

# History of Meteorology and Physical Oceanography Special Interest Group



Newsletter 2, 2009

## A VIEW FROM THE CHAIR

**The following review of 2008, by the Group's Chairman, Malcolm Walker, was presented at the History Group's Annual General Meeting on 28 March 2009.**

Without an enthusiastic and conscientious committee, there would be no History Group. My thanks to all who have served on the committee this past year. Thanks especially to our Secretary, Sara Osman, who has not only prepared the paperwork for committee meetings and written the minutes but also edited and produced the newsletter (and sent you subscription reminders!). She left the Met Office in January 2008 and has since worked in the library of Kingston University. Unfortunately, she now wishes to relinquish the post of Secretary and is stepping down after today's meeting. We thank her very much indeed for all she has done for the Group during her time as Secretary, and that is, believe me, a great deal. Thanks also to our Treasurer, Mick Wood, who has once again kept our accounts healthy.

As I said at last year's Annual General Meeting, I am very keen to see a growth in membership of the Group, and we have, indeed, welcomed new members during the past year. Sadly, however, two people who have supported the Group for many years died during 2008. Jim Burton, who was the Group's Treasurer for many years, passed away on 30 July, and Alan Wall died on 15 September.

With 75 members at the end of 2008, we were the largest of the Royal Meteorological Society's Special Interest Groups. But, as I said last year, I should like to see a massive growth in membership. When I talk to meteorologists and oceanographers, I find no lack of interest in the history of their subjects, but why do not many more of them join our Group? Perhaps they do not know exactly what our Group is for and what it does. I ask you, please, to publicize the Group's work whenever and wherever you can.

Repeating further what I said last year, I ask you all, please, to spread the word that our Group is very active and well worth supporting and

arranges meetings which are full of interest. We need especially to convince students that the origins and growth of the atmospheric and oceanic sciences are not only fascinating but also important. All too many research students are now discouraged from reading anything more than ten years old and, moreover, do not appear to want to read anything that is not on the Web. To this end, historians of science are fighting back. A network of bodies concerned with the history of science, technology, mathematics, engineering and medicine has been formed and our Group is one of the network's members. An issue taken up by the network during the past year is the withdrawal of Royal Society funding from the National Cataloguing Unit for the Archives of Contemporary Scientists, which is based in the Library of the University of Bath. I am sorry to report that the representations of the network do not yet appear to have proved successful.

The Group's meetings are highlights of every year, no less 2008, when four excellent meetings were held, one in April, one in June, the others in November.

- The meeting in April, held at Radley College, was concerned with the history of public weather services.
- The meeting in June was held at the National Oceanography Centre, Southampton, on the subject of the meteorology and physical oceanography of the Southern Ocean and Antarctic Edge during the 1920s and 1930s. It was adopted by the Royal Meteorological Society as a National Saturday Meeting.
- The first of the November meetings was a Royal Meteorological Society National Wednesday Meeting organized by the Group. In this meeting, held at Reading University, we began with a talk about the classic papers of Sir Gilbert Walker in the 1920s and 1930s on teleconnections and the Southern Oscillation and thereafter focused on advances in knowledge and understanding of climatic variability that have taken place since Walker's day. This was the first of what we hope will be a series of 'classic papers' meetings.

- The other meeting in November was held at the Science Museum and was kindly arranged and hosted by Group member Jane Insley. We were treated to a private viewing of a special exhibition concerned with the history of climate change studies.

Many thanks to all who have organized, and those who have spoken at, the Group's meetings.

Members of our Group also spoke in 2008:

- at the Eighth International Congress on the History of Oceanography, held in Naples in June;
- at the 42<sup>nd</sup> Maritime History Conference, held in Exeter in September;
- and a Royal Meteorological Society National Saturday Meeting on Weather and Photography, held at Imperial College in November.

Three issues of the newsletter appeared in 2008 and we hope you found them interesting. The third one was a Silver Jubilee issue to mark the Group's first quarter century. Do, please, send us snippets or longer pieces for the newsletter. We want it to be your newsletter.

As chairman of a Royal Meteorological Society Special Interest Group, I attend meetings of the Society's Meetings Committee. I attended three such meetings in 2008 and took every opportunity to point out the importance of historical context.

## THE ANNUAL GENERAL MEETING

The AGM was held at the Royal Astronomical Society on 28 March 2009 and attended by eighteen members of the Group. Apologies for absence were received from three members.

Malcolm Walker was re-elected Chairman and Mick Wood was re-elected Treasurer and Vice-Chairman. Martin Kidds was elected Secretary.

The following were re-elected committee members: Margaret Deacon, Alan Heasman, Joan Kenworthy, Julian Mayes, Howard Oliver, David Pedgley, Vernon Radcliffe and Dennis Wheeler. Because they live so far from Reading (where committee meetings are held), Margaret and Dennis are rarely able to attend meetings in person. Thus, they are Corresponding Members of the committee. Margaret also represents the Challenger Society for Marine Science.

Thanks to Mick, the Group's finances are in good shape. The Group began 2008 with a balance of £1,889.01 and ended the year with £1,944.25, of which £27.69 was in the form of cash, £97.76 was in a current account and £1,818.80 was in a savings account.

Pat and Maurice Crewe were thanked most warmly for auditing the accounts.

## CONGRATULATIONS

Many congratulations to Dr Dennis Wheeler, the 2009 winner of the History Group's Jehuda Neumann Memorial Prize. A Reader in Geography in the University of Sunderland, Dennis has made many contributions to the history of meteorology, and some of his papers have mirrored a style of paper very much favoured by Jehuda Neumann himself, viz. analyses of the significance of the weather in historical events. The prize will be presented at the Royal Meteorological Society's Awards Dinner on Wednesday 1 July 2009.

## WELCOME

A big welcome to Martin Kidds, who is now the History Group's Secretary.

An Assistant Librarian at the Met Office's National Meteorological Library and Archive, Martin was previously a Reference Librarian at Reading Central Library before joining the Met Office some eighteen months before the move to Exeter. Having said that, this was not his first experience with the Met Office – his father was a forecaster and at an earlier stage in his career Martin did a month's work experience at the Library and Archive in Bracknell in 1996 when Maurice Crewe was librarian. Since 2002 he has been involved with development of the library catalogue with colleagues such as Geraldine Edmond (now retired) and Sara Osman as well as being one of those who answers enquiries from the public. Martin says: "I have enjoyed enormously helping enquirers find information about our varied weather and climate and in doing so learning much about the fascinating history of the science of meteorology and the people who made it happen. There is always so much more to learn, so I am looking forward to playing an active part of the History Group and passing knowledge on to others."

## JOINT MEETING WITH THE SOCIETY FOR THE HISTORY OF ASTRONOMY by Mick Wood

On Saturday 28 March 2009, we held a joint meeting with the Society for the History of Astronomy in the rooms of the Royal Astronomical Society, Burlington House, Piccadilly, London. Forty-two attended.

The first presentation was given by **Howard Oliver**, who in his talk *Early aurora studies and the work of John Dalton* gave us another facet in the life of John Dalton.

Aurorae have been observed and reported for many years and in ancient times caused consternation and awe. Aristotle thought they were caused by burning flames. Halley, who eventually saw the aurora in 1717 and 1719, considered that the phenomenon might be part of the earth's magnetic field and so should be observed at both poles. This was confirmed by Captain Cook. John Dalton, professor at Manchester Academy, and a keen meteorological observer in the early 1800s, was a noted aurora investigator, publishing many articles on the subject including the magnetic origin. From detailed triangulation measurements, he estimated the top of an arch to be about 100 miles. He was so keen on the aurora that he was known to bore other members of the Manchester Literary and Philosophical Society. Later studies led to the discovery of the 11-year sunspot cycle, and solar flares connection. Strong aurora activity is capable of great damage to electric and communication networks as was shown in Canada in 1859. The next strong activity is expected in 2012, just in time for the London Olympics. Howard had also brought along some interesting books and articles by John Dalton.

The second talk was by **Malcolm Walker**, on *Lunarists, sun-spottery and astro-meteorology in the nineteenth century*, which, he suggested, a little tongue-in-cheek, might be sub-titled 'alternative approaches to long-range weather forecasting'.

Astro-meteorology is a pseudo-science founded by the ancient Babylonians and is concerned with the alleged influences of celestial phenomena on the weather. It was practised down the years until the 17<sup>th</sup> century and indeed flourished in Europe in the 16<sup>th</sup> and 17<sup>th</sup> centuries, as too did lunarism (the belief that the moon's phase influenced the weather). Both of these approaches to weather forecasting then

declined but were, however, revived in the 19<sup>th</sup> century. Various short-lived astro-meteorological societies were formed in the middle years of the nineteenth century, and so too were conventional meteorological societies, first the Meteorological Societies of London (in 1823 and 1848) and then, in 1850, the British (later Royal) Meteorological Society.

Notable among those who formed astro-meteorological societies were R.J.Morrison (whose pseudonym was Zadkiel) and W.H.White (who served as Secretary of one Meteorological Society of London from 1836 to 1843 and the other from 1848 to 1850). As astrology was declared illegal in the 1820s, astro-meteorological societies had to appear to be astronomically-based. Many weather predictions based on astro-meteorology and lunarism were published in almanacs and Patrick Murphy published, in 1834, his *Anatomy of the seasons, weather guide book, and perpetual companion to the almanac*. In 1864, S M Saxby published *Saxby's weather system or lunar influence on weather*. In his *Weather Book* (1863), FitzRoy was scathing of astro-meteorology but a little ambivalent towards lunarism. Unwisely, he took issue with Saxby and other astro-meteorologists and lunarists through the correspondence columns of newspapers and thus damaged both his reputation and his health. At the same time, he was fighting the scientific establishment who considered his weather forecasting techniques unscientific. Malcolm showed that the distinguished astronomer Sir John Herschel could be considered to some extent an astro-meteorologist and lunarist and concluded his talk with a few words about sun-spottery, the idea which emerged in the 19<sup>th</sup> century that sunspot cycles determined the weather, at least in part. Into the 20<sup>th</sup> century, Norman Lockyer studied the effects of sunspots on the weather and did so systematically and analytically. For those wishing to follow up his talk, Malcolm provided a lengthy bibliography.

**Storm Dunlop** gave a talk on *Eclipse Weather*. He mentioned some of the weather lore associated with eclipses, including some listed by Inwards. The memoirs of the Royal Astronomical Society in 1879 noted various changes of meteorological parameters that might be observed. A number of optical effects had been observed, including the elusive shadow bands, (atmospheric) coronae and halos. The principal observed effects were a drop in temperature and reduced convection

leading to a reduction of low cloud, and the occasional formation of fog and stratiform cloud. Wind changes were difficult to quantify but there was some evidence for changes in katabatic (downslope) winds and land- and sea-breezes. Recently changes had been found in ozone concentration in the ionosphere. Although not directly related to eclipses, the suggestion had recently been made that changes in the depth of the atmosphere with changing solar flux could lead to changes in atmospheric gravity waves, and thus be an actual link between solar activity and meteorological effects.

Storm's book 'Weather' (Cassell Illustrated, 2006 and 2007, ISBNs: 9781844033959 and 9781844036011), which included some of the subjects mentioned, was available for sale at a very attractive price.

After lunch and our AGM, the next presentation was by **Diane and Malcolm Walker** on **John Lee's Hartwell Observatory**.

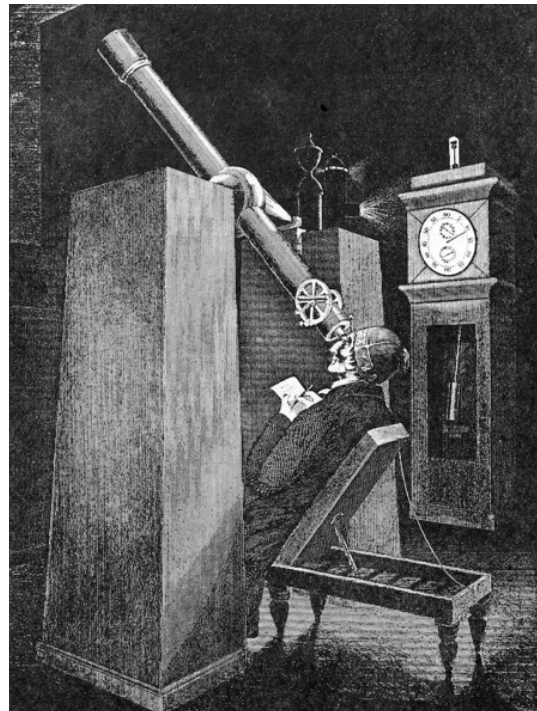
Dr John Lee FRS (1783-1866) was a member of many societies in the 1830s and 1840s, and in his library at Hartwell House, near Aylesbury, the British Meteorological Society was formed on 3 April 1850. All but one of the ten gentlemen who founded it were members of the Royal Astronomical Society, including James Glaisher. A plaque commemorating the event was unveiled in 2000 by the then President of the Royal Meteorological Society.



*Professor (now Sir) Brian Hoskins FRS and the plaque he unveiled in Hartwell House on 7 June 2000.*

William Henry Smyth (1788-1865), a retired naval officer, helped Lee set up his observatory in a purpose-built extension to the House adjoining the library. Various expensive telescopes, some on loan from the Royal Astronomical Society, were installed, and

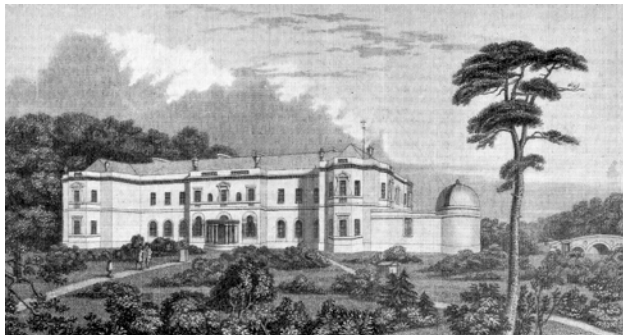
meridian markers in the shape of classical temples were placed in the grounds of the House. Among the many pictures shown by Diane and Malcolm, there were some of instruments, including an engraving of Lee at his telescope. Lee inspired others in the area to set up observatories. At Stone Vicarage, for example, a complete set of meteorological instruments was installed under the direction of Glaisher, and the observations, made by the Rev John Bancroft Reade, were forwarded to the Registrar-General.



*Dr Lee at his transit telescope (from Ædes Hartwellianæ, published by W.H.Smyth in 1851).*

Dr Lee had a comprehensive collection of meteorological instruments and made regular readings at 9 am and 3pm (see *Ædes Hartwellianæ*, published by W.H.Smyth in 1851, pp.353-354). The readings he made from January 1829 to December 1837 are now in the National Meteorological Archive (NMA) at Exeter but the whereabouts of the observations made later is not known. The observations which are in the NMA were copied out by Master John Arata White (aged 11 years), a son of the W.H.White who was mentioned by Malcolm in his talk about astro-meteorologists. Lee was a very generous host and guests usually stayed for several days, a feature of their stay being soirées which were devoted to discussions of scientific matters. On one occasion, in 1856, the guests included Capt Robert FitzRoy.

The observatory was demolished soon after Lee's death, but his hospitality lives on, as the house is now a country house hotel, and from personal experience Malcolm and Diane were able to confirm that the excellent afternoon teas which are served are good value for money.



▲ *Hartwell House in 1851, showing the Observatory which adjoined the Library.*  
▼ *Hartwell House in 1996.*



**Joan Kenworthy** explained that Gordon Manley, a geographer, ensured the importance of the Durham record with his work on the temperature series, but it was astronomers who established meteorology at the Observatory, opened in the 1840s through the enthusiasm of the Rev Temple Chevallier, Professor of Mathematics and later of Astronomy. Curiously, two others, known to have observed local weather in the eighteenth century, Thomas Wright and Spencer Cowper, Dean of Durham, were also involved in astronomy. Durham observers were paid little and could not marry. Most were trained at Greenwich and a few proceeded to successful careers in astronomy elsewhere. Richard Carrington rejected the early observations as unreliable and left a neat record of corrected observations from 1850. William Ellis, later to succeed James Glaisher at Greenwich, was also meticulous, but the temperature series was not fully analysed until, in the 1870s, John Isaac Plummer was observer. Plummer was followed by Gabriel Alphonsus Goldney, although astronomy had temporarily ceased. Unfortunately, Goldney was dismissed following complaints from Robert

H.Scott that he had failed to return the sunshine recorder on loan from the Meteorological Office! The work of Gordon Manley may have been influenced by Plummer, who made corrections to the temperature series for changes in the siting of instruments from the 'north shed' to a Glaisher screen on the south lawn.

**Anita McConnell's** talk was called ***George Airy and the Battle for the Clouds***, but she suggested that a better title might have been ***A storm in a teacup***. During the 1860s there was much bad feeling between Edward Sabine, PRS, a noted geophysicist who knew everybody and was supervising magnetic observations at Kew Observatory, and George Airy, the Astronomer Royal and therefore director of Greenwich Observatory, a man of fiery temper.

The storm broke in 1862, when Sabine stated that Kew must continue with magnetic observations, first started in the 1840s, as there was nowhere else competent to make them. Airy took offence at these remarks as there had been a Magnetic Department at Greenwich for many years, but he could not complain too much as Sabine was Chairman of the Board of Visitors to Greenwich. He wrote a confidential letter to members of the Board about the insult and was assured that the Board had confidence in him. Airy's response was that he would run his observatory with his own judgement. His draft letter states that he would not be dictated to by "any single person" but he prudently deleted this from the fair copy.

There was also a long running battle between Whipple at Kew and Glaisher at Greenwich over the discordant results from their respective magnetic dip instruments. When the instruments and staff were exchanged it was found that the Greenwich instrument was defective and Airy was forced to destroy his measurements.

As a result of the inquiry which followed the death of FitzRoy in 1865, the Meteorological Department of the Board of Trade was taken directly under the wing of the Royal Society. It was decided that Kew, under Balfour Stewart, was the best site for a British "Central Observatory". Airy was not asked for his comments, which led him to make further protests. In 1872 Sabine resigned as PRS and was succeeded by Airy who continued to fight for the older observatory at Greenwich, even by-passing the Royal Society, but failed to get the support of the Board of Trade. The storm seemed to die down after this; Airy himself retired in 1881.

The next speaker was **Fred Taylor**, Halley Professor of Physics at Oxford University, who gave an enlightening talk entitled ***Weather and climate on the planets: changing perceptions.***

Early ideas of the planets assumed that they were Earth-like and habitable. This idea persisted until the mid 20<sup>th</sup> century when robotic space missions made close range and in-situ observations. In 1915, Arrhenius published that Venus had a surface temperature of about 46°C and humidity about six times that of Earth. In 1954, Patrick Moore surmised that the planet might support primitive organisms; however, recent observations with spacecraft have found the surface temperature is around 450°C, hot enough to melt lead and tin.

Bright features near the south pole on Mars observed by Mitchel in 1842 were interpreted as mountains; photographs from spacecraft have shown that, although the observations remain valid, the interpretation apparently is not. Schiaparelli's discovery of "canali" on Mars in 1877 was advanced by Lowell who in 1908, at the height of the "canal" controversy, argued that the surface pressure was about 86mb. This value was considered valid by many until as late as the mid 1950s, and it was assumed by von Braun in 1956 that the atmosphere was suitable for a landing by gliders carrying human explorers. This would have failed however, as it is now known that the mean surface pressure is only about 6mb.

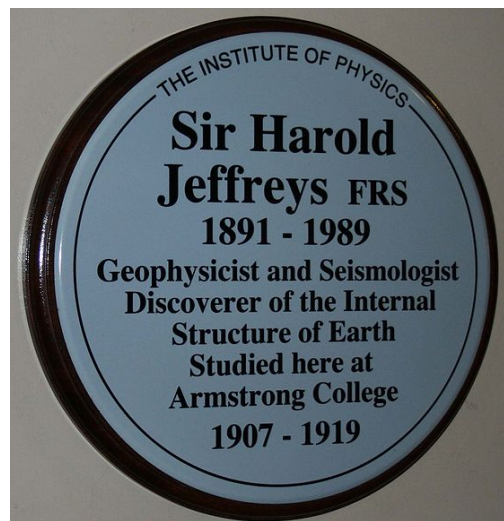
Saturn's moon Titan is the most interesting satellite in the solar system since it has a thick atmosphere with some similarity to Earth's. Now that planets orbiting distant stars have been detected in deep space, the search has begun for planets with truly earth-like surface conditions. We were also treated to some great pictures of other planets showing their real atmospheres.

The final speaker was **Raymond Hide** (Past President of the RMetS and Past President of the Royal Astronomical Society), who gave some insights into the life and works of **Sydney Chapman (PP-RAS, PP-RMetS) and Harold Jeffreys (PP-RAS)**. These two outstanding mathematical scientists were influential members of both societies.

Sydney Chapman (1888-1970, FRS 1919) went to the Royal Greenwich Observatory in 1910 to study geomagnetism. He researched the effect of the sun and the moon ("quiet days") on the earth's atmosphere. He returned to university

life in 1914 to pursue an academic career. The range of his work is illustrated by the books he wrote: from *The earth's magnetism* (1936) and *Solar plasma, geomagnetism and aurora* (1964) to *Solar-terrestrial physics* (1972). He retired as Sedleian Professor of Natural Philosophy at Oxford. He served with distinction as president of a special commission planning the 1957-58 International Geophysical Year. He was President of the RMetS from 1932 to 1934 and President of the RAS from 1941 to 1943.

Harold Jeffreys (1891-1989, FRS 1925) worked on hydrodynamics in the Meteorological Office under Napier Shaw from 1917 to 1922. He then returned to university life, as a mathematician and geophysicist. His books included *Theory of Probability* (1939) and *Methods of Mathematical Physics*, with his wife, in 1946. He retired as Plumian Professor of Astronomy at Cambridge. In all, he published more than 400 papers, mostly in astronomical journals, though he did publish a major paper "On the dynamics of geostrophic winds" in the *QJRMetS* in 1926 and a paper on "Cyclones and the general circulation" in the *QJRMetS* in 1927. He was President of the RAS 1955 to 1957 but never President of the RMetS. He did, though, receive the Society's Buchan Prize in 1929.



*Plaque to Jeffreys at Newcastle University*

This was a very interesting and informative meeting which illustrated well the overlaps between astronomy and meteorology. Although there were noises offstage for a couple of hours as crowds processed along Piccadilly to Hyde Park for a gathering to protest against the G20 summit, the bands and crowd noise did not distract from a very enjoyable day.

## A NEW METEOROLOGICAL DATA SET by Howard Oliver

A London book dealer is advertising a diary written by the Unitarian minister William Johns between 1810 and 1815, together with his weather log for the period 1842-45.

The dealer is Richard Ford,  
e-mail: [richard.rmford@btopenworld.com](mailto:richard.rmford@btopenworld.com)  
Price £950.

William Johns ran a school in Manchester and John Dalton lodged with him at 24 George St, near the centre of the city, from 1804 to 1830. Both were officers of the Manchester Literary and Philosophical Society. On retirement, Johns moved outside the city to Higher Broughton, where he lived in "Eaglesfield House" – presumably named after Dalton's birthplace.

While living at George St, Dalton took regular meteorological observations which he continued nearby until his death in 1844. Regrettably, much of the original data were lost in the bombing of World War II and only charred remnants plus his published papers now remain.

The discovery of this Johns data set adds significantly to the early Manchester

meteorological information. Presumably, Johns became keen on observing following years of watching his famous lodger. Either on his own volition, or at the request of Dalton, at some stage he began taking his own measurements after he had moved to the suburbs. His data continue from 1842 almost until his death. Nothing earlier was found. The final pages in the diary, written in a different hand on 9 November 1845, say "on the day of this last entry my father's health, which had been declining since July, gave way and he went to bed to rise no more. At first he requested me to keep an account of the temperature which I did for some days, but when his death appeared certain, the thing ceased to interest both him and me." He therefore did not quite take data to the last, unlike Dalton whose last observations were made the night before he died!

The Johns weather log consists of two entries per day (around 9am and in the evening – times precisely noted) and comprises temperature (to 1 deg F), pressure (to 0.1 inch), a brief weather description, wind direction and speed description in words.

Mr Ford kindly let me have copies of two of the pages which were enough to confirm the validity of the data. A comparison between the winter 1844 daily morning temperatures measured by Johns and values for Durham, kindly provided by Joan Kenworthy, show a reasonable consistency, giving confidence in the data set. A shorter period of summer data also provided correlated rather less well.

The Johns data I was provided with also quoted his calculated average temperatures for January and June 1844 (37.4 and 58.4 deg F), which show remarkable agreement with the monthly Central England values of 38.8 and 58.5 deg F.

Understandably, no further pages can be made available for study, but it is to be hoped that any purchaser will feel able to make the data available for scientific purposes and I have provided Mr Ford with all my findings to try to encourage this!

The image shows two pages from a diary with handwritten meteorological data for 1844. The left page covers dates from Jan 23 to Feb 17, and the right page continues from Feb 17 to Feb 24. The entries include time of day (e.g., 9 AM, 9 PM), weather descriptions (e.g., 'Thunder fog', 'Much cloudy'), wind directions and speeds (e.g., 'E 3/4 m', 'W 1/2 m'), and temperature readings in degrees Fahrenheit. A section titled 'Average temperature of Jan 37.4' is also visible.

Data from 23 January to 17 February 1844

## **WEATHER IN MY LIFE**

**by Richard Gregory**

### CHILDHOOD / APPRENTICESHIP

With another cold snap just upon us [this being written in March 2009], it is timely to recall that, as a small boy growing up in London's dockland, it was quite usual to find beautiful ice patterns on the inside of my bedroom window during winter. About four years later, the family having moved to Stanmore, my Saturday morning task was to cycle to Burnt Oak for the week's shopping. In the right weather conditions, this produced frost on my eyelids and eyebrows but it was not until I went to Willesden Technical College, some 3 miles farther from home, that I experienced the most agonising return of circulation to my fingers after the 25 minutes' cycle ride in winter. Warming my gauntlet gloves before the open fire before setting off merely delayed the onset of chilling. Otherwise, with no other practicable means of transport between Stanmore and Willesden, it was a matter of getting on my bike and setting off, sometimes through 6 inches of snow or, at other times, through heavy rain, from which my cycling cape protected me down to just below my knees. 1940 saw our employer's in-house training school moved from Willesden to Bishops Cleeve just outside Cheltenham, which was close enough to avoid the worst effects of sub-zero temperatures on one's hands.

### POWERED FLYING

Joining the Royal Air Force in January 1946 at a very muddy Padgate Reception Centre and mustered as PNB, or pilot/navigator/bomb aimer, I soldiered on in the ranks waiting for pilot training to begin again, and was lucky enough to be part of the very first post-war pilot training course at Spitalgate, near Grantham. This introduced me to the triangle of velocities on the Dalton computer, and to the Tiger Moth training biplane with its open cockpits. Trundling along at about 80 mph, it was very easy to see sideways drift imposed on our little aeroplanes by a beam wind which might be 30mph+. However, with accurate measurements of wind velocities below cloud level as measured by the duty forecaster tracking a pilot balloon with a theodolite (to which art Wally Warrington and David Pedgley introduced me much later), the wind arrow could be laid off at the tip of the airspeed arrow. Putting in the third side of the triangle gave the pilot his required heading and ground speed. Track-made-good and time over

the ground were checked by accurate map reading, the scale being 1 inch to 1 mile.

The Tiger Moth carried no radio and, as we all know, weather here can change rapidly. In the event of a recall to base being necessary due to worsening weather, the recall system relied upon the visual and aural effects of a large rocket which, of course, had very limited range. This meant that, on one occasion when a number of us were airborne solo and the cloud base dropped markedly to rather less than 1,000 feet, those of us to the east of Spitalgate made our way safely back home. "Farmer" Frank Warboys had been practising aerobatics over a useful rail junction well to the west, at a rather lower level. As a result, when the cloud lowered abruptly, Frank set off home along a railway line - the wrong one - but having turned back to the junction and picked up the correct line - flying at about 200 feet it should be noted - he very sensibly followed the road out of Grantham and up the hill to the airfield boundary, where a touch of throttle took him over the hedge. Again, very sensibly, he decided to put it down, dispensing with the usual joining procedure, and walked into the locker room to be greeted as a hero! Soon after this, the last group of Dutch pilots to be trained by the RAF began their night flying. So it happened that one night, with clear skies, temperature falling, and the dew point critical, the duty forecaster warned of the very strong probability of fog forming, but the duty flight commander would have none of it. He strode out to his Harvard, leapt in, fired it up, taxied out and took off, when the fog, like the Red Sea closing behind the Israelites after they had crossed dry shod, closed in behind him. Luckily, Waddington with its GCA talk-down radar, was just a few minutes up the road, so all ended safely though embarrassingly for our hero!

Our course of about 24 strong was almost 50-50 with new boys - sproggs like me who were much impressed by the other half, who were all ex-Halton "brats" or apprentices of many years' service, some in India, Malaya, and Singapore, so we had a very steep learning curve, socially as well as technically. We worked hard and enjoyed ourselves immensely, despite food rationing which lasted until 1953. However, their Airships decided to close Spitalgate and disperse the course, which meant that half of us were posted to Feltwell, in the low-lying fen country. It was here that, in one period dominated by high pressure and with a light north-north-easterly drift to the wind, visibility



dropped to less than 1,000 yards in smoke, which put a stop to flying for two days. It was not until three or four days later that we read in the newspapers that there had been a forest fire in Scandinavia! There was no instant dissemination of news then. Here too we had the shortest weather forecast I have known, when the duty forecaster took his place by the briefing board, turned to face us and then, spreading his hands horizontally at waist level, with a shrug of his shoulders spoke the one word: "Foggy". It was at Feltwell that, at the end of a long dry spell in early 1948, strong winds from the South West lifted up and carried out to sea several hundred tons of precious fenland peat soil, a side-effect of a high pressure system no doubt. Airborne, this also reduced visibility to below 1,000 yards and kept us grounded for two days.

From Feltwell, a number of us were posted to a Spitfire operational training unit at Chivenor in north Devon, and it was here that I had the most wildly exhilarating flight of my life. On a gin-clear day I was briefed to move to a position behind my leader's tail after climbing to a medium altitude, and to stick there! My formation leader was an ex-operational pilot, and he did his very best to shake me off, so that with my feet on the top rudder pedals to help prevent the blood draining from my head, grunting with the four and five G imposed by the racking turns, I had no notion of up or down, while the sun appeared in front, over my left shoulder, or directly overhead. I hung on grimly to the twisting and turning aircraft ahead. Eventually I was called back into battle formation, we went back to base and landed. Walking in from our aircraft, the leader turned to me and said. "That wasn't bad".

Next to Bentwaters in Suffolk, and the Mark 1 Vampire, an interesting but operationally useless aeroplane. The pilot's seat was raised and lowered by a handle on the right-hand side operating a plunger to go into one of a number of holes on a 90° quadrant. This caught me out one day. Returning to base after a session of aerobatics, my seat at its lowest point, I pushed the button to release the plunger and raise the seat, just as I met some very bumpy air. My seat went from fully up to fully down, without giving the plunger a chance to pop into a hole and lock – a brain-rattling experience!

From Suffolk to 16 Squadron in Gutersloh, north-west Germany, and the operational Mark 5 Vampire. Soon after joining the Squadron, I was sent off as the first to fly round a high-level cross-country route. Settled on a

northerly leg from Cologne to Bremen, I looked over the port side of the cockpit for a rough check on position and was very put out to observe a marked starboard drift. This was all very well on the Tiger Moth, but to a jet jockey at over 30,000 feet – well! However, there it was and I had to do something about it for the sake of the other Squadron pilots who would follow me round the route. With no computer to help, just a few figures from my school logarithm tables, I estimated the strength and direction of this considerable beam wind which had not been part of the forecast briefing. The figures were startling: 115 knots from about 265°. Conscious of my new boy status, I checked my figures and taking a deep breath, pressed the radio transmit button. I reported my estimated wind speed and direction and requested that the information be transmitted to the crew room. It was very gratifying to have a telephone call from the duty forecaster shortly after landing, both to thank me for the reported jet stream – which it was – but also us to compliment me on the accuracy of my estimate, which had only been 5 knots out in the strength element.

Gliding at Gutersloh introduced me to thermal up currents, which usually took me up to cloud base, so it was with keen interest, back on a day when a high-pressure system had been in existence over North Germany for three or four days, with very little wind at any level, that I saw a funnel of smoke-laden air rising above 25,000 feet! Climbing to investigate I saw that the rising warm air had been capped by the inversion which was present, and had spread, mushroom like. On looking down, a small forest fire could be seen, performing this stoking up action.

On another occasion, returning to base at low level and about 300 knots in open battle formation with four aircraft, many well-developed cumulus clouds were producing heavy showers, one directly and ahead of us at about 3 miles distance. Before our gallant leader could gather his wits to change our course, we were into the rain, which was mixed with hail. The noise of the precipitation striking my aircraft was extremely loud, and it was with some difficulty that I heard the radio message calling a turn about. Getting out of my aircraft after landing I was not particularly surprised to see that the paint had been stripped off the wing leading edge to a depth of about 9 inches rearwards, but that the heavy metallic filler used to bring the leading edge to the correct aerodynamic shape should also have been ripped off was surprising. On inspecting the

aluminium bullet fairing about 5 inches across, between the tailplane and the fin looked like nothing more than a large ball of putty into which a forefinger had been poked.

About 14 years later, I encountered the heaviest, indeed torrential, rainfall I had ever seen, with forward visibility reduced to less than 25 yards, and the rebound splashes from the rain forming a carpet about 10 inches deep about the runway surface, and we were lined up for takeoff some 10 seconds after another aircraft had rolled. I looked across at my student and said "Right-o, we've practised instrument take-offs, let's do one for real". He released the brakes and we rolled forward, accelerating with increasing power until, when the nose wheel lifted off the runway at about 85 knots, I heard my friend call "Barrier, barrier". This meant that the arrester gear at the far end of the runway had been raised to stop his aircraft, which left us with no option but to continue, and we eventually lifted off to climb away, with a small prayer of thanks – from me, anyway. My next encounter with such extreme rainfall occurred sailing a yacht in the Ionian on 10<sup>th</sup> September 2004, as described in December's *Weather* of that year.

In the late 50s and early 60s, at Worksop airfield in the Dukeries we usually had less than 2000 yards' horizontal visibility at circuit height, but one Monday morning after about three days of intense high pressure, solids in the atmosphere has settled out. I decided that my student, who had just come from flying a mahogany bomber (aka desk) at Air Ministry, and whom I knew had never been above 19,000 feet (and that at night), deserved a special treat. So began a long climb up to 43,000 feet – well above the aircraft's nominal operational height limit. At this height we found ourselves over the Isle of Man, with the whole of the east coast of Ireland ahead, and behind us the West Coast of Scotland, Wales and England, from the Mull of Kintyre all the way down to the Bristol Channel, with just the glint of early morning sun on the English Channel beyond. With civilian air traffic still mostly below 10,000 feet, powered by piston engines, we were very, very much alone – truly a moment to "Put out my hand, and touch the face of God".

It was the great frost of 1962-63 which gave me two of my most "interesting" moments in the Royal Air Force when, approaching Lincoln from the South at 19,000 feet on a northerly heading in brilliant moonlight with all the muck in the atmosphere deposited on the frozen earth, I

glanced over the starboard side of the aircraft to see our shadow flitting along over the permafrosted earth. A few days later, with my student making a practice instrument approach to Swinderby, we were approaching Newark at 1,200 feet (where we had been told there was a layer of air at very low temperature), flying in the trapped smoke from the power station, the droplets of supercooled water turning instantly to ice as the wing struck them. Necessarily holding this critical height for four minutes led to an unhealthy build up of ice on the leading edge, which would require an extra 5 knots on the approach speed, giving us more kinetic energy to be soaked up by the brakes – on a runway which was more than half covered in glazed ice – not an enticing prospect. Consequently, applying gentle braking almost as soon as the wheels touched, the wheel on the tarmac dutifully did its retarding bit while the other, on ice, just locked. When that wheel skidded on to tarmac, the enormous heat generated in the tyre between the tread and the pressure-bearing casing beneath it, caused a huge bubble of air to burst the tyre. The wheel rim dropped on to the tarmac and we began a gentle hockey stick like curve off the runway and on to the grass, where we quickly came to a stop, with the left wing somewhat lower than the right. Luckily for me, since we had been flying in conditions "outside the book", the Wing Commander Flying, in covering his own back, graciously whitewashed me!

### GLIDING

From June 1949 to August 2003, I accumulated nearly 6000 glider launches and over 600 hours flying. This took me from Gutersloh in Germany to Swinderby in Lincolnshire, Mahaliesberg in South Africa and, most exciting of all, to Omarama in South Island New Zealand. However, on a wave soaring expedition to the disused airfield near Carlisle in February 1961, and after acting as the aircraft pilot for five days, I was finally let off the leash and on August 3<sup>rd</sup> was able to complete the 5 hour flight leg of my Silver C certificate and, in the same flight, reach a height just 200 feet short of the Diamond C requirement. This was achieved in a remarkable flight in which all I had to do was to fly gently south into the wind over the hills near Carlisle, until I hit smooth lift. All that was subsequently necessary was to maintain a steady position in relation to the ground, and watch the altimeter clock up the thousands of feet!

Some years later, on 19 February 1999, I experienced the roughest turbulence I had ever

come across in 50 years of flying. The aerotow had left me over the beginners' slope, where I gained height steadily up to about 5,000 feet above ground level, from which height I could see the chief flying instructor in another sailplane also climbing above a long gentle slope, and made a radio call to let him know that I would join his thermal shortly. His reply was "Caution, Richard, this is a rotor, not a thermal!" and when I reached a position below his circling sailplane I realised why he had said that. I received the most enormous upward jolt, which made the accelerometer needle show +6G, and then almost immediately another violent blow downward produced an indication of -3G. Until I hauled down heavily on the shoulder restraining straps, my head was banged briskly from one side of the cockpit canopy to the other. Fortunately, the sailplane performance envelope extended to +7G and -4G, so the wings stayed on, though I very soon left this most uncomfortable region. The sharp memory is still with me today!

© Richard Gregory

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## **THOMAS BARKER: RUTLAND'S 18<sup>th</sup> CENTURY METEOROLOGIST** **by Tim Clough (Hon. Editor, Rutland Local History & Record Society)**

In 1988, the then Rutland Record Society published *The Weather Journals of a Rutland Squire: Thomas Barker of Lyndon Hall*, edited by John Kington, as the second of its Record Series. The Barker family was well-known on the Rutland social scene, and in his turn Thomas Barker (1722-1809) was to become squire of Lyndon Hall, situated in a prime location at the heart of Rutland's rolling agricultural landscape. Whilst still a boy he began over sixty years of daily observations of weather, natural phenomena and country life. He meticulously recorded everything from rainfall and barometric pressure to earthquakes, from the state of the crops to the swarming of bees: a highly readable, detailed and fascinating picture of country life, valuable not only in terms of social and agricultural history but increasingly to those interested in reconstructing historic weather patterns and in studying climatic change past, present and future. It is also worth noting that Thomas Barker married Anne White, sister of Gilbert White, the well-known naturalist of Selborne in Hampshire: the two men were in regular contact over the years.

Although accounts of Barker's annual records had been communicated to the Royal Society at the time and published in its *Philosophical Transactions*, it was whilst at the Climatic Research Unit of the University of East Anglia that John Kington worked with the Rutland society to bring much of Thomas Barker's archive more accessibly into print. In view of renewed interest in these records and today's ongoing digitisation project it seems appropriate to note that this title is still in print and readily available from the Rutland Local History & Record Society. Orders by post should be sent to the Hon Editor, RLHRS, c/o Rutland County Museum, Catmose Street, Oakham, Rutland, LE15 6JHW, enclosing a cheque payable to RLHRS for £6.50 (which includes £1.50 p&p). Details of the Society and its other publications will be found at [www.rutlandhistory.org](http://www.rutlandhistory.org). To order on-line and pay by debit or credit card, visit the Society's page on [www.genfair.co.uk](http://www.genfair.co.uk) (p&p charge will be different). Better still, have a short break in Rutland, enjoy its countryside, historic towns and villages, and the pleasures of Rutland Water, and pick up a copy while you are there!

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## **SHIPS' LOGBOOKS ONLINE**

As many members may know, History Group member Dennis Wheeler has been working with Royal Navy ships' logbooks to recover oceanic climate data from as early as the late seventeenth century. One of the projects (funded by JISC – the Joint Information Systems Committee) has been imaging and analysing the logbooks of the famous voyages of exploration. These are held in the National Archives collection ADM55. The project (acronym CORRAL - UK COLONIAL REGISTERS AND ROYAL NAVY LOGBOOKS: making the past available for the future) now has a website at [www.corral.org.uk](http://www.corral.org.uk). This site is still in the process of 'construction' but can be accessed without limitation and gives an indication of the team's activities. Our partners include the Hadley Centre and the British Atmospheric Data Centre. The logbooks (including those of Fitzroy's Beagle voyages) have all been imaged and we are currently making progress in making them available for free access. This should be complete by September, so watch this space.

**JOINT MEETING WITH THE RETIRED MEMBERS' SECTION OF THE LONDON AND SOUTH EAST BRANCH OF THE INSTITUTE OF PHYSICS**  
**Thursday 15 January 2009**

This was a full-day meeting held in the lecture theatre of the Institute of Physics, 76 Portland Place, London. It was concerned with "The development of meteorological observations"; and ninety-five people attended.

The first talk was given by **Richard Pettifer**, ***A short history of upper-air measurements: a brief look at the technology.***

He began in the 18<sup>th</sup> century with Jacques Alexandre César Charles, of Charles's Law fame, who worked with the Montgolfier Brothers and made a balloon ascent to a height of about 3km on 1 December 1783. He also mentioned that Joseph-Louis Gay-Lussac and Jean Baptiste Biot had found that water vapour decreased with height but not air's composition.

In the middle of the 19<sup>th</sup> century, John Welsh, James Glaisher and Henry Coxwell made balloon ascents for meteorological purposes, some to heights above 7km; and as early as 1822 Sir Edward Parry and George Fisher used kites with recording thermometers to study the Arctic atmosphere. At Kew Observatory in 1847, W.R. Birt flew a hexagonal kite with thermometer and hygrometer attached, using a pulley system to raise and lower the kite.

Kites and pilot balloons were much used in the 1890s and early part of the 20<sup>th</sup> century, often being used to carry meteorographs aloft. Among those who pioneered this kind of work were Richard Assmann and William Henry Dines. Indeed, the Dines balloon meteorograph remained in use in the United Kingdom until 1939, when superseded by the radiosonde.

Since the late 1920s, radiosondes in a variety of forms have been used operationally to measure the atmosphere with ever increasing accuracy. And as Richard said in the abstract of his talk: "Although both ground-based and space-based remote sensing have appeared in the past twenty years or so, radiosonde measurements are still the most fundamental and important data source for both weather forecasting and climate studies".

Radiosonde systems are today fully automated and use the latest meteorological sensors, sophisticated tracking and monitoring devices, complex electronic sub-systems and advanced

data acquisition facilities. How primitive the radiosonde systems in use only three or four decades ago seem now!

The next talk was by **David Pick**, on ***The development of satellite observations.***

He mentioned first the aeolipile, an early form of rocket or reaction steam turbine, which was described by Hero of Alexandria in the first century AD. But not until 16 March 1926 was a liquid-fuelled rocket launched successfully, by Robert Hutchings Goddard. Since then, rockets have become important in meteorology, not just for sounding purposes but also for carrying aloft meteorological satellites.



*Hero's aeolipile*

A pioneer of atmospheric remote sensing by means of emission spectroscopy was Lewis David Kaplan, who in the 1960s initiated the use of infra-red spectroscopy to sound atmospheric temperature structure. *cont'd on page 13*



*Radiosonde launch at Lerwick Observatory in a gale, summer 1963. Notice that the corners of the radar reflector have been padded, to reduce the risk of the balloon bursting should it whip back in the turbulent conditions and strike a corner of the reflector. The operator on the right will release the instrument package when he is sure the balloon has ascended sufficiently for the package to be carried aloft in the capricious conditions without hitting the ground and thus being damaged or destroyed.*

The first successful weather satellite, TIROS I, was launched in 1960 and remained operational for 78 days. Until 1964, however, when the first of the NIMBUS series of spacecraft was launched, there was no practical demonstration of the capabilities of routinely measuring temperature, humidity and composition of the earth's atmosphere. The technique relied on the ability to measure accurately the outgoing radiation from the earth's atmosphere from the visible through to the infrared and microwave spectral regions. To be of practical use to the meteorological user, this had to be done globally and the data made available within hours to the global forecasting community.

In his review of meteorological satellite observing systems, with many of which he had been involved, David described in some detail the UK Met Office's Stratospheric Sounding Unit, a three-channel infrared radiometer which was flown on TIROS N and NOAA polar orbiting satellites and measured radiation in the 15 micron band of carbon dioxide using a pressure modulation technique he had helped develop at Oxford. He also outlined the history of EUMETSAT (the European Organization for the Exploitation of Meteorological Satellites) and described the instruments and systems aboard various polar-orbiting meteorological spacecraft which had been operated by this organization.

After an excellent lunch, a hot buffet with wine – they do things in style at the Institute of Physics – **Gordon Peckham** gave a short talk on ***The Cairngorm Automatic Weather Station***, which was installed on the summit of Cairngorm in 1976 and has functioned well ever since. The station is operated by Heriot Watt University and provides temperature and wind data every half an hour, with the data uploaded to the internet several times each day using the mobile telephone network.

Prior to 1976, Gordon said, few continuous sets of mountain weather observations had been obtained since the closure of the Ben Nevis observatory in 1904. The summit of Cairngorm was a particularly difficult environment because of severe riming when there was freezing fog. To combat this, the instruments were housed in a heated cylinder and exposed to sample the weather for only three minutes every half hour.

The final talk was given by **Keith Browning**, who spoke on ***Weather Radar***, which, he said, had been used to observe and advance understanding of a wide range of weather phenomena, ranging from thunderstorms and

frontal rain and wind systems to clear-air turbulence. It had also been developed for use as an operational tool for mapping the extent and movement of rain.

Keith explained that spurious echoes on World War II radar displays were caused by birds, insects and raindrops, and he then introduced Rayleigh Scattering and Bragg Scattering. He mentioned that radar revealed temperature inversions, thermals of fair-weather cumulus, Kelvin-Helmholtz billows and other features of the atmosphere. Problems of using radar included enhancement because of orography, sheltering behind objects and attenuation by other rain-storms. The concept of networking radars had been introduced in the early 1970s.

Among advances in understanding that have stemmed from studies which have made use of observations derived from different types of radar have been the seeder-feeder mechanism for precipitation enhancement over hills and a greater insight into the small-scale and mesoscale processes that help drive and maintain slantwise and upright convection in extratropical weather systems. Results of radar studies are now being incorporated in numerical weather prediction on ever-smaller grid scales.

This was yet another excellent meeting of the History Group.

Malcolm Walker

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## DAVID LIMBERT

Sadly, David Limbert, a member of the History Group for many years, passed away on 3 May 2009. He was 81. We send our most sincere condolences to his family. David joined the Royal Meteorological Society on 15 June 1952.

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## IN THE NEXT NEWSLETTER

There will be articles on:

- the *Royal Charter* storm of October 1859 and its importance in meteorological history;
- how the Royal Meteorological Society coped with the Great Depression of the early 1930s.

Do **please** put fingers to word processor or typewriter or even pen to paper. We are very keen to hear from you. We do want to publish your contributions. Please send them **BY 30 SEPTEMBER 2009** to Malcolm Walker, 2 Eastwick Barton, Nomansland, Tiverton, Devon, EX16 8PP.

## SUMMER MEETING Rothamsted Research Saturday 6 June 2009

It was probably too much to expect the warm sunny weather of the previous week to hold for a meeting that was partly out of doors! However, the rain that was falling at Rothamsted in the morning soon stopped (as forecast) and the weather was dry for the afternoon visits to the meteorological enclosure and agricultural trial grounds. The temperature of about 13°C was, though, quite a contrast to the mid-twenties of only a few days before, a classic occurrence of Schafskälte (Sheep Cold), which is a sudden cold spell that often occurs in early June.

The meeting began, after morning coffee, with an introduction to the work of Rothamsted Research, the largest agricultural research station in the United Kingdom. This was given by **Professor Keith Goulding**, Head of the station's Department of Soil Science.

Rothamsted Research has outposts at Woburn in Bedfordshire, Broom's Barn in Suffolk and North Wyke in Devon, and funding comes mainly from the Biotechnology and Biological Sciences Research Council, partly from the Department for Environment, Food and Rural Affairs and partly from other sources, including industry and the European Union.

The Rothamsted research station was founded in 1843 by Sir John Bennet Lawes, who employed Sir Henry Gilbert and worked with him for the next 57 years. There was wheat research from the outset, and a soil and plant archive was also begun in 1843. This archive now has 300,000 samples, all sealed from changes in the external atmosphere.

A rain-gauge with a rectangular funnel of area 1/1000<sup>th</sup> of an acre was built in 1852 and is still used for measuring rainfall amounts and collecting samples of rain-water for analysis. By means of other devices, wet and dry deposition have been measured for many years. Using diffusion tubes, for example, concentrations of nitrates, sulphates and other compounds are ascertained. Radioactive isotopes are also monitored, notably amounts of caesium-137 and ratios of uranium-238 to uranium-235. Rothamsted meteorological records indicate that winters have been warmer over the past two decades than hitherto, providing evidence for a climatic warming trend. Nitrogen dioxide concentrations have been declining steadily because of decreasing emissions from industry.



*The 1/1000<sup>th</sup> acre rain-gauge and other meteorological instruments.*

The next speaker was **David Pedgley**, who presented a paper by Joe Riley and Don Reynolds called *A history of the use of radar to study insect movement in relation to the wind*. He passed on the apologies of the authors, whose absence was unavoidable, but said that he had been a colleague of both for many years and therefore knew something of their work. He nevertheless hoped he would not have too many problems giving someone else's paper. He had none at all.

David began with a chronology of key technical developments in entomological radar, beginning with the 3cm mobile scanning radar introduced in 1968 and proceeding to mention, *inter alia*, a nutation version of vertical-looking radar used since 1993 and a harmonic radar used since 1995, the latter for investigating the behaviour of low-flying insects such as bees. Reg Rainey (1913-1990) had been convinced more than fifty years ago that radar could be used for studying insect movements, particularly locusts.

Radar studies have shed much light on insect flight speeds, directions, durations and tracks, and some surprising discoveries have been made. A study in Niger and Mali, for example, has shown that insects can travel 350km in a night. Recent studies using nutation vertical-looking radar have also revealed information about insect orientation, body shapes and wing-beat speeds. From radar studies, it has been shown that insects are able to compensate for wind drift and are not simply blown hither and thither by the wind. Insects are able to use the wind to reach their intended destinations, by selecting the winds for their flights and by adopting appropriate headings. Radar techniques are becoming more and more sophisticated. Transponders that weigh a few milligrams are now attached to insects; these respond to radar beams.

The final talk of the morning session was given by **Howard Oliver**, who spoke about work at Rothamsted carried out by pioneer soil physicist and research hydrologist Howard Penman (1909-1984).

At the beginning of his talk, Howard considered why clothes on a washing line dry. In so doing, he adopted an interactive dynamic approach, assisted by two volunteers from the audience, who formed the end supports of a washing line on which he hung garments. The audience agreed that wind speed, relative humidity, sunshine, orientation of washing line, colour of the object hanging on the line and looseness of material were all important factors. Then, using a small plastic model tree, Howard considered evaporation from soil and vegetation, pointing out (a) that some leaves on a tree are in shade, others in sunshine, (b) that turbulence plays an important part, with bushes and trees rougher in an aerodynamic sense than smoother surfaces.

Penman was active before and after the Second World War, joining the Rothamsted Soil Physics Section in 1937. He was engaged in acoustic mine development during the War and resumed his soil and evaporation studies at Rothamsted in 1944, becoming Head of Physics in 1954. He served as President of the Royal Meteorological Society from 1961 to 1963.

His definitive paper on "Natural evaporation from open water, bare soil and grass" was published in 1948 in the *Proceedings of the Royal Society of London, A* (Vol.193, pp.120-145). In this, he introduced his now-famous Penman equation, by means of which evaporation can be calculated using standard meteorological observations. He also published a monograph called *Humidity* in 1955 (Institute of Physics, 71pp) and a book called *Vegetation and Hydrology* in 1963 (Commonwealth Bureau of Soils Technical Communication 53, 124pp).

Howard mentioned that John Monteith, another distinguished Rothamsted researcher, had advanced Penman's work by formulating a more complete evaporation equation and published, in the *QJRMetS* in 1961 (Vol.87, pp.159-170), a classic paper with G.Szeicz entitled "The radiation balance of bare soil and vegetation". Howard further mentioned that he himself had contributed to studies of natural evaporation, publishing, in the *QJRMetS* in 1977 (Vol.103, pp.345-357), a paper with Alasdair Thom "On Penman's equation for estimating regional evaporation".

After lunch, the Lawes Trust Senior Fellow at Rothamsted, **Roger Plumb**, led three field visits, the first to the meteorological enclosure, where the 19 participants in the day's meeting viewed the 1/1000<sup>th</sup> acre rain-gauge, diffusion tubes, insect traps and standard meteorological instruments. After that, the group visited the Park Grass hay meadow and the Broadbalk wheat strips, seeing at both sites the obvious effects of applying various inorganic and organic fertilisers. The Park Grass experiment began in 1856, the Broadbalk experiment in 1843.



*Roger Plumb explaining the Broadbalk experiment.*

For the final session of the day, the group visited Rothamsted Manor, where Roger outlined the fascinating history of the building and introduced some of its owners, including Sir John Bennet Lawes (1814-1900) and Sir John Wittewronge (1618-1693). The latter maintained a weather diary from January 1684 to March 1689, as **Alan Heasman** explained.

The reason why Sir John began to make daily observations of the weather is not known, but Alan suggested that it may have been that the exceptionally severe weather of the 1683-84 winter had impressed him. On the other hand, he may have been inspired by Sir Christopher Wren, who encouraged weather recording. Or it may be that Sir John knew Robert Hooke, who was an inventor and improver of meteorological instruments and also had interests in Hertfordshire. Sir John had access to a barometer (but not to thermometers).

The diary came to light as a result of a letter from John Kington published in *The Times* on 1 July 1976. In this, he appealed for information about meteorological and related natural history observations made before 1860. A number of replies were received, among them one from the Hertfordshire County Archivist, who drew attention to the manuscript diary maintained by

Sir John and still to this day cared for by the Hertfordshire County Record Office.

The observations in the diary are fairly general but nevertheless fit in well with contemporary records analysed by Gordon Manley. For further information, see "The weather diary of Sir John Wittewronge at Rothamsted, Hertfordshire, 1684-1689", by R.N.Hughes (*Weather*, 1984, Vol.39, pp.68-78) and *Observations of weather. The weather diary of Sir John Wittewronge of Rothamsted 1684-1689*, edited by M.H.Williams and J.Stevenson (Hertfordshire Record Publications, 1999, Vol.15, pp.lvii+79). Copies of the book were available for inspection during the morning session, and copies of the *Weather* article were provided for anyone who wished to take one away.

This was an excellent meeting. Very many thanks to Alan (Heasman) for organizing it.

Malcolm Walker

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## A NOTABLE METEOROLOGICAL LETTER TO THE EDITOR OF *THE TIMES*

The following letter, headed "Francis Moore, Physician, Outdone", was published in *The Times* newspaper on 31 January 1837.

Sir, As there is no part of your estimable journal I do not take an interest in, and living as I do in an isolated part of the country, which would be rendered intolerable if it were not that *The Times* was delivered regularly, I cannot refrain from "crying back", as we fox-hunters say, to your paper on the 29<sup>th</sup> of December, 1836; for in it is contained the following report from the Meteorological Society:-

"Anticipated state of the weather during the approaching month of January 1837. The tendency of the weather throughout the month will be to drought. Frost may be expected to set in about the 5<sup>th</sup> of the month, if not sooner; and the period of greatest cold may be expected to occur on the night of the 13<sup>th</sup>, or following morning, succeeded by a thaw; squally weather with rain thence to the 22<sup>nd</sup>; after which a return to frost and dry harsh weather to the close of the month."

So for the report. Now to begin with the beginning – "The tendency will be to drought". The answer to this is, that one of the greatest floods known for six years has occurred in this month. "Frost may be expected to set in about the 5<sup>th</sup> of the month, if not sooner". That "if" has saved the credit of the society, for it set in a

fortnight sooner, having begun on Christmas Eve, and continued till the 5<sup>th</sup>, when it began a gradual thaw. "Francis Moore" used to confine his prophetic knowledge to a day or two before or the day after, but the "society" think nothing of days, and substitute "fortnights". "And the period of greatest cold may be expected to occur on the 12<sup>th</sup> or following morning, succeeded by a thaw". The thaw unfortunately succeeded too early, having, as I said, commenced on the 5<sup>th</sup>, and the night of the 13<sup>th</sup> and following morning were remarkable for their mildness. The report goes on to say, "squally weather with rain thence to the 22<sup>nd</sup>". To illustrate the truth of this I have only to say, I have a windmill opposite to my window, and the miller assured me he had not wind enough, from the 13<sup>th</sup> thence to the 22<sup>nd</sup>, to grind three sacks of corn. So much for squally weather, and as to rain, scarce a drop fell in that time. The prophecy concludes with this – "after which (the 22<sup>nd</sup>) a return to frost, and dry harsh weather to the close of the month". The answer to this could be given by my "Macintosh" if it could "discourse eloquent" praises of its waterproof qualities; from the 22<sup>nd</sup> up to the present day, the 29<sup>th</sup>, every day during which time it has been in requisition to keep out the mildest showers, which make one continually in anticipation of spring, and teach us to forget the Meteorological Society and its unfortunate prophecies.

I have the honour to remain, Sir, your obedient servant,  
A HERTFORDSHIRE YEOMAN

Oh dear, oh dear! Disgusted of Hertfordshire!

The response of the Meteorological Society was a deafening silence! The yeoman's letter was ignored.

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## JOB FOR LIFE?

Treasurers are often told jokingly the job is for life. One Treasurer of the Royal Meteorological Society, Henry Perigal, served for 45 years. He was appointed on 24 May 1853, only three years after the Society was formed, and he retained the job continuously until his death, which occurred on 6 June 1898, when he was 97 years of age. During his time in office he saw the society change its name first, in 1866, from *British Meteorological Society* to, simply, *The Meteorological Society* and then, in 1883, to *Royal Meteorological Society*. To mark the 40<sup>th</sup> anniversary of his appointment as Treasurer, a dinner was given by the Society in his honour.



Another who served the Society for more than forty years was William Marriott (1848-1916), who was the Assistant Secretary (the post now called Chief Executive) from 1 May 1872 to 30 September 1915, when he retired.

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## ANOTHER NEW OCCASIONAL PAPER

Occasional Paper No.8 was added to the website of the Royal Meteorological Society in March 2009. Called *The Met Office grows up: in war and peace*, it was written by Maurice Crewe. In the words of the author: "This paper is not intended to be a detailed comprehensive history but a personal collection of historical pointers to complement *Meteorology and Aerial Navigation* (Occasional Paper No.4; Crewe, 2002). ... The object of the paper is to record some of the ways that day-to-day meteorology changed [mainly in the 1910s and 1920s] and to introduce notable meteorologists who either contributed to the improved meteorological services during the Great War or developed their interest in the subject."

The paper is available online only. See:

<http://www.rmets.org/pdf/hist08.pdf>

If, however, you do not have internet access and would like a copy of the paper, please contact Malcolm Walker, 2 Eastwick Barton, Nomansland, Tiverton, Devon, EX16 8PP.

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## ATLANTIC FURY by Roger Phillips

How many members remember the description of a met office in Hammond Innes' book *Atlantic Fury*? The use of empty tobacco tins for ash trays, the tea stains on the bench. I remember an old wartime building, at Rhoose, alongside the tower, that doubled for airfield comms and the met office, a leaky old place to say the least!

I am therefore attempting to collate memories of forecast rooms and observing offices, RAF and Civil, UK and Overseas, that members may have.

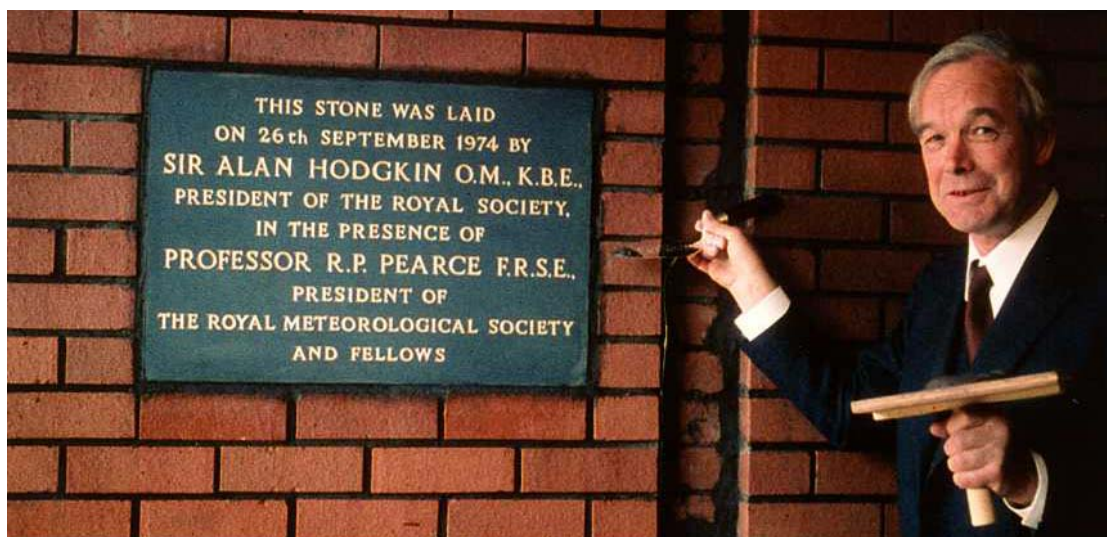
- What was your accommodation like?
- What was your workload like?
- How has it changed?
- In fact anything of interest.

It is social history with a meteorological bias.

Replies can be by e-mail to [mail@doddingtonpark2.freeserve.co.uk](mailto:mail@doddingtonpark2.freeserve.co.uk) or by 'snail mail' to

R W Phillips  
40 Kelstern Road  
Doddington Park  
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Sir Alan Hodgkin (President of the Royal Society) laying the foundation stone of the Royal Meteorological Society's headquarters building, James Glaisher House, Bracknell, on 26 September 1974. This was the Society's home until 1990, when the Society moved to its present home, 104 Oxford Road, Reading. From the outset, James Glaisher House leaked in wet weather and the problem of rain-water ingress was never solved. In 1988, the Society's Council decided the property would have to be sold. For further information about the Society's homes, see the History Group's Newsletter 2, 2008, page 13.

## RECENT PUBLICATIONS

*This list of books and articles concerned with the history of meteorology and physical oceanography has been compiled by Malcolm Walker and Anita McConnell.*

BENTLEY, L., 2009. Obituary: J.Scott. *Weather*, **64**(4), 111.

BONNER, W.D., HALLGREN, R.E., McPHERSON, R.D. and UCCELLINI, L.W., 2008. Obituary: George Cressman. 1920-2008. *Bulletin of the American Meteorological Society*, **90**(11), 1751-1754.

BOOTH, B.J., 2009. Obituary: R.F.Zobel OBE. *Weather*, **64**(2), 55.

BROHAN, P., ALLAN, R., FREEMAN, J.E., WAPLE, A.M., WHEELER, D., WILKINSON, C. and WOODRUFF, S., 2009. Marine observations of old weather. *Bulletin of the American Meteorological Society*, **90**(2), 219-230.

CAHALAN, R.F., NAKAJIMA, T., BOLLE, H.-J., WISCOMBE, W. and STEVENS, G., 2009. Obituary of Anthony Slingo. *Bulletin of the American Meteorological Society*, **90**(4), 548.

CAVELL, J. and NOAKES, J., 2009. The origins of Canada's first Eastern Arctic Patrol, 1919-1922. *Polar Record*, **45**(2), 97-112.

DRY, S., Safety networks: fishery barometers and the outsourcing of judgements at the early Meteorological Department. *British Journal for the History of Science*, **42**(1), 35-56.

FIELD, M., 2009. Pen portrait – Sir Graham Sutton. *Weather*, **64**(1), 16-17.

FIELD, M., 2009. Pen portrait – Richard Bentley. *Weather*, **64**(6), 162-163.

FUNG, I., 2008. Remembering Lorenz. *Bulletin of the American Meteorological Society*, **89**(11), 1748-1750.

HOINKA, K.P., TAFFERNER and WEBER, L., 2009. The 'miraculous' föhn in Bavaria of January 1704. *Weather*, **64**(1), 9-14.

HULME, M., 2009. On the origin of 'the greenhouse effect': John Tyndall's 1859 interrogation of nature. *Weather*, **64**(5), 121-123.

HULME, M., 2009. *Why we disagree about climate change*. Cambridge University Press, 432 pages. ISBN-13: 9780521727327

KENWORTHY, J.M. and McCOLLUM, M.S., 2009. A contribution to meteorology by Spencer Cowper, Dean of Durham 1746-74. *Notes and Records of the Royal Society*, **63**, 57-80.

KUIJPERS, A. and MIKKELSEN, N., 2009. Geological records of changes in wind regime over south Greenland since the Medieval Warm Period: a tentative reconstruction. *Polar Record*, **45**(1), 1-8.

MARNEY, P. and McCONNELL, A., 2009. Wheel and banjo barometers. *Antique Collecting*, **43**(10), 4-9.

MISHCHENKO, M.I. and TRAVIS, L.D., 2008. Gustav Mie and the evolving discipline of electromagnetic scattering by particles. *Bulletin of the American Meteorological Society*, **89**(12), 1853-1861.

OKE, T. and CLOUT, H., 2009. Obituary: T.J.Chandler. *Weather*, **64**(2), 53-54.

PERSSON, A., 2009. Hadley's Principle: Part 2 – Hadley rose to fame thanks to the Germans. *Weather*, **64**(2), 44-48.

PERSSON, A., 2009. Hadley's Principle: Part 3 – Hadley and the British, **64**(4), 93-96.

PIKE, W.S., 2009. A rare photograph of Leo Bonacina (1882-1975). *Weather*, **64**(4), 97.

RODDA, H.J.E., LITTLE, M.A., WOOD, R.G., MacDOUGALL, N. and McSHARRY, P.E., 2009. A digital archive of extreme rainfalls in the British Isles from 1866 to 1968 based on *British Rainfall*. *Weather*, **64**(3), 71-75.

ROY, M., 2009. Alexander Buchan Memorial Bench, *Weather*, **64**(4), 112.

SHANKLIN, J., MOORE, C. and COLWELL, S., 2009. Meteorological observing and climate in the British Antarctic Territory and South Georgia: Part 1. *Weather*, **64**(5), 127-134.

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## HOW WEATHER MAGAZINE BEGAN by Malcolm Walker

At the meeting of the Royal Meteorological Society's Council held on 16 January 1946, Mr A.J.Drummond, Scottish Secretary, said he felt the Society was not doing enough for its Fellows. His original idea had been that the *Meteorological Magazine* should be purchased at a reduced rate from His Majesty's Stationery Office for distribution to Fellows. As, however, publication of *Met.Mag.* would not be resumed for at least another year, having ceased during the war, Mr Drummond suggested that a new

magazine called either *Meteorology* or *Weather* should be published by the Society. This, he suggested, could be supplied to the public, possibly through the medium of W.H.Smith's bookstalls. The President (Gordon Manley) felt the project one worth exploring and asked Mr Drummond to make preliminary enquiries and report upon his findings at the Council's next meeting.

At the Council meeting on 16 January 1946, it was agreed that a committee consisting of Mr Drummond, Mr J.S.Forrest, Dr A.R.Meetham and Wing-Commander R.M.Poulter should examine the question of a new publication in the form of a popular monthly magazine. This committee met on 24 January, 31 January and 8 February and duly reported to Council, on 20 February 1946.

The committee felt the most urgent matter facing the Society was that of retaining the large number of Fellows who had joined during the war years. To quote the committee's report, "Only by making the Society more interesting for these Fellows (and for others besides) can their interest in meteorology be preserved". The recommendations of the committee were that:

- The magazine should be published monthly.
- There should be 32 pages of text, plus a minimum of four advertisements.
- The page size should be the same as that of the *Quarterly Journal*.
- There should be four art plates and up to ten line diagrams.
- There should be a summary of the previous month's weather, Camden Square daily observations, reviews of books and meetings, correspondence, Society news and notices of forthcoming events.
- There should be, from time to time, articles of an instructional nature which would "serve to introduce readers to the more difficult parts of the subject by easy stages".
- The magazine should be distributed to Fellows and Foreign Members as part of the normal subscription but sold at half price to Associates and Student Associates.
- The magazine should be made available to the general public through sales outlets such as W.H.Smith, Wyman and Menzies at a retail price of one shilling and three pence.
- The committee should for six months undertake the entire editorial, financial and ancillary work and thereafter delegate to the Society's Office staff the minor editorial and routine duties.

- The first issue of the new magazine should be published in mid April or early May, including articles already promised for that issue by the Society's President, the Director of the Naval Meteorology Branch, an Air Commodore and a university lecturer in meteorology.

At the Council meeting on 20 February 1946, as it was put in the minutes:

*Mr Drummond gave a report on the meetings of the Magazine Committee. Details of all that had taken place had been circulated to Council and after discussion it was agreed that the project was a good one and viewed with sympathy by the Council. A question did arise, however, regarding the freedom from income tax enjoyed by the Society as a charitable Institution and whether this would be affected by the general sale of such a publication. It was felt that the Magazine Committee should make appropriate enquiries and that a special meeting of the Council should be called for March 8, at 2.30 pm, to discuss the matter further.*

At the meeting on 8 March 1946, Council adopted the recommendation of the Magazine Committee that there should be a new monthly magazine entitled *Weather*; and all of the committee's other recommendations were adopted too. Council agreed that the first three issues should be circulated free to all members of the Society, after which the magazine would be sent only on request. Mr L.C.W.Bonacina proposed a vote of confidence in the committee and this was seconded by Mr E.L.Hawke. The Council hoped the committee would have the success their enterprise deserved.

The first issue of *Weather* appeared in May 1946 and included a Foreword by the President and articles by Sir Nelson Johnson, Mr James Paton, Professor David Brunt, Air Commodore B.H.C.Russell, Mr A.J.Drummond and Mr A.J.Lander. The photograph on the cover, showing a cumulus cloud, was supplied by Flight Lieutenant G.J.Jefferson. In the event, the magazine cost a little more than the committee recommended, one shilling and six pence (annual subscription 18 shillings post free).

The rest is history, as they say, but we cannot conclude without noting that the first issue of *Weather* was published only four months after the idea of the magazine was first put to the Council. That is remarkable. Could we go so quickly from proposal to publication with a new journal now? I think not.



*The weather station at Seathwaite (now Cumbria), the wettest inhabited place in England, with a mean annual rainfall of about 3,550mm (140 inches), 14 July 1899, view northwards.*

*Source of picture: "Photographs of stations, 1896-1906", in the Royal Meteorological Society Collection, National Meteorological Archive, Exeter.*

## **DATES FOR YOUR DIARY: FORTHCOMING MEETINGS**

There will be a meeting at the **University of Reading**, in the **Madejski Lecture Theatre**, on **Wednesday 18 November 2009** from **2.00 to 5.30pm**. This will be the second Classic Papers meeting, in which developments stemming from a classic paper (or classic papers) through to the present day will be discussed. It will be a National Meeting of the Royal Meteorological Society organized by the History Group, as was last November's Classic Papers meeting.

The meeting will consider first the classic contributions of Carl-Gustav Rossby and Jules Charney to dynamical meteorology that were crucial to the successful development of Numerical Weather Prediction (NWP) techniques in the 1940s and 1950s and then focus on the scepticism of some in the UK who argued at that time that improved weather forecasting depended not on numerical methods but on greater understanding of atmospheric processes. Later in the meeting, the reasons why modellers and dynamicists now appear to be talking to each other less and less will be explored, not only in NWP but also in general circulation modelling. Some think understanding of the atmosphere has been sidelined in favour of simulation and wonder to what extent this is

detrimental to the progress of modelling or, indeed, meteorology as a whole. How many of today's modellers are really computer engineers who tweak models but do not fully understand the underlying dynamics? If this is the case, how have we reached this state of affairs and how should we remedy it, if, indeed, we need to remedy it? Have we strayed from the pioneering principles of Rossby and Charney? If so, does it much matter now? The last session of the afternoon will be a Panel Discussion, involving all of the day's speakers.

The programme will be as follows:

- 14:00 Introduction by the President
- 14:05 Malcolm Walker (History Group)  
*Introduction to the meeting and introduction to Rossby, Charney, Sutcliffe and others*
- 14:20 John Methven (University of Reading)  
*Early theories for extratropical weather system development*
- 14:45 Lennart Bengtsson (University of Reading)  
*The early days of numerical weather prediction in the UK and USA*
- 15:15 Tea
- 15:45 Brian Golding (Met Office)  
*Numerical Weather Prediction since the 1960s: a triumph of numerical analysis or meteorological science?*
- 16:15 Andy White (Met Office)  
*The role of meteorological dynamics in numerical model construction and appraisal in 2009*
- 16:45 Panel Discussion, chaired by Sir Brian Hoskins (Imperial College and University of Reading)  
*Looking to the future*

On **Saturday 17 April 2010**, from **mid morning to about 5.00pm**, there will be a meeting in **London**, probably in the Zoological Society of London's Huxley Lecture Theatre, Regent's Park, **to mark the 150<sup>th</sup> anniversary of the formation of what was later called the British Rainfall Organization (BRO)**. The founder, George James Symons (1838-1900), was an outstanding figure in meteorology in the late 19<sup>th</sup> century, not only because of his BRO work, but also as the founder and editor of the *Meteorological Magazine*, leading member of the Royal Meteorological Society and active member of societies abroad with an interest in meteorology. His name lives on in the Royal

Meteorological Society through the Symons Gold Medal and Symons Memorial Lecture.

There will be talks at this meeting about the history of the BRO, about Symons himself, about the and development of rain-gauges, about the British Rainfall Heavy Falls archive and much else. Further information about the meeting on 17 April 2010 will be given in the next issue of this newsletter.

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On **either Saturday 15 or Saturday 22 May 2010**, there will be a full-day meeting on **Phenology**. This will be in London but no further details of the meeting are available yet.

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**From the evening of Sunday 18 to the evening of Tuesday 20 July 2010**, there will be a **Two-day Summer Meeting**, which will be a Royal Meteorological Society National Meeting organized by the History Group. It will be based in **Exeter**.

There will be review-type talks in the mornings and visits in the afternoons. Visits to the Met Office, the National Meteorological Archive, the Norman Lockyer Observatory and Barometer World are planned. Overnight accommodation at Exeter University has been booked and talks will be given at the University, which has a most beautiful campus, with extensive views across Exeter and landscaped gardens containing a great many plants and trees.

This will be a mainly informal meeting that we hope will prove attractive to many. Do please note the dates in your diary. Further details will be available in the fairly near future.

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#### Other meetings in the pipeline:

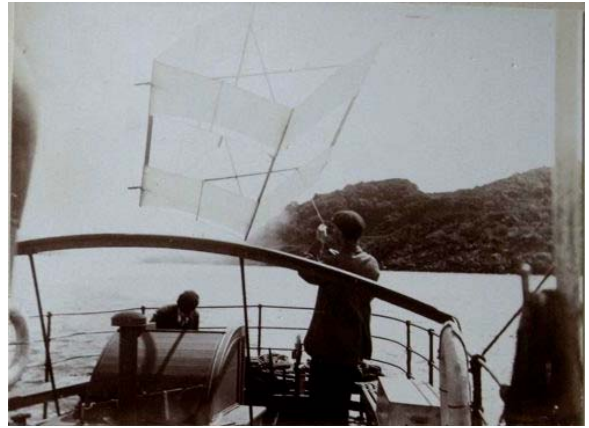
- The third Classic Papers meeting, on the subject of **turbulence**, will take place on **Wednesday 17 November 2010**, again probably at the University of Reading.
- A Saturday meeting, **possibly in the autumn of 2010**, to mark the **centenary of aircraft first being used for meteorological purposes** is being discussed.
- A Saturday meeting at **Cambridge** to mark the **centenary of Scott's 1910-13 expedition to the Antarctic** is planned for April 2011.

Meetings at the **Thames Barrier** and the **Chatham Historic Dockyard** are being considered.

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If you have any thoughts about these meetings (comments, suggestions, etc), please get in touch. Email [MetSocHistoryGroup@gmail.com](mailto:MetSocHistoryGroup@gmail.com) or write to Malcolm Walker, 2 Eastwick Barton, Nomansland, Tiverton, Devon, EX16 8PP.

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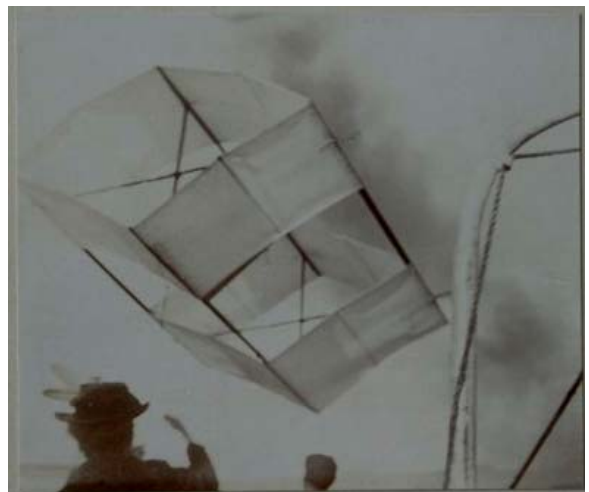
*In the summer of 1902, W.H.Dines and his sons flew kites from the deck of a small steam-tug near Crinan, Argyll, western Scotland. The kites carried self-recording instruments, sometimes to heights above 10,000 feet. Profiles of temperature and relative humidity were obtained.*

*The picture above shows a kite being let out. The winding gear, which was bolted down to the deck, can be seen on the left. The kites were rhomboidal and flown on steel wires 1/32 inch in diameter.*

*The picture below shows a kite ascending.*

*Source of pictures:*

*"Photographs of stations, 1896-1906", in the Royal Meteorological Society Collection, National Meteorological Archive, Exeter.*



## ANNUAL GENERAL MEETINGS

### Do you think the History Group should hold an Annual General Meeting? Please let us know your view.

There is nothing in the By-Laws or Standing Orders of the Royal Meteorological Society that requires the Group to hold one, nor does Charity Law require one.

- So far as accounts are concerned, it is sufficient for the Group's committee to approve them prior to forwarding them to the Society for incorporation in the Society's annual financial statement. A summary of the accounts can be published in the Newsletter.
- So far as the Chairman's Report is concerned, it is sufficient for that to be published in the Newsletter.
- So far as committee membership is concerned, it is sufficient for nominations to be invited through the Newsletter.
- The Chairman must be either a Fellow or an Associate Fellow of the Royal Meteorological Society and his/her appointment should be approved by the Society's Council (but approval has not in practice been sought or required in the past).
- So far as comments/ideas from Group members is concerned, it is sufficient to solicit them through the Newsletter.

### What do you think? Please let us know as soon as possible.

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Please send any comments or contributions to:  
Malcolm Walker, 2 Eastwick Barton,  
Nomansland, Tiverton, Devon, EX16 8PP.

✉ [MetSocHistoryGroup@gmail.com](mailto:MetSocHistoryGroup@gmail.com)

The Group's annual subscription is £5 (cheques payable to *Royal Meteorological Society History Group*). A reminder will be sent when your subscription is due.

## 2009 MEMBERS

Rob Allan (Exeter)  
Alberto Ansaloni (Milano Italy)  
Oliver Ashford (Didcot)  
Rodney Blackall (Buckingham)  
Brian Booth (Devizes)  
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 (Middlesbrough)  
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)  
Richard Link (Croydon)  
Jean Ludlam (Sunningdale)  
Norman Lynagh (Chalfont St Giles)  
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)  
Nick Ricketts (Exmouth)  
P R Rogers (Sevenoaks)  
James Rothwell (Southwell)  
Peter Rowntree (Crowthorne)  
Marjory Roy (Edinburgh)  
Ann Shirley (Canterbury)  
David Simmons (Cambridge)  
Hugh Thomas (Hassocks)  
Derry Thorburn (London)  
Keith Tinkler (Ontario, Canada)  
Jack Underwood (Barham)  
Bill Wade (Harrogate)  
Diane Walker (Tiverton)  
Malcolm Walker (Tiverton)  
Catharine Ward (Bury St Edmunds)  
Dennis Wheeler (Sunderland)  
G D White (Truro)  
Peter Wickham (Wokingham)  
Clive Wilkinson (Diss)  
Christopher Wilson (Cullompton)  
Mick Wood (Bracknell)