HISTORY GROUP NEWSLETTER

News, views and a miscellany published by the Royal Meteorological Society's Special Interest Group for the History of Meteorology and Physical Oceanography

Issue No.3, 2012

In this bumper issue of the newsletter, we continue with the theme of anniversaries (inspired by 2012 being the year of Her Majesty's Diamond Jubilee). We have, in this issue, features that take us back 20, 25, 50, 60, 70, 100 and 150 years. We hope you enjoy reading them.

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20 YEARS OF THE WORLD WIDE WEB
by Malcolm Walker
History Group Chairman

One afternoon in November 1992, the telephone in my office rang. The call was from my wife, who was, at the time, Head of IT Training in Cardiff University. I was an academic in that same university, my subjects being marine meteorology and physical oceanography.

"I've got a weather satellite image on the screen of my computer monitor", my wife said, or words to that effect. I didn't understand. Why was she telling me this? I was able to obtain the latest images from polar-orbiting satellites and from the Meteosat geostationary satellite. I had a satellite dish on the roof of the building I was in.

"I'm getting the image through the World Wide Web", she said, and I still didn't understand. What was the World Wide Web, I asked, and why was it any better than my Dartcom satellite receiving system? All was explained, and I put the matter to the back of my mind. I used e-mail for communicating with people around the world, but I didn't have any other Internet access, so I continued to obtain satellite images through the Dartcom system. My wife worked in the Computing Centre. She had access to facilities that were not available to staff or students in the academic departments – or were, rather, not yet available.

Four weeks after that telephone call from my wife, the Computing Centre provided access to the World Wide Web across all departments in the university. To me, it was all so exciting. I was now able to obtain up-to-date satellite images without leaving my office. True, the downloading of my first image took 23 minutes, but I didn't now need to go to my laboratory to obtain up-to-date images. How times have changed. I now get irritated if a satellite image doesn't appear on the screen in 23 seconds!

Back in December 1992, I soon found that weather satellite images were not the only meteorological 'goodies' available via the Web. Charts and weather observations were available, too, though the quantity and quality of the charts and some of the data left much to be desired. However, enough was available for me to take a new approach to the setting of coursework for students. No longer did I need to give each student the same set of charts and other meteorological data. I could now set exercises which required students to download near real-time charts and observations from the Web. This meant that the charts and data sets which the students worked on were those that were current when they were downloaded. Thus, the charts and data varied from student to student, a consequence being that collaboration between students was reduced!

For visual subjects like mine – meteorology and oceanography – the 'Web' proved beneficial very quickly. Educationally useful material such as charts, data, satellite images, diagrams, and photographs of clouds and optical phenomena soon became available readily (though for some years a number of national weather services refused to provide near real-time weather observations free of charge).

By 1998, when I became the Royal Meteorological Society's Education Officer, the Web had developed sufficiently, and Internet connectivity in schools had improved to such an extent, that a project called *MetLinkInternational* could be run, whereby schools around the world could exchange weather data and receive online guidance from professional meteorologists. The project, which ran for two weeks each year, began with twelve schools in 1998 (eleven in Europe and one in Zimbabwe) and at its peak in 2005 had over 300 participating schools in many parts of the world.

From those small beginnings in the early 1990s, the World Wide Web has become an essential resource, not only in meteorology but in all walks of life. Where would we be without the Web today? From the latest local, national and international news to the latest share prices to the latest cricket and football scores and so on and so on, we can turn to the Web. Answers to so many questions are these days 'out there' on the Web, but a word of caution is necessary, as a huge amount of reliable information is mixed up with a huge amount of rubbish. No one should believe everything that is published in newspapers. Even less should we believe without question everything we find on the Web.

What is on the Web that is useful to historians of meteorology and physical oceanography? That is a difficult question to answer fully, so I'll provide here, in no particular order, a selection of what I have found useful.

Many books, papers and other items published before 1900, and not a few published since, are now available free of charge, thanks in many cases to libraries in the USA and Canada which have scanned publications that are out of copyright.

Potted and longer biographies of distinguished and lesser-known meteorologists, oceanographers and other scientists are available on the Web, but authors of biographies can be very careless over dates and other details, often through copying blindly from other websites. Biographical details should be checked carefully; and even websites that one might assume are reliable contain mistakes. In my experience, online biographies should be used as no more than starting points when searching for bio-details. And obituaries and retirement notices in reputable printed journals may also contain mistakes and misconceptions.

When seeking chapter and verse for obituaries and retirement notices for meteorologists, the online catalogue of the National Meteorological Library and Archive (NML&A) is a valuable resource. For finding the correct titles and other details of books, I recommend both the NML&A catalogue and the online catalogue of the British Library.

For finding out what has been published in journals, the best approach is to go to the website of the journal in question, where lists of contents (and often abstracts of papers) can usually be found. Whether or not any given paper can be downloaded in full free of charge varies from journal to journal.

For questions asked in the Houses of Commons and Lords about matters involving meteorology and/or oceanography, along with the answers given, *Hansard* is available online free of charge for the period 1803 to date. To find out what meteorologists and oceanographers said when in front of parliamentary committees, go to: http://www.publications.parliament.uk/

Newspapers contain much that is useful in the form of letters, editorials and other articles, as well as reports on newsworthy meteorological and oceanographic events, but a subscription is necessary to gain access to most of them. I am lucky, because, by virtue of being a member of the Devon County Library Service, I have free access at home to *The Times* for the period 1785 to 1985 and to a number of other newspapers.

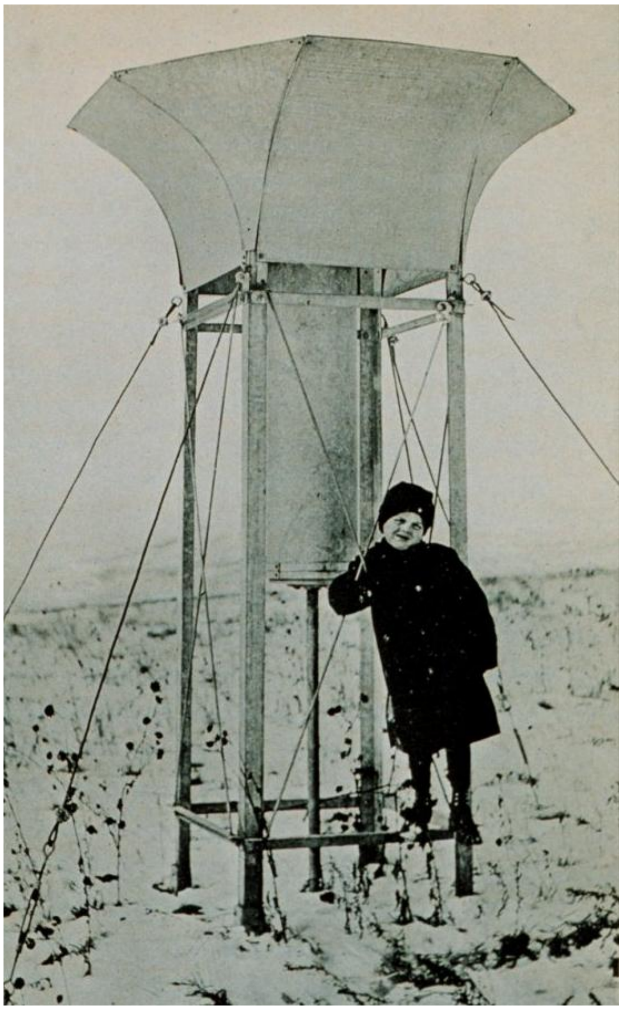
A magazine called *Flight* contains much of interest to historians of meteorology, especially those with an interest in aviation. Every issue from 1909 to 2005 is available online free of charge.

Photographs of meteorological instruments old and new can be viewed free of charge on a number of websites, but they are often marked in some way for copyright purposes. A site that contains much of historical interest is that of the Photo Library of the USA's National Oceanic and Atmospheric Administration (NOAA):
http://www.photolib.noaa.gov/nws/index.html

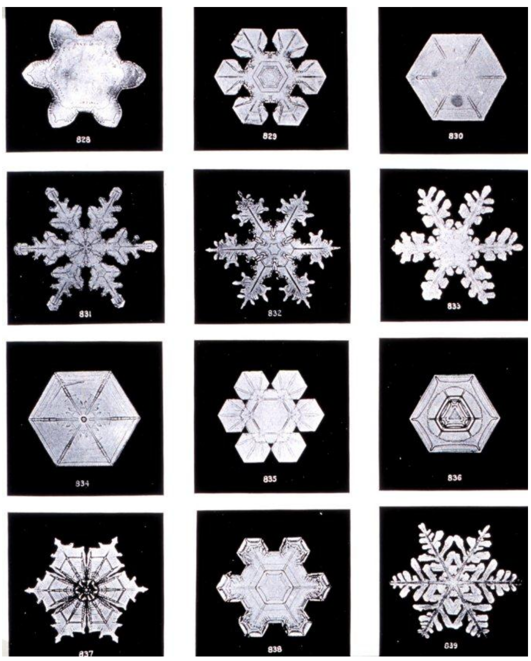
Another is that of the Science Museum Group:
http://www.ingenious.org.uk/See/Naturalworld/Meteorology/

The pictures below and on the right were all downloaded from the NOAA Photo Library website.

Finally, there's the Google search engine. It's an essential starting point for trying to find things meteorological and oceanographic. The URL is:
http://www.google.com
which defaults on my computer to
http://www.google.co.uk/



Shielded snow gauge in the north-west of the USA. From The Boy with the U.S. Weather Men*, by Francis Rolt-Wheeler, published in 1917 by Lothrop, Lee and Shepard, Boston, USA, p.224.*



From 'Studies among the snow crystals during the winter of 1901-02' by Wilson Bentley, published in the Monthly Weather Review *in January 1903 (Vol.30, pp.607-616).*

U.S. Signal Service weather map for 1 September 1872.

All pictures on this page from the NOAA Photo Library website

UNDER THE WEATHER
by Joan Kenworthy

When reading the report of the meeting 'Under the Weather', which took place on Saturday 17 March 2012, report published in Newsletter No.2, 2012 (pages 2 to 4), it occurred to me that a further paragraph on my contribution on tropical climates and health might be of interest.

My experience in Kenya in the mid 1950s certainly made me aware that, even then, Europeans were concerned about the effects an equatorial climate at high altitude might have on their health, blaming any behavioural peccadillo on the altitude or the climate! But anxieties about climate on the Guinea coast, the 'white man's graveyard' or 'fever coast', had been of a different nature.

In Sierra Leone, in 1975, I was greatly moved by a memorial plaque in St. George's Cathedral, Freetown, which records the death of Captain Robert Corley of the R. A. C. Corps, 'who survived the battle of Waterloo and perished in this unhealthy climate June 16th 1837, in the 39th year of his age'.

continued in the next column

Paul Curtin records that among the worst statistics for West Africa were those of the Church Missionary Society, when 54 died out of 89 sent out during the period from 1804 to 1823 (1964: *The Image of Africa: British Ideas and Action 1780-1850*). As Curtin explains, 'the expression, a bad climate, came to mean a place where mortality rates were high'.

A supposedly fever-laden atmosphere had been known as *miasma* from the time of the Elizabethans. It was only with the recognition that malaria and yellow fever were transmitted by the mosquito that climate ceased to be blamed for illness and death.

Sir Ronald Ross, the first British Nobel Laureate, discovered the malaria parasite in the mosquito in 1887. Today, research on malaria and other tropical fevers continues. The prevalence of mosquitoes is influenced by climate and it may interest readers to know that researchers at Liverpool University have developed a tool that uses long-range weather forecasts to predict epidemics of malaria up to five months in advance. An early-warning model uses the variability forecasts of daily rainfall and temperature to predict unusual changes in the seasonal pattern of disease, allowing doctors to make advanced preparations to cope with malaria outbreaks in epidemic-prone countries (*100 Facts from the University of Liverpool*).

UNDER THE WEATHER IN INDIA

The picture below shows a memorial which was erected in the North Nave Aisle of Exeter Cathedral in 1860. Listed on it are the names of the officers, non-commissioned officers and privates of the 9th Queen's Royal Lancers who died in India in the service of their country. Notice that more "died from effects of climate" than were "killed in action or died of wounds".

THE BRITISH ANTARCTIC EXPEDITION (BAE) 1910-1913: THE METEOROLOGICAL VIEW – PART VIII by Alan Heasman

In Part VII of this series, we left the rather depleted members of the BAE in the midst of their second Antarctic winter (May to August 1912). Scott and his four companions had failed to return from their polar trek. The six-man Northern Party had failed to return from their explorations to the west. They may have been picked up by the *Terra Nova* when it left in February bound for New Zealand, but if not the Northern Party were marooned with insufficient food, fuel and shelter to see them through the bitter winter on the coast of Victoria Land.

That left just fifteen men at the BAE's HQ hut at Cape Evans. They were not idle. They maintained as much of the scientific work of the BAE as they could. Charles 'Silas' Wright, the physicist and geologist oversaw the work. George Simpson, the chief meteorologist had left on the *Terra Nova*. He had done his best to train others rapidly to maintain the weather observations as best they could.

Observations continued near the Hut, but the weather of the second winter was even worse than the first, so it was too dangerous to venture far for weather readings. Interestingly, it was during this period that 'Silas' Wright studied ice accretion under various weather conditions. He noted the existence of almost microscopic ice particles in the open air which could be seen only when they reflected light e.g. from the sun. He named this 'diamond dust', a name that has been enshrined in the meteorological glossary of Antarctic and Arctic weather.

When time permitted, Wright and his colleagues debated what to do in the spring (August to November). Should they send out a search party towards the Pole to try and find out what had happened to Scott's team (almost certainly dead) or should they search for the Northern Party (possibly dead but probably alive)? They did not have the resources to send two teams so they decided to search for Scott. The weather would be too severe to set out on to the Ross Ice Shelf (the Barrier) until November, so once the sun reappeared over the horizon on 23 August, they began to improve their fitness with a few short exploratory trips. Even on these they maintained weather records.

On 11 October, a team set out for the hut at Hut Point, the staging post before the Barrier proper. They ferried supplies south on to the Barrier. On 29 October, the full search team, supported by the now old and tired ponies and remaining dogs, set out southward. Temperatures were still minus 20 to minus 30°F and the surface made for hard going.

On 11 November, they reached One Ton Camp. This was the important and well stocked depot which should have helped Scott on his return journey. The search party found that the fuel had leaked from the tins and tainted some of the food, so it may have been of little help to Scott had he reached there. Next day, 12 November 1912, they found the collapsed tent of the Polar Party, containing the bodies of Scott, Wilson and Bowers inside. It was just 11 miles short of One Ton Camp. They retrieved diaries, personal letters and effects and the formal weather log kept by 'Birdie' Bowers throughout the polar trek from November 1911 until 11 March 1912, probably about two weeks before he died. The original of this log is kept at the Scott Polar research Institute at Cambridge. A 'fair copy' is held at the National Meteorological Archive at Exeter.

After a short and fruitless search for the body of Lawrence 'Titus' Oates, who had famously walked to his death to unburden the polar team, the search party returned via Hut Point to reach Cape Evans HQ by 28 November. To their great relief, they found that the Northern Party had not only survived the winter in an ice cave but had then trudged around the unreliable coastal ice to reach safety at Cape Evans. It was a staggering story of survival to help offset the bitter loss of Scott and his team.

During the remaining two months or so, small teams made further journeys from Cape Evans, including an ascent of the volcano Mount Erebus (2 to 15 December 1912), which had served as a 'beacon' throughout their sojourn. Simpson and others had used the direction of its smoke plume to estimate the wind direction and speeds at high levels. The weather observations made during this ascent were amongst the final set of two years of meteorological observations of the BAE. Their ship *Terra Nova* arrived from New Zealand on 18 January 1913 and, after erecting a large wooden cross to the memory of Scott and his companions on the hill behind Hut Point, the BAE left mainland Antarctica bound for New Zealand and eventually home to Britain.
In the next and final part of this story, I shall reflect on the meteorological achievements and legacy of the British Antarctic Expedition 1910 to 1913.

THE GREAT STORM OF 25 YEARS AGO by Malcolm Walker

Most readers of this newsletter, particularly those who lived in south-east England or East Anglia at the time, will remember the Great Storm of 1987, possibly all too vividly from personal experience. Here is an extract from my book, *History of the Meteorological Office* (Cambridge University Press, 2012, pp.417-419), which provides an overview of the storm and the aftermath.

A storm which developed rapidly wreaked havoc across northern France, south-east England and East Anglia during the night of 15/16 October 1987. The winds in the early hours of the morning were terrifyingly strong. Millions of trees were lost; roads and railways were blocked; electricity and telephone lines were brought down; many buildings were damaged; and the storm killed eighteen people in England and four in France. Winds reached Force 11 in many coastal regions.

A BBC TV weather presenter, Michael Fish, will long be remembered for telling viewers at lunchtime on 15 October there would be no hurricane. He was, in fact, correct. He was referring to a tropical cyclone which was over the western part of the North Atlantic, a weather system that was certainly not heading for the British Isles. Earlier in the day, when referring to the weather to be expected in southern Britain, he advised viewers to "batten down the hatches" because there was some "extremely stormy weather on the way". That was a forecast which could hardly be faulted. The storm which was to cross south-east England and northern France that night was developing over the Bay of Biscay. Many people now believe that Fish was the presenter who said in an evening forecast on the 15th that it would be "breezy up through the [English] Channel and on the eastern side of the country". He was not on duty that evening. The presenter was Bill Giles.[1]

The Great Storm of October 1987 was not, by any definition, a hurricane. It was, however, exceptional. South-east of a line extending from Southampton through north London to Great Yarmouth, gust speeds and mean wind speeds were as great as those which can be expected to recur, on average, no more frequently than once in 200 years.[2] Comparison with the Great Storm of 1703 was entirely justified, a storm which had affected much the same area of the British Isles.[3]

Four days before the Great Storm struck, Met Office forecasters predicted severe weather on the 15th or 16th. A couple of days later, however, the guidance provided by numerical modelling was somewhat equivocal. Instead of stormy weather over a considerable part of the British Isles, the modelling now suggested that severe weather would occur no farther north than the English Channel and coastal parts of southern England. In the event, forecasts of wind strengths for the sea areas of the English Channel were both timely and adequate, but the forecasts for land areas left much to be desired.

During the evening of 15 October, radio and TV forecasts mentioned strong winds but indicated that heavy rain would be the main feature, rather than strong wind. By the time most people retired to bed that evening, exceptionally strong winds had not been mentioned in national radio and TV weather broadcasts. The Office had issued warnings of severe weather, however, to various agencies and to the authorities responsible for dealing with emergencies. The London Fire Brigade had been notified at 21:50 GMT, and the first warnings for civil and military airfields had been issued as early as midday. Perhaps the most important warning of all was that issued to the Ministry of Defence at 01:35 GMT on the 16th. This warned that the anticipated consequences of the storm were such that civil authorities might need to call upon assistance from the military.

Journalists who were looking for scapegoats and a sensational story were quick to accuse the Office of failure to forecast the storm correctly. Time and again they returned to the statement by Michael Fish that there would be no hurricane. The *Sunday Telegraph* reported that Nicholas Ridley, the Secretary of State for the Environment, had condemned the "unbelievable failure" of the Office to "get it right". It mattered not that the Office's

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[1] See 'Media reaction to the storm of 15/16 October 1987', by D M Houghton *et al*, published in 1988 in the *Meteorological Magazine* (Vol.117, pp.136-140).

[2] The word 'average' must be stressed. A 'once-in-200-years storm' is not one that recurs exactly every 200 years. It is one that can be expected to occur *on average* once in 200 years. Another storm as severe as that of October 1987 could have occurred in the following days or months or, indeed, in any year since 1987.

[3] The tempest of 26-27 November 1703 (6-7 December New Style) was the most devastating storm to visit the British Isles in recorded history.

forecasters had for several days warned of severe weather, and it was hard to shake the views of some that the European Centre for Medium-Range Weather Forecasts (ECMWF) and the French and Dutch meteorological services had forecast the storm a great deal more accurately than their British counterparts when they had not.

The Office's Director-General, Dr John Houghton, set up an internal inquiry, and the Secretary of State for Defence asked two independent assessors, Sir Peter Swinnerton-Dyer (Chairman of the Meteorological Committee) and Professor Robert Pearce (Head of the Department of Meteorology in the University of Reading), to review the findings of the inquiry and advise as appropriate. The main conclusions and recommendations of the Office and assessors were that:[4]

- observational coverage over the ocean west of France and the Iberian peninsula, where the storm had developed, needed to be improved by increasing the quality and quantity of observations from ships, aircraft, buoys and satellites;[5]
- certain specific refinements to the computer models used for weather forecasting needed to be made;
- procedures for issuing to authorities warnings of severe weather should be reviewed;
- procedures for presenting such warnings to the public should also be reviewed;
- the training given to weather forecasters needed to be improved and lengthened;
- forecasters should have greater seniority in the Office;
- the economies imposed by the government on the Met Office in recent years had compromised the effectiveness of the Central Forecasting Office, especially on occasions of unusual weather situations.

Swinnerton-Dyer and Pearce addressed the question of whether the computer-based forecasts available from Météo-France (the French national meteorological service) were superior to those from the Met Office. They found that the French forecasts were "somewhat more consistent" than those from the Office, mainly because they used a more powerful computer. However, they said, the forecasts "equally underestimated the storm's intensification". The Cyber 205 computer used by the British was, they pointed out, significantly less powerful than the Cray machines available to ECMWF and Météo-France and possessed a smaller memory. A consequence was that the model used by the French had a resolution twice that of the model used by the Office. They stressed the importance of ensuring that the Office always had at its disposal the most powerful computer available. In their words:[6]

Underprovision of computing power would indeed be a false economy, because it would undermine the campaign to increase the Met Office's commercial income – and this campaign is essential to the Met Office's future funding strategy. We are relieved to hear that the Met Office will be provided with an ETA 10 supercomputer in the spring, even though the cost has had to be found by internal economies. We are not in a position to comment on the damage done by these economies beyond saying that it will have to be endured because the new computer is essential.

A storm of intensity comparable to that of the 1987 storm occurred on 25 January 1990 and has been dubbed the 'Burns' Day Storm' because it occurred on the anniversary of the birth of Scotland's national poet. It caused widespread damage over England and Wales and the loss of 47 lives. The centre of the depression moved across southern Scotland and the severity of the gales on its southern and western flanks was well forecast. On this occasion, no blame was placed on the Office's weather forecasters.[7]

[4] See *The storm of 15/16 October 1987*, by P Swinnerton-Dyer and R P Pearce, published in 1988 by the Secretary of State for Defence (17 pages). See also 'The Meteorological Office report on the storm of 15/16 October 1987', published in the *Meteorological Magazine* in April 1988 (Vol.117, pp.97-98). The whole of this issue of the *Meteorological Magazine* (pp.97-140) was devoted to the Office's studies of the storm. The whole of the March 1988 issue of *Weather* (Vol.43, pp.66-142) was devoted to the storm, too, including comparisons with the tempest of 1703.

[5] In the 1970s, there had been eight ocean weather stations on the North Atlantic, including one to the west of the Bay of Biscay (at 47°N 17°W). In October 1987, there were only two, one at 57°N 20°W, the other at 66°N 02°E. In 1977, the UK had owned three weather ships. In 1987, it owned only one.

[6] See 'Summary and conclusions from the Secretary of State's enquiry into the storm of 16 October 1987', by Sir Peter Swinnerton-Dyer and R P Pearce, published in the *Meteorological Magazine* in 1988 (Vol.117, pp.141-144).

[7] See 'The Burns' Day Storm, 25 January 1990', by E McCallum, published in *Weather* in 1990 (Vol.45, pp.166-173).

CLIMYTHOLOGY

Fifty years ago, in the October 1962 issue of the *Bulletin of the American Meteorological Society* (Vol.43, No.10, pp.533-538), there appeared an article entitled 'Let's end Alaska climythology'. Written by Ernest Gruening, a Senator from Alaska, it was based on an address he had given at the banquet of a national meeting of the American Meteorological Society held at the University of Alaska on 27 June 1962.

It was surely unusual (and probably still is) for a Senator to give a talk about meteorology or, as was the case on this occasion, climatology; and what on earth is climythology? How come Mr Gruening came to be the speaker at the banquet?

The answer to the second question was given in the opening words of the article. Mr Gruening had been invited to speak by the Regional Administrative Officer of the United States Weather Bureau for Alaska because he had "a comprehensive understanding of the rôle that meteorology and climatology play in the scheme of things".

Mr Gruening went on to say that, as the field of human knowledge expanded, not only were new sciences and sub-sciences born but also, "by becoming correlated and interrelated", established sciences had given birth to new ones. For example, physics and geology were "the happy progenitors of geophysics", and physics and astronomy had given birth to astrophysics. He referred also to geopolitics and suggested that selenopolitics may follow the landing of men on the moon. This would be succeeded, he suggested, by astropolitics or cosmopolitics "as the invasion by earthians [*sic*] of our planetary neighbours becomes imminent". These were, in 1962, the ambitious days of President Kennedy's era, when it was believed that earthlings would in the not-too-distant future travel not only to the moon (which they did in 1969) but also to the nearer planets of our solar system.

Mr Gruening ventured to suggest that "a hitherto undesignated child of meteorology and climatology" had played an important part in the history of Alaska and was "still to be reckoned with in the future". He called this offspring "meteoromythology or mythometeorology, or climythology". He would leave "the determination of nomenclature to the philologists with historians and meteorologists as consultants" but decided that he would, for the time being, call the offspring 'climythology'. It had had, he said, "a marked effect in shaping, or misshaping, Alaska's destiny.

So far as Alaska was concerned, said Mr Gruening, climythology had "come into existence sometime between 30 March 1867, when William Henry Seward consummated the purchase of Alaska [from Russia], and 1868, when the Congress was called upon to pay the bill [$7,200,000]". This purchase had not proved popular in the House of Representatives and had been criticized in "a substantial section of the press". Alaska was considered "a frozen waste with a savage climate, where little or nothing could grow, and where few could or would live".

This was, Mr Gruening explained, the essence of climythology. Alaska was, in the minds of most Representatives, "a barren unproductive region covered with ice and snow" and would "never be populated by an enterprising people". Indeed, he added, one Representative had ventured to suggest that Greenland would soon be on the market!
Mr Gruening quoted from a report of the House Committee on Foreign Relations, in which it was declared that Alaska had no capacity as an agricultural country and no value as a mineral country. Furthermore, its timber was "generally of poor quality and growing upon inaccessible mountains"; its fur trade was of "insignificant value and would speedily come to an end"; the fisheries were of doubtful value; and the climate was "unfit for the habitation of civilized men". Many "denigrating epithets had been fastened on Alaska, Mr Gruening said, such as 'Icebergia', 'Polaria', 'Seward's Polar Bear Garden' and 'Seward's Icebox'.

The consequences of Alaskan climythology were soon evident, said Mr Gruening. "Having established and propagated the concept of Alaska as a worthless waste with a savage climate, Congress had proceeded to act accordingly". Alaska had no government for the next seventeen years and was designated a District, not a Territory. During those seventeen years, Mr Gruening noted, no pioneer could acquire title to the log cabin "he had hewn from the forest wilderness nor to the land on which he had settled". No prospector could stake a mining claim, and property "could not be deeded or transferred". No will was valid. Crime could not be punished; and marriage could not be celebrated.

The consequences of climythology continued, decade after decade. Not until 1912, i.e. 45 years after the purchase, did Alaskans have "the minimum of self-government to which all Americans feel themselves entitled", and, even then, there were many things Alaskans were forbidden to do. For example, they were not allowed to make any basic land laws and were not permitted to manage their natural resources. A consequence of the latter had been that Alaska's greatest natural resource, its salmon fishery, had been steadily depleted almost to extinction.

In 1913, during the debate on the building of the Alaska Railroad, a Representative had said, in opposing the bill, that America had "owned this colossal chunk of frozen earth for more than fifty years and with great labour and expense succeeded in thawing out only two or three thousand acres". Another Representative had asked why money for a railroad should be spent at the North Pole, thus introducing, said Mr Gruening, "a touch of mythogeography".

In the 1940s, climythology was still alive and well when Alaskans, as Mr Gruening put it, "moved boldly toward statehood". An opponent argued in the Senate that Alaska's difficulties were "due to the extreme climate and hazardous living conditions". Congress could not change the climate, he said.

The opponents of statehood won the day, though narrowly, by only one vote. In the words of Mr Gruening, "climythology had done it", and "this was 1952". Not until 1958 did the people of Alaska achieve statehood.

Climythology was still widespread even now, in 1962, Mr Gruening said, as he had found when visiting other parts of the United States, especially Washington DC. He therefore thought the talk he was giving "an appropriate time and occasion to set the record straight and replace climythology with comparative climatology, dispelling the climyths of the 'hazardous living and savage climate' of Alaska". The truth was, he said, that the living was, from a climatic standpoint, less hazardous in Alaska than in any other state of the Union.

For example, no life had ever been taken by a tornado or hurricane. Tornadoes occurred in every state of the Union except Alaska, and hurricanes of the tropical kind did not occur in Alaska. Moreover, thunderstorms were rare in Alaska and no one had ever been killed by lightning in that state. He conceded, though, that volcanoes were active in Alaska; and tsunamis generated by earthquakes under the sea had sometimes caused death on the coast of Alaska by sweeping people into the sea.

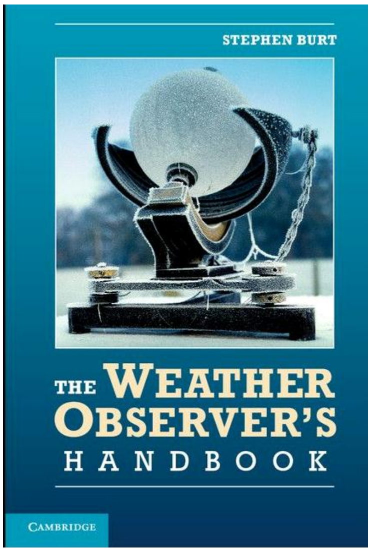
Mr Gruening said he wished to replace climythology with facts. These facts would reveal, he said, that Alaska had "the widest range of temperatures under the Flag – from 100° [F] above to 76° below zero at Fort Yukon". "As far as climatic vicissitudes are concerned", he went on, "life is the least hazardous of any state of the Union".

NEW BOOK

History Group member Stephen Burt has recently (July 2012) published *The Weather Observer's Handbook* (Cambridge University Press, 2012, 456 pages).

In the words of the blurb:

The Weather Observer's Handbook provides a comprehensive, practical and independent guide to all aspects of making weather observations. Automatic weather stations today form the mainstay of both amateur and professional weather observing networks around the world and yet – prior to this book – there existed no independent guide to their selection and use. Traditional and modern weather instruments are covered, including how best to choose and to site a weather station, how to get the best out of your equipment, how to store and analyse your records and how to share your observations with other people and across the Internet. From amateur observers looking for help in choosing their first weather instruments on a tight budget to professional observers looking for a comprehensive and up-to-date guide covering World Meteorological Organization recommendations on observing methods and practices, all will welcome this handbook.



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A MODEL OF SCIENTIFIC REASONING

In a series of articles published in recent issues of this newsletter, Alan Heasman has told the story of Captain Scott's 1910-13 expedition to the Antarctic. He mentioned on page 16 of Newsletter 1, 2012 that the expedition's meteorologist, George Simpson, left the Antarctic on 25 February 1912 aboard *Terra Nova* to return to India to deputize for his boss, Gilbert Walker, whose health had broken down. He travelled via London and did not reach Simla in India until August 1912. On 19 June, whilst in London, he read a paper before the Royal Meteorological Society, its title 'Coronæ and iridescent clouds'. Based on work he had carried out in the Antarctic during September 1911, when he was one of a party led by Captain Scott to survey the western coast of McMurdo Sound, his paper was published 100 years ago this autumn, in the October 1912 issue of the *Quarterly Journal of the Royal Meteorological Society* (Vol.38, pp.291-302). It was a model of scientific reasoning.

Simpson stated in the Conclusion of his paper that Dr Napier Shaw, the Director of the Meteorological Office, had discussed with him before he left for the Antarctic "some of the meteorological problems which his stay in the Antarctic might help to elucidate". Shaw had strongly impressed on him, he said, "the importance of determining the lowest temperature at which liquid water can exist in the atmosphere". Simpson reported that this question had not yet been answered definitively. However, he was able to say that progress had been made, for it had been found that water droplets could exist at much lower temperatures than ever previously suspected by meteorologists.

In the opening paragraphs of his paper, Simpson described an optical effect he had observed in foggy conditions during the survey party's afternoon march on 24 September. It was, he said, "a fine fog-bow, opposite the sun, and a measurement of the radius with a theodolite gave 38 degrees". The bow was "practically white, but a reddish tinge could be seen on the outer side". Furthermore, "within the arch the sky appeared whiter than outside, but just within the sky was nearly as blue as outside, so that there appeared to be a second arch within the main one". When the bow was at its brightest, the reddish colour on the outside was clearly visible. When the sun shone faintly through the fog, however, "brightening up the fog in its neighbourhood, no colours or rings were visible in this half of the sky".

For some minutes as the fog dissipated, Simpson reported, "the sun had a brilliant corona with bright colours, and the diameter of this corona seemed unusually large, but there was no opportunity to make a measurement". As the fog continued to dissipate, "glimpses of the corona appeared again, and the fog under the sun became fairly brilliantly illuminated with iridescent colours, which did not appear to be part of the corona, but in places blended into it". The temperature during the period of observation of the fog bow was, Simpson said, between minus 15°F and minus 21°F, and "the fur of the sleeping bags and the wool of sweaters became covered with hoar frost".

When, after the march, Simpson returned to the expedition's winter quarters, he "looked up the literature to identify the bow" and found in Volume 3 of Pernter's *Meteorologische Optik* that two bows may be seen opposite the sun, both with diameters of approximately 38 degrees. The first of these was, he learned, the Bouguer Bow, which was caused by ice crystals but was pure white and not only showed no colours but was also not accompanied by a secondary bow. It was clear, he said, that the phenomenon seen on 24 September was an optical effect that was commonly known as a 'fog bow'. From details given by Pernter, Simpson was able to prove that the bow he had observed was composed of <u>water droplets</u> which had a radius of less than 0.025 mm, with the temperature at the time about minus 21°F (minus 29°C). The observation that the hair of sweaters and fur bags had become covered with hoar frost was, Simpson said, "a sure sign of supercooled water".

Simpson went on to discuss the physics of coronæ and iridescence in some detail, concluding that the occurrence of a corona indicated cloud composed of water droplets, whereas a halo formed in cloud that was composed of ice crystals. This was at odds with the general belief among meteorologists at the time that ice crystals could give rise to coronæ and other diffraction effects. "It does not seem unreasonable", he said, "to conclude that any high cloud exhibiting a corona, in whole or part, must be composed of water drops and not of ice crystals", and it followed from his observations in the Antarctic that water droplets could exist in low or medium clouds at temperatures down to minus 29°C or even lower.

In the Antarctic, Simpson reported, iridescent clouds often blended into a corona, "so that it was not possible to say where the iridescent colours ended and the corona commenced". Thus, he concluded, "iridescent colours are diffraction effects" and "where we see diffraction colours we must assume the presence of water drops". In response to the question posed by Napier Shaw, it was Simpson's view that it "only remained to determine the temperature of clouds exhibiting either corona or iridescent clouds, which were seen in all parts of the world, to collect a mass of data from which a conclusion could be drawn".

Simpson was correct. It is now accepted that coronæ and iridescence are produced by diffraction of light by small water droplets. Shaw's question has still not been answered definitively, though. It is known that water can exist in a liquid state down to a temperature of about minus 40°C. However, electrical fields can affect the freezing point of supercooled water, though exactly how has not yet been resolved.

As regards fog-bows, this is what the 1991 edition of the *Meteorological Glossary* says of them (glossary published by Her Majesty's Stationery Office for the Meteorological Office, Met.O.985):

> A white rainbow of about 40° radius seen opposite the sun in fog. Its outer margin has a reddish tinge, its inner a bluish tinge, but the middle of the band is quite white. A supernumerary bow is sometimes seen inside the first bow and with the colours reversed. The bows are produced in the same way as the ordinary rainbow but owing to the smallness of the drops, the diameters of which are about 50μm, the colours overlap and the bow appears white.

Exactly as Simpson observed.

Fog-bow

SUBSCRIPTIONS

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.

THE METEOROLOGICAL RESEARCH FLIGHT – FORMED 70 YEARS AGO

It was proposed in 1938 by the Meteorological Committee (the group who oversaw the work of the Meteorological Office), that a Meteorological Research Committee (MRC) be set up. It was, in the event, set up in 1941 by the Air Ministry.

A number of problems which came to the fore in the early years of the Second World War led several prominent scientists to offer to serve on the committee. One problem was that condensation trails (contrails) were made by aircraft at great heights and thus revealed the whereabouts of the aircraft to the enemy. The exact conditions for the occurrence of the trails needed to be investigated. In addition, there was a revival of interest in the problem of fog dispersal by artificial means; and the naval authorities pressed for an inquiry into the possibility of forecasting the weather for periods of a week to a month ahead.

The MRC was appointed by the Secretary of State for Air on 7 November 1941, its chairman Professor Sydney Chapman of Imperial College and its terms of reference to advise the Secretary of State for Air as to the general lines along which meteorological research should be developed, as well as to advise and assist in the carrying out of investigations and research within the Met Office and to receive reports on meteorological investigations carried out in the Office or on behalf of the Air Ministry and make recommendations for further action.

The MRC held its first meeting on 10 December 1941 and thereafter met another 33 times during the war. Sub-committees met on numerous occasions to deal with special questions. One of the MRC's first initiatives was to establish, through the Air Ministry, a special Meteorological Research Flight (MRF) to conduct atmospheric research from aircraft. It was formed at Boscombe Down in Wiltshire in August 1942 and one of its important early tasks was to investigate the atmospheric conditions which favoured the formation of contrails. The MRC was not disbanded when the war ended but continued for many years thereafter. [8] So, too, the MRF. [9]

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[8] See 'The history of the Meteorological Research Committee', by F J Scrase, published in 1962 in the *Meteorological Magazine* (Vol.91, pp.310-314).

[9] For further information, see 'A short history of the Meteorological Research Flight, 1942-92', by W T Roach, published in 1992 in the *Meteorological Magazine* (Vol.121, pp.245-256).

LYNMOUTH 1952 [10]

This painting of the developing storm over Exmoor on 15 August 1952 was painted by Lt Cdr Geoffrey Webb RN of Oxted, Surrey. The original is owned by the Royal Meteorological Society

On 15 August 1952, there was an intense and prolonged rainstorm over the hills of Exmoor in south-west England. Some 230 millimetres of rain fell in under 24 hours on already sodden ground. A number of villages were flooded, the place worst affected being Lynmouth, five to ten miles north of the area of heaviest rain. It was devastated. Torrents of water poured off the moors, carrying boulders, trees, carcases of animals and dozens of vehicles. Bridges and buildings were demolished and 34 people died.[11] Questions were asked. Was the storm forecast? If not, could it have been?[12] Heavy and prolonged rain was indeed forecast. However, the state of weather forecasting in 1952 was such that predictions of the intensities and precise locations of storms were not possible.

An intriguing speculation has persisted for many years, that rainmaking experiments over southern England contributed to the meteorological conditions which caused the storm over Exmoor. Rainmaking was certainly topical at the time. In fact, the whole of the July 1952 issue of *Weather* was devoted to the subject, which served to fuel the speculation. It is recorded in the annual report of the Meteorological Office for the year ending 31 March 1953 that more than 30 cloud exploration flights had been carried out by aircraft of the Meteorological Research Flight during the year in question. However, there is no mention of rainmaking in that annual report. The UK's practical involvement in this activity began in the spring of 1954, when the Meteorological Research Committee concluded that the growing interest in, and importance of, the subject was such that a trial should be carried out.[13] It should be stressed that there is no evidence that the storm which brought devastation to Lynmouth in 1952 was anything but a natural occurrence.

[10] This has been taken from *History of the Meteorological Office* by Malcolm Walker (Cambridge University Press, 2011), though lightly edited.
[11] See *The Lynmouth flood disaster*, by E R Delderfield (Newton Abbot: Raleigh Press, 1953, 164 pages).
[12] For a discussion of the meteorological conditions, see 'The 1952 Lynmouth floods revisited', by J B McGinnigle, published in 2002 in *Weather* (Vol.57, pp.235-242).
[13] For details of this trial, see 'The Meteorological Office experiments on artificial rainfall", by B C V Oddie, published in *Weather* in 1956 (Vol.11, pp.65-71).

THE GREAT SMOG OF 1952 [14]

The weather was cold in early December 1952, as it had been for some weeks. To keep warm, the people of London had burnt large quantities of coal in their grates, causing smoke to pour from the chimneys of their houses. Particles and gases had been emitted from factory chimneys, too, and winds from the east had brought pollution from industrial areas on the Continent. Early on 5 December, an anticyclone brought to the London area atmospheric conditions that were ideal for the formation of 'radiation fog', and a smoky layer of it 100-200 metres deep formed.[15] Elevated spots such as Hampstead Heath were above the fog. From there, the hills of Surrey and Kent could be seen. In some parts of London, the fog was so thick that people could not see their own feet! Not until 9 December did the fog clear.

The death toll of about 4,000 was not disputed by the medical and other authorities, but exactly how

[14] This has also been taken from *History of the Meteorological Office* by Malcolm Walker (Cambridge University Press, 2011).
[15] At night, when skies are generally clear of cloud, the ground cools. This occurs because more heat is radiated from the ground than is received from above, there being no sunshine at night. If there is no wind, dew forms, i.e. condensation in the air which is in contact with the ground. If there is a very light wind, a shallow layer of condensation known as radiation fog forms. It is typically 100-200 metres deep.

many people died as a direct result of the fog will never be known. Some suffered already from chronic respiratory or cardiovascular complaints. Without the fog, they might not have died when they did. The number of deaths in Greater London in the week ending 6 December 1952 was 2,062, which was close to normal for the time of year. The following week, the number was 4,703. Mortality from bronchitis and pneumonia increased more than sevenfold as a result of the fog.[16]

The Meteorological Office predicted the anticyclonic conditions and the formation of fog. What they could not forecast was the extent to which the smoke from the chimneys of London would aggravate the fog problem. Legislation followed the Great Smog of 1952 in the form of the City of London (Various Powers) Act of 1954 and the Clean Air Acts of 1956 and 1968. These Acts banned emissions of black smoke and decreed that residents of urban areas and operators of factories must convert to smokeless fuels. As residents and operators were necessarily given time to convert, though, fogs continued to be smoky for some time after the Act of 1956 was passed, but nothing on the scale of the 1952 event has ever occurred again. In the early 1960s, winter sunshine totals were thirty per cent lower in the smokier districts of London than in rural areas around the capital. Today, there is little difference.[17]

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100 YEARS AGO IN *SYMONS'S METEOROLOGICAL MAGAZINE*

What was published in the October 1912 issue of *Symons's Meteorological Magazine* (Vol.47, No.561)? Well … there was an article by the Revd D.C.Bates, Dominion Meteorologist, New Zealand, on 'Atmospheric disturbances and deep-sea fish' (pages 180-181), and there were articles about the unusually cold weather of August and September 1912 in many parts of the British Isles. The article by Bates began with a paragraph about a deep-sea fish known as the 'frost-fish' (*Lepidopus Caudatus*), which had been found dead upon the shores of New Zealand's South Island during and after severe frosts, and went on to describe an occurrence which occasionally accompanied storms over the coasts of New Zealand, this being the casting up of tons of dead deep-sea fish on shores, not, Bates said, as a result of thermal or volcanic action but of stormy conditions. He suggested that deep-sea fishes hugged close to land during stormy weather and appeared to be flung ashore by large waves which struck the bottom of the sea. We consider the weather of August and September 1912 elsewhere in this newsletter (page 15).

Pride of place in the October 1912 issue of *Symons's Meteorological Magazine* was given to a couple of articles about the meeting of the British Association for the Advancement of Science held at Dundee from 4 to 11 September 1912. First, there was an article by Ernest Gold entitled 'Meteorology at the British Association, Section A' (pp,173-176), and this was followed by another article by Gold, on 'The meteorological luncheon at Dundee' (pp.176-179).

What Gold called "the leading feature of meteorological interest in the proceedings" at Dundee was a joint discussion on 9 September between Section A (Mathematics and Physics) and Section M (Agriculture). This discussion had been opened by Dr Napier Shaw, Director of the Meteorological Office, who had thought it time to ask if weather forecasts were useful and "if they were used as they might be". In Shaw's view, said Gold, "the annual loss to this country [the UK] through unfavourable weather might be put at £20,000,000, and the saving of that sum, or part of it, was an object worthy of serious attention". More than that, though, Gold reported that Shaw had considered that, "owing to the special position in which the British Empire stood, the matter was even more important, for ultimately forecasts must be forecasts for the whole globe, and the amount of money to be saved throughout the empire far exceeded the estimate mentioned".

Gold went on to say that Shaw had asked the agriculturalists if they could make use of meteorological statistics and in what form they wished statistics to be presented to them. In particular, did they want them quarterly, monthly, weekly or daily? Did the agriculturalist require mean temperatures, maximum temperatures, or accumulated temperatures; rainfall or duration of rain; sunshine or intensity of radiation; or some combination of these?

After Shaw's contribution to the discussion, slides were shown, representing, respectively: the average

[16] For personal experiences of the 1952 Great Smog, see 'London Particulars and all that', by R J Ogden, published in 2000 in *Weather* (Vol.55, pp.241-247).

[17] This is true of visible pollution but not of micro-particles and gases, particularly ozone and nitrogen oxides. Levels of these are considerably greater in London today than in the surrounding countryside.

course of the seasons in the British Isles and the values for the current year, the connection between weather and crops, the connection between autumn rainfall and the yield of wheat in the following year, and the connection between rainfall and the depth of water in a well at Ditcham Park [the home of a distinguished amateur meteorologist C.J.P.Cave]. Reference was also made to papers published recently on the yield of wheat and the importance of an index number which depended on accumulated temperature and the duration of darkness.

Gold went on to report that Mr A.Watt [Secretary to the Scottish Meteorological Society] had referred to the establishment of a lectureship in meteorology at the Edinburgh and East of Scotland Agricultural College. This was, Gold said, "an event of significance both to agriculture and to meteorology". In another contribution, this one by Dr E.J.Russell [the newly-appointed Director of the Rothamsted Experimental Station], it had been pointed out that "agriculturalists were setting out to meet the meteorologists". Russell had asked Dr Shaw if it was possible to forecast the general character of the seasons for the next five years!

Mr R.M.Barrington spoke as a practising farmer. In his opinion, "meteorology ought to be taught to every aspiring farmer". If he were Chancellor of the Exchequer, he said, "he would give Dr Shaw all the money he wanted for the development of meteorology. He said that chemistry and physics were important in farming, "and mathematics too in an indirect way", but he considered that "meteorology was most important of all". Major P.G.Craigie [of Lympstone, Devon] was also convinced of the importance of meteorology, in particular "the steady and continuous utilization of meteorological forecasts and observations". He wished to "make a more modest request than Dr Russell": he asked for a forecast of the weather for the next five weeks!!

Gold reported that Shaw had referred to the early work of Admiral FitzRoy in producing weather forecasts and to the resumption of forecasting for the public in 1879, after a lapse of thirteen years, during which time weather forecasts had not been issued to the public. Soon after the resumption in 1879, the Meteorological Office began to issue forecasts for farming. In the words of Malcolm Walker, in his *History of the Meteorological Office* (CUP, 2012, p.101):

> Hay-harvest forecasts also commenced in 1879, in collaboration with the Royal Agricultural Society, the Royal Dublin Society and the Highland Society. That year, weather forecasts were sent *gratis* during the hay season to about thirty observers selected by the Councils of these Societies on condition that recipients made the forecasts known as widely as possible and, in addition, assessed and recorded the accuracy of each forecast. The scheme was considered satisfactory, with 76% of the forecasts rated completely or partially successful, as calculated from the reports of observers. Accordingly, the scheme was repeated in the summer of 1880 and in the summers of many years thereafter.

One may wonder why the profile of agricultural meteorology had not been higher in the Meteorological Office in the late nineteenth century and early years of the twentieth, when it had surely been recognised for hundreds, if not thousands, of years that weather was an important factor in agriculture, but it was clear from Gold's report on the discussion at the British Association meeting in 1912 that determined attempts were being made by Napier Shaw and others to remedy this situation.

It is clear from Gold's article about Section A's meteorological luncheon at Dundee on 9 September that agricultural meteorology was a matter of some importance to those present. The toast to the Scottish Meteorological Society, for example, and the replies to this toast, focused almost entirely on weather and agriculture. Other aspects of meteorology were not, though, overlooked. When proposing a toast to 'Bonnie Dundee', for example, Dr Shaw said that Mr W.H.Dines had recently "turned our ideas upside down by his discovery that the origin of meteorological disturbances was to be sought at a height of 9 kilometres above the Earth's surface". It was also noteworthy, he added, that "observations with theodolites of the motion of pilot balloons had been instituted at Aberdeen" during the past year, "and already valuable information had been obtained there".

Have you an unsung hero of meteorology or physical oceanography?
Alan Heasman wrote about William Merle in Newsletter 2, 2012 (pages 14-15).
Stephen Burt writes about an unsung hero of his in this newsletter (page 16).
If you have an unsung hero of meteorology or physical oceanography, do please write about him/her.

BLOWING HOT AND COLD

Most readers of this newsletter will agree that the summer of 2012 was not one to write home about. The abiding memory for most who live in the United Kingdom will be of cool, cloudy and all-too-often wet weather, though there were some fine spells. There was, for example, warm, sunny weather over England and Wales for a week or so in the second half of May (but was that a fine spell at the end of spring, rather than early summer?). And there were brief spells of hot weather in south-east England in July and August, in one of which temperatures reached 32°C. The far north-west of Scotland was the place to be for much of the summer of 2012. The weather there was, overall, drier than average.

But what of August and September 1912, the subject of two articles in the October 1912 issue of *Symons's Meteorological Magazine*? One of these articles (on p.181) focused on the basic temperature statistics; the other, by F.J.Brodie (pp.182-183), reviewed the weather of September 1912.

In the Central England Temperature (CET) record from 1659 to 2011, the coldest August occurred in 1912 and the eleventh coldest September in 1912. August 1912 was also very wet – indeed the wettest on record in south-east England – with 151.6 mm of rainfall. This was quite a contrast to the glorious weather of August and September 1911. In the 253 years of the CET record from 1659 to 1911, August 1911 was the second warmest, with only the August of 1747 warmer; and July 1911 was warmer than

continued in the next column

average, too, exceeded only by the Julys of 1701, 1733, 1757, 1783, 1808, 1852, 1859 and 1868. September 1911 was also warmer than average but in the 252 years from 1659 to 1910 66 Septembers were warmer.

It was noted in the article on page 181 of the October 1912 issue of *Symons's Meteorological Magazine* that the mean temperature in London was above average in each of the fifteen consecutive months from May 1911 to July 1912 and was then considerably below average in both of the following two months. In the words of the author of the article:

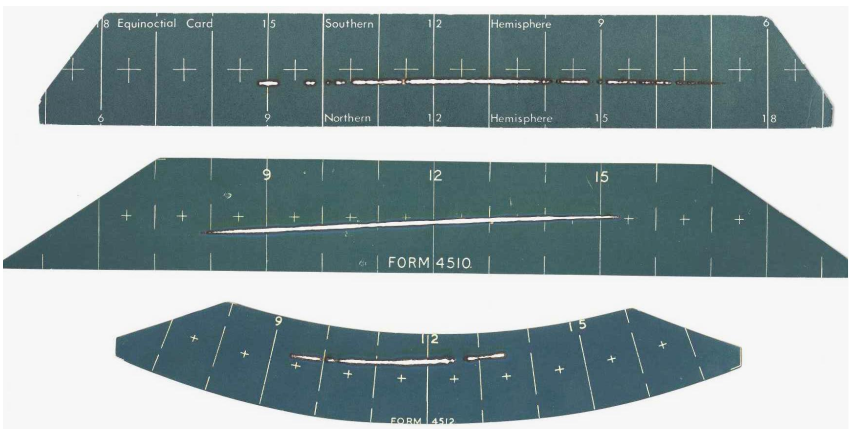
> In August-September 1911, the temperature rose to 80°F or above on 22 days and exceeded 90° on five days. The mean shade maximum for August 1911 was 80.8°F, or 14.2°F above the corresponding mean for 1912. In September 1911, the mean shade maximum was 73.0°F, or 12.5°F above that of September 1912.

In August 1912, the shade temperature failed to exceed 73.2°F. In September 1912, the absolute maximum was 69.4°F. The contrast between the two pairs of months was brought out by a table in the article which provided a summary of maximum temperatures in the 61 days of August and September 1911 and 1912:

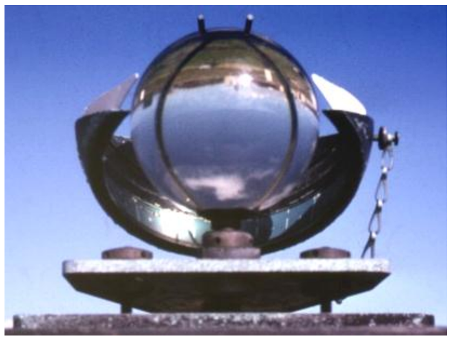
Number of days with maximum temperature above:

	60°F	65°F	70°F	75°F	80°F	85°F	90°F
1911	61	55	44	36	22	13	5
1912	53	28	3	0	0	0	0

REMEMBER THESE?



Sunshine cards from a Campbell-Stokes sunshine recorder, showing holes burnt and scorch marks left by the sun's rays being focused on the cards.



Campbell-Stokes sunshine recorder, invented by John Francis Campbell in 1853 and modified by George Gabriel Stokes in 1879. Not as common as it used to be, being replaced by modern electronic devices.

AN UNSUNG HERO IN METEOROLOGY: CHARLES HIGMAN GRIFFITH (1830-1896)

by Stephen Burt

Stratfield Mortimer, Berkshire

Charles Higman Griffith (**Figure 1**) was a Hampshire clergyman who, by conducting a series of thorough instrument comparisons in the late 1860s and early 1870s, helped establish the Stevenson screen and the five-inch 'Snowdon' copper rain-gauge as UK and Ireland standard climatological instrumentation. They remain standards to this day. With the British Empire at its height, British meteorological instruments and standards spread quickly around the globe. Neither instrument is perfect, but because their design and construction have changed little in more than a century, today's climate researchers have a wealth of relatively consistent long-period temperature and rainfall measurements from around the world. Without the comparative trials undertaken by Rev. Griffith in the garden of a north Hampshire rectory over 140 years ago, and the rationalisation and standardisation of instrument types that followed, the world's climatological records would be much more fragmented and inconsistent.

Charles Griffith was born in north London on 10 August 1830. By 1860 he had moved as a curate to the rectory at Strathfield Turgiss (now Stratfield Turgis), part of the Duke of Wellington's estate in north Hampshire midway between Reading and Basingstoke. He was already a keen naturalist and microscopist, and his diaries abound with detailed observations of plants, insects and natural phenomena, including weather events. He began rainfall records in 1862: these were first published in *British Rainfall* in 1865, and this was presumably the first time he corresponded with George Symons, the founder of the British Rainfall Organization or BRO (see the special issue of *Weather*, May 2010, for more on Symons and the BRO).

Figure 1: Charles Higman Griffith

The founding of the British Rainfall Organization in 1860 was a landmark event in British climatology. In its early years, there were almost as many different types of rain-gauges, exposures and observational details as there were observers. As the BRO expanded, the need for guidance to observers on a 'standard rain-gauge' became pressing. In 1863, Symons encouraged and part-funded Colonel Michael Ward, at Calne in Wiltshire, to set up a series of gauges of different size, construction and materials, exposed at various heights above the ground, to examine their relative performance. When Col Ward moved to Switzerland in 1868, Rev. Griffith agreed to continue the trials at Stratfield Turgis. By the end of 1868 the rectory grounds contained no fewer than **42** different daily-read rain-gauges, as shown in the famous Frontispiece to *British Rainfall 1868* (**Figure 2, page 18**).

The results from over a decade of field trials in differing climatic regimes led to the formal adoption in 1875 of the copper Snowdon 'five-inch' (127 mm) gauge as the BRO standard. The Snowdon gauge with its deep funnel and an accurately-turned brass rim was found to offer a fair compromise between the various factors influencing rainfall catch.

As an aside, it has always puzzled me how Rev. Griffith managed to get round 42 rain-gauges at 9 a.m. Clearly if it was raining at the time, the daily totals between the first-read and the last-read gauge would differ, perhaps substantially. Following a presentation to my local history society in 2001, referring to the role of Rev. Griffith and Stratfield Turgis (Stratfield Turgis Rectory lies less than 5 km south-east of my home at Stratfield Mortimer, on the Hampshire/Berkshire border), one member suggested that the Rev. Griffith may have run a boarding school in the rectory. A check of the 1871 Census returns shows that the only people registered as living at the property were Rev. Griffith and his wife, their five children (then aged from 9 to 16), and two domestic servants. Local parish records do confirm a 'boarding and tutorial establishment for boys' at the rectory run by Rev. Griffith, so perhaps with five of his own children already living there, the pupils boarded locally in 1871. The 1881 Census does show five teenage 'scholars' living in the rectory with Rev. and Mrs Griffith and their two remaining unmarried daughters. The mental image of a horde of small boys running around to the 42 gauges, wrapping up the rainfall observations within minutes, has great appeal, even if there's no unambiguous evidence for it!

The thermometer screen trials

Rev. Griffith commenced measurements of air temperature around 1864 or 1865. At that time, types and patterns of thermometer housing were almost as numerous as rain-gauge designs. Thomas Stevenson's short note on a proposed design for a thermometer shelter using wooden louvres to screen the interior instruments from radiation and precipitation appeared in the *Journal of the Scottish Meteorological Society* only in 1866 (Vol. 1, p.122) and at the time was only one of a multitude of competing designs. Clearly not one to pass up a challenge, Rev. Griffith then set up comparative trials of ten types of thermometer exposure in the grounds of the rectory, including one constructed to Stevenson's design, using identical calibrated thermometers. Equipment costs (£45) were met by a grant from the Royal Society procured by George Symons. These trials ran from November 1868 to April 1870, consisting of observations made three times daily (9 a.m., 3 p.m. and 9 p.m.), together with maximum and minimum temperatures in the screens that held such thermometers. It should be noted that part of this period also coincided with the daily 9 a.m. reading of the 42 rain-gauges!

The work involved in collating, tabulating, analysing (by hand – no PCs then!) and writing up such a large trial was a daunting undertaking, and the results did not finally appear in print until 1882, when Frederic Gaster's 27 page paper was published in the Met Office's *Quarterly Weather Report for 1879*. Gaster's conclusion and recommendation (Appendix II, page 31) was that "Stevenson's screen is better adapted than any of the other stands tested to register the temperature of the air."

The (Royal) Meteorological Society subsequently established a thermometer screen committee to undertake further tests, eventually recommending slight modifications to Stevenson's original design, culminating in the endorsement and recommendation of a standard pattern in 1883 (Report of the thermometer screen committee: *QJMetS,* **10**, pp.92-94).

Changes have been minor since, at least in the UK and Ireland. A double-width 'large' Stevenson screen was introduced early in the 1900s to accommodate clock-driven autographic instruments recording on paper charts, while more recently screens have been made from UV-resistant plastic, with consequent reductions in maintenance requirements. Trials undertaken by the Met Office showed little significant difference between wooden and plastic screens, and plastic Stevenson screens have since been formally adopted by the Met Office, with a rolling replacement programme as wooden screens reach the end of their working lives.

Global impact

It is hard to underplay the impact of those two painstaking instrument trials undertaken in the garden of a north Hampshire rectory just over 140 years ago. Both eventually led to the clear endorsement of a particular design of instrument, which soon found their way around the globe. Louvred Stevenson-type screens are the closest that we have to a global standard thermometer housing, and at a conservative estimate there are probably 35,000 in daily use around the world.

The dominance of the 'five-inch' rain-gauge is less pronounced, owing perhaps more to climatic factors than to any limitations in design; in regions with significant annual snowfall, a rain-gauge mounted 300 mm above the surface is quickly buried. Even so, a WMO report in 1989 established that the basic Snowdon pattern, or minor variations thereof, was the standard precipitation sensor in 29 countries, with approximately 18,000 gauges in use by national or regional weather services alone.

Of course, the numbers of both Stevenson screens and Snowdon-type rain-gauges are only likely to decline in the coming decade or two as automation continues to erode the dominance of 'traditional' manual instruments. The existence of long periods of conservative record made using such standardized instruments today provides us with the essential baseline for assessing the extent and magnitude of climate change, although changes of instrument type often result in catastrophic loss of homogeneity in long-period records where no period of overlapping observations has been allowed for.

Epilogue

Rev. Griffith remained rector of Stratfield Turgis for the rest of his life. After 1870, he continued to make twice-daily readings of temperature, rainfall, pressure, wind and weather, with only a few short gaps in his record. His original handwritten records survive in the National Meteorological Archive in Exeter, and I have copies of most of them. Because Stratfield Turgis rectory is so close to my current observing location, and the records (and of course

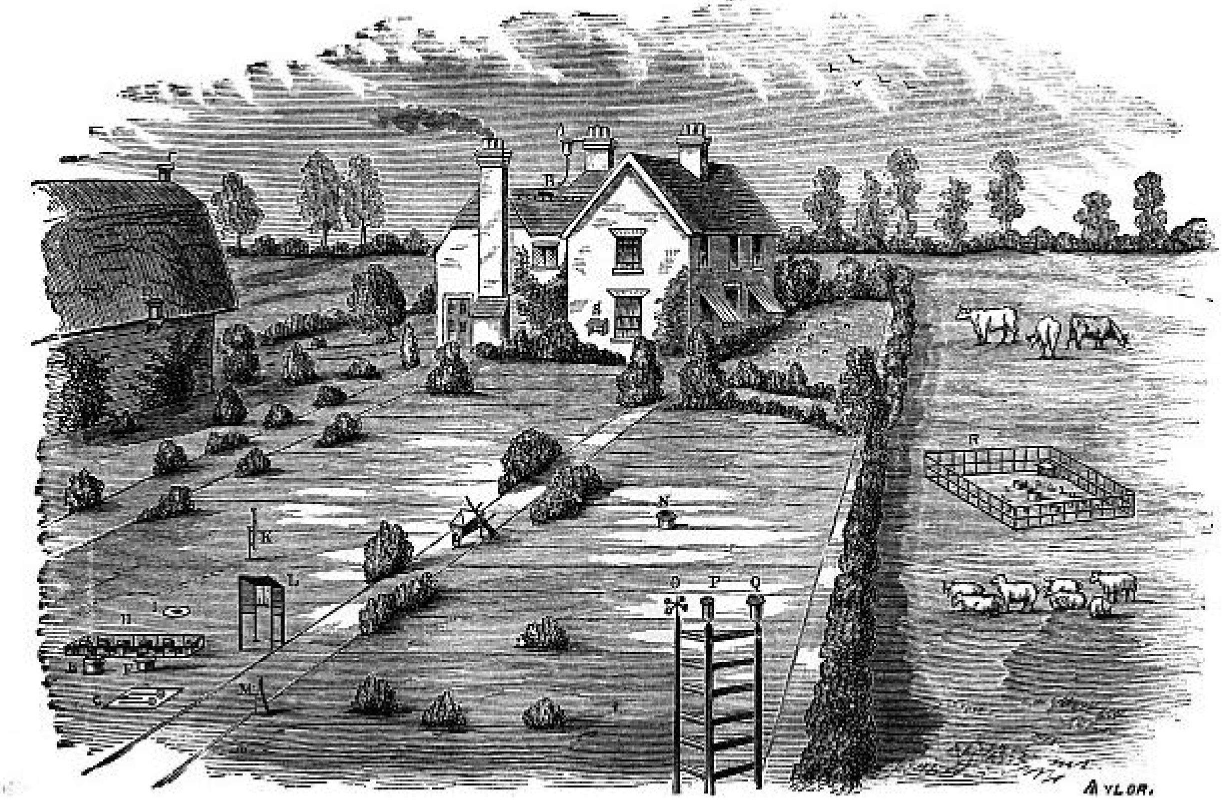


Figure 2: Experimental gauges at Stratfield Turgis Rectory, Hampshire.

Figure 3: The site today.

instruments) are directly comparable, Rev. Griffith's notes provide a fascinating local window on the weather of the latter nineteenth century compared to today.

His record ends abruptly. The last entry to appear in the register is for 9 a.m. on 25 March 1896 ('cloudy, fine'). It appears that Charles Griffith was suddenly struck down with a terminal affliction, for he died exactly a week later, on 1 April 1896 (his death notice appearing in *The Times*, 4 April 1896 – issue 34856, page 1, column A). Considering his many contributions to meteorology over four decades, it is surprising that no formal obituary appeared in either *Symons's Meteorological Magazine* or the *QJRMetS*. George Symons' brief note in *SMM*, however, concluded with the following handsome eulogy: "Mr Griffith was a worker rather than a writer; had he written more, the parallelism between the two Hampshire rectors, Gilbert White of Selborne in the 18th century, and Griffith of Strathfield Turgiss in the 19th, would have been noteworthy."[18]

Stratfield Turgis rectory is still there today, recognisably the same as the buildings and gardens depicted on the frontispiece of *British Rainfall 1868*. A few years ago I contacted the current owners, who of course had little inkling of the important climatological research that had taken place in the grounds almost 150 years ago, and I had the opportunity to take photographs of the site from a vantage point close to where the 1868 sketch was made (**Figure 3, above**). It is surprising how little had changed, and it was very easy to half-close my eyes

[18] It is probable the reason why there was no obituary of Rev. Griffith in the *QJRMetS* is that he was not a member of the Society at the time of his death. He was elected a Fellow of the (then) Meteorological Society on 20 November 1867 and resigned his membership on 31 December 1886 – *Ed.*

and imagine the Victorian clergyman and his small army of pupils racing into the grounds to read the instruments at 9 a.m.

If not for the Victorian clergyman and his pupils making those meticulous records from so many different types of instrument in a north Hampshire rectory garden, day in and day out, standards might still be as ill-defined as they were in the 1860s. For this, Charles Higman Griffith certainly deserves posthumous recognition. He is my 'unsung hero'. He could not have imagined what an impact his painstaking investigations would have on global climatology over the course of the following 150 years.

Thanks to Mark Beswick in the Met Office Archives and Steve Jebson in the National Meteorological Library, and to Philip Eden, who searched for CHG's obituary, without success, in both SMM *and* QJ*.*

A longer version of this note has been submitted to Weather*.*

ABOVE THE CLOUDS 150 YEARS AGO

A journal which bore the title *Proceedings of the British Meteorological Society* has unfortunately been forgotten by most meteorologists. It was published from 1861 to 1871 and was then replaced by a journal that is still published today: the *Quarterly Journal of the Meteorological Society* (from 1884 *Quarterly Journal of the* <u>*Royal*</u> *Meteorological Society*). As stated in the Preface to the first issue of the *Proceedings*, published in November 1861, the journal was "not only intended to place before Members the election-lists and the papers read [at Society meetings], but to call attention to books published, instruments introduced, papers read elsewhere, and to other sundry items of meteorological news".

Information about the activities and finance of the Society prior to the autumn of 1861 was published in a series of *Annual Reports* which also contained, in whole or in part, papers read at Ordinary Meetings. The first of these reports was a very modest affair of four pages, covering the period from the Society's foundation on 3 April 1850 to the first Annual General Meeting, held on 27 May 1851. The last was published after the Annual General Meeting of 12 June 1861. Complete sets of the reports are very scarce in 2012 and were already in short supply in 1861, as was pointed out in the Preface to Volume 1 No.1.of the *Proceedings* that the stock of back numbers was exhausted and complete sets were "not now to be obtained".

The issue of the *Proceedings* that was published almost exactly 150 years ago, Volume 1 No.5, was dated 19 November 1862. It opened with a list of the sixteen people who had been balloted for that day and duly elected Members of the British Meteorological Society, among them Henry Coxwell, of Lower Tottenham, an experienced and intrepid balloonist. In Volume 1 No.5, he figured not only in the list of newly-elected members but also in the 'classic' paper which took up 27 of the 40 pages (pp.234 to 260). This paper, 'On the meteorological observations made in eight balloon ascents', was by James Glaisher, the British Meteorological Society's Secretary.

The first paragraph of the paper read as follows:

> Amongst meteorologists, the desire to be among, and to get above, the clouds has always been great, as promising the only satisfactory means of determining the laws of the decrease of temperature with increase of elevation under different states of the sky, the laws of moisture, the circumstances of each formation of cloud, the heights at which they take place, their thickness and the space which separates them, as well as to determine the many currents which may simultaneously exist in the atmosphere. The only sure way of getting into the clouds, passing through and getting above them, is by means of balloons: hence the interest and value of balloon experiments for meteorological purposes.

Glaisher continued with a review of balloon ascents for meteorological purposes, including, among others, the ascents made by Étienne-Gaspard Robert from St Petersburg in 1803 and 1804, Joseph-Louis Gay-Lussac from Paris in August and September 1804, and John Welsh (of Kew Observatory) from London on 17 and 26 August, 21 October and 10 November 1852.

Robert (also known as Robertson) made numerous measurements and observations, including barometric pressure and temperature, the shapes and altitudes of clouds, the behaviour of parachutes at different altitudes, the evaporation of ether, the electrical properties of different materials and the air, the behaviour of a magnetic needle, the boiling point of water at great altitudes, sound propagation, influence of high altitudes on pigeons and butterflies, strength of solar radiation, the solar spectrum, gravity properties, and the chemical composition of air.

Gay-Lussac ascended to 22,977 feet (7,000 metres) on 15 September 1804, thus establishing a record that was not beaten for almost 50 years. At that height, he experienced quickened pulse, shortness of breath and finally unconsciousness (all symptoms of oxygen deprivation) until the balloon began to descend. He still managed, however, to collect air samples at over 20,000 feet (6,000 metres) and to study variations of pressure and temperature.

Welsh reached an altitude of 22,930 feet on 10 November 1852 and therefore did not break the altitude record held by Gay-Lussac. His observations of temperature did, though, tend to confirm the deduction of Gay-Lussac that temperature decreased roughly one degree Fahