Group's committee and served as the Group's Treasurer from 1983 to 2004. He was elected a Fellow of the Royal Meteorological Society on 18 May 1960.

Born in Stockport on 12 August 1930, James Michael Crowther Burton moved with his family to Cookridge near Leeds at an early age. He was educated at Leeds Modern School, studied accountancy for two years, and then, in 1950, joined the Meteorological Office. Though his career took him far from the county where he was brought up, he remained a Yorkshireman at heart and was more than delighted when posted to the Leeds Weather Centre in 1984.

After his retirement in 1993, he continued to reside in Ilkley, close to his beloved Yorkshire Dales. He was an active member of the Ilkley Civic Society, rose to be a vice-chairman of the Yorkshire Dales Society and served from 1992 to 2000 as a member of the Yorkshire Dales National Park Authority. He also served as regional chairman of the Campaign to Protect Rural England (CPRE), held office in the West Yorkshire Branch of the CPRE and in 2000 received the CPRE's Countryside Medal. He was appointed, in 2004, in the New Year Honours, a Member of the Order of the British Empire (MBE) "for services to the environment".

He was a keen sportsman whose enthusiasm for sport never waned. He was an able cricketer and maintained a lifelong interest in the Old Modernians' Cricket Club, of which he was an honorary vice-president. As an orienteer, he was able to combine his love of the countryside with his love of sport. He chaired the Yorkshire and Humberside Orienteering Association from 1985 to 1988 and at the same time chaired the English Orienteering Council. Whilst based in the south of England in the 1970s and early 1980s, he was a member of the Mole Valley Orienteering Club and served as the Club's Master from 1981 to 1983. The Club's website says that he was never more amused than when crowned the South-East's most improved competitor. He completed an early London Marathon for charity and in the 1970s played tennis at the Lapwing Club (a Civil Aviation Authority facility near Heathrow).

He was selected, in 1956, for the Royal Society's International Geophysical Year Expedition (IGYE) to Antarctica and spent two years at Halley Bay (1957-59) working on meteorology, glaciology, geomagnetism and seismology. History Group member David Limbert has drawn attention to a picture in an IGYE volume which shows Jim wearing a cricket blazer whilst reading screen thermometers at Halley Bay! After his return to the UK in early 1959, Jim spent several months at the Royal Society working on the Antarctic data. Along with other members of the IGYE, he was awarded the Polar Medal in 1961.

Whilst in London, Jim met his future wife, Dawn, who was then visiting from Australia. They married in 1960 and had two sons: Michael (born in 1961) and Anthony (born in 1964).

Jim was posted to the Meteorological Office at RAF Boscombe Down in 1960 and moved from there to Australia in January 1962 to join the Bureau of Meteorology. He worked first at Launceston and subsequently at Hobart, Port Hedland, Cairns and Darwin. He returned to the UK's Meteorological Office in 1970 and then worked at Heathrow Airport for many years, partly on the Outstations Bench and partly in the Briefings Bay of the Queen's Building.

He gained a science degree from the Open University (OU) in the 1970s and went on to gain an OU PhD in 1988 for his dissertation on "The history of the British Meteorological Office to 1905". He published many articles on this and related subjects from 1982 onwards in *Weather*, *The Meteorological Magazine* and *The British Journal for the History of Science*.

He also published pen portraits of Presidents of the Royal Meteorological Society in *Weather*, among them pieces about Sir Napier Shaw and Professor R.C.Sutcliffe. He was particularly interested in the careers of these men and indeed interviewed Sutcliffe on tape. The recording and transcript of the interview are held in the National Meteorological Library at Exeter. Around 1984, Jim was instrumental in arranging for various of Shaw's papers to be transferred from the Meteorological Office to the Napier Shaw Library in Cambridge University.

Jim will be greatly missed. He has been called in a newspaper obituary "a tolerant and public-spirited man with a contagious optimism that energised those around him". That is the Jim we in the History Group remember. Most of all, he will be greatly missed by Dawn, Michael and Tony, to whom we send our condolences.

Malcolm Walker

AIRMET – A NOSTALGIC RETROSPECT
by Oliver Ashford

How many reading this note will, like the writer, remember listening to the 'wireless' station *Airmet* and regret the day when, at very short notice – it was terminated? Very few, I imagine.

Started by the Automobile Association in 1932 as a pioneering service for its members who were owner-pilots, *Airmet* was taken over by the Met Office in 1935 and, after being suspended during the War, re-started as a 24-hour weather-reporting station.

After the closure of *Airmet* in March 1950, the Royal Meteorological Society received a spate of letters of protest, a selection of which were published in *Weather*. One suggestion was that the Society should organize a petition for *Airmet* to be re-commenced. In agreeing to this idea, Council requested the Editors of *Weather* to make the necessary arrangements – but failed to provide any funds! As senior Editor, I was asked to assume the main responsibility, my first task being to raise some money. The response from a wide range of organizations was encouraging, the largest contribution to the total of £83 being a magnificent £15-10s from the National Farmers' Union.

The petition was launched at a well-attended press conference on 5 October 1950. By the closing date of 15 November, more than 21,000 people had signed the petition, which included space for indicating their reason for listening to *Airmet*. Those from industry, agriculture and sport (including large numbers of pigeon fanciers) far out-numbered the aircraft pilots (see *Weather*, 1950, Vol.5, pp.403-405). A revised version of the petition was finally presented to Parliament in July 1951 under the signatures of the heads of eight of the organizations mainly concerned (by which time I had been posted to Gibraltar).

Although *Airmet* was never restored, it was considered to have been a very useful effort in that the weather information it provided was of value to a much wider section of the public than originally envisaged. The then President of the Royal Meteorological Society, Sir Robert Watson-Watt, stressed this aspect of *Airmet* in his Presidential Address in 1951 (see *Quarterly Journal of the Royal Meteorological Society*, 1951, Vol.77, pp.552-568).

At times I wondered if anybody would object to my close involvement in the *Airmet* petition on the grounds that it was inappropriate for a civil servant to undertake such responsibilities. There was even a wild rumour that my posting to Gibraltar was not entirely unconnected. In fact, I had received tacit approval from headquarters and before my departure had a telephone call from a director (Dr Stagg) telling me that the results would be invaluable in planning the best way of presenting weather information to the public.

EXCLUSIVELY FOR HISTORY GROUP MEMBERS

PRIVATE VIEWING OF SPECIAL EXHIBITION

MONDAY 24 NOVEMBER 2008
Tea/coffee and tour: 3.00-4.30pm

The Science Museum, South Kensington, London

An exhibition which is not open to the general public has been mounted by the Science Museum, to serve as a taster for sponsorship for a much larger Climate Change exhibition. History Group member and exhibition curator Jane Insley has offered all Group members an opportunity to view.

The show touches upon such topics as energy sources and uses, the scientists who recognised the Greenhouse Effect, weather measuring, the Central England Database, de-carbonising technology, satellite monitoring of sea ice, and more, in the relaxed atmosphere of a gentlemen's club.

The exhibition is in the Science Museum's Smith Centre, which occupies the space that was for many years the Meteorological Office.

The entrance to the Smith Centre is on the north side of the Science Museum's building, on Imperial College Road, between the Museum and Imperial College. This entrance has a ramp which provides excellent wheelchair access. Those attending should gather at this entrance just before 3.00pm.

If you wish to view the exhibition, free of charge, please inform Malcolm Walker as soon as possible. His address is 2, Eastwick Barton, Nomansland, Tiverton, Devon, EX16 8PP, and his telephone number is 01884 860501.

HISTORY GROUP MEETINGS IN 2009
Dates for your diary

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THURSDAY 15 JANUARY, LONDON

A joint meeting with the Retired Members' Group of the London and SE Branch of the Institute of Physics, from 10.30am to about 4.00pm on Thursday 15 January at the Institute of Physics, 76 Portland Place, London, on

The development of meteorological observations

The speakers will be:
Richard Pettifer on *Radiosonde development and in-situ ground-based observations*
Geraint Vaughan on *Remote sensing from the ground*
Gordon Peckham on *The Cairngorm automatic weather station*
Keith Browning on *Weather radar*
David Pick on *Satellite observations*

The programme and registration details will be sent to History Group members in due course.

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SATURDAY 28 MARCH, LONDON

A joint meeting with the Society for the History of Astronomy at the Royal Astronomical Society, Piccadilly, London, from 10.30am to 5.00pm on Saturday 28 March, on

Links between meteorologists and astronomers

Plans for this meeting are well advanced and full details with booking form will be sent to History Group members early in the New Year.

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SATURDAY 6 JUNE, ROTHAMSTED

A meeting on **Agricultural Meteorology**. Plans for this meeting are also well advanced and full details with booking form will be sent to History Group members in due course.

Please send any comments or contributions to:
Sara Osman
Hon Secretary, History Group
c/o Royal Meteorological Society
104 Oxford Road
Reading RG1 7LL.

MetSocHistoryGroup@gmail.com

The annual subscription for membership of the History Group is £5 (payable to Royal Meteorological Society History Group). Members will be sent a reminder when their sub is due.

2008 Members

Rob Allan (Exeter)
Alberto Ansaloni (Milano Italy)
Oliver Ashford (Didcot)
Rodney Blackall (Buckingham)
Ron Bristow (Maidstone)
Stephen Burt (Stratfield Mortimer)
J Carpine-Lancre (Beausoleil, France)
Nick Chappell (Lancaster)
Mike Collins (Frinton on Sea)
Phil Collins (Okehampton)
Andrew Cook (London)
Stan Cornford (Bracknell)
Maurice Crewe (Watford)
B D Dagnall (Lymington)
Peter Davies (Reading)
Tony de Reuck (London)
F de Strobel (La Spezia, Italy)
Margaret Deacon (Callington)
Laurie Draper (Dingwall)
Storm Dunlop (Chichester)
Philip Eden (Luton)
Michael Field (Arundel)
Tom Fitzpatrick (Glasgow)
Robert Gilbert (North Chili, NY, USA)
B D Giles (Auckland, New Zealand)
John Goulding (Middlesborough)
Valerie Green (London)
Richard Gregory (Woodbridge)
Eric Harris (Crowthorne)
Alan Heasman (Marlborough)
A M Hughes (Oxford)
Julian Hunt (Cambridge)
Jane Insley (London)
Arnold Johnson (Maidenhead)
Simon Keeling (Wombourne, Staffs)
Joan Kenworthy (Satley, County Durham)
Martin Kidds (Cullompton)
John Kington (Norwich)
Daudu Kuku (London)
David Limbert (Cambridge)
Richard Link (Croydon)
Jean Ludlam (Sunningdale)
Norman Lynagh (Chalfont St Giles)
Ian MacGregor (Ivybridge)
Julian Mayes (West Molesey)
Anita McConnell (Stowmarket)
C R Milne (Farnborough)
Alison Morrison-Low (Edinburgh)
John Norris (Gerrards Cross)
Howard Oliver (Swanage)
Alan O'Neill (Twyford)
Sara Osman (London)
Andrew Overton (Doncaster)
David Pedgley (Wallingford)
Ernie Pepperdine (Scunthorpe)
Anders Persson (Lehmo, Finland)
R W Phillips (Lincoln)
Vernon Radcliffe (Newark)
P R Rogers (Sevenoaks)
James Rothwell (Southwell)
Peter Rowntree (Crowthorne)
Marjory Roy (Edinburgh)
Ann Shirley (Canterbury)
David Simmons (Cambridge)
Keith Tinkler (Ontario, Canada)
Diane Walker (Tiverton)
Malcolm Walker (Tiverton)
Alan Wall (Southampton)
Catharine Ward (Bury St Edmunds)
Dennis Wheeler (Sunderland)
G D White (Truro)
Peter Wickham (Wokingham)
Clive Wilkinson (Diss)
Christopher Wilson (Cullompton)
Mick Wood (Bracknell)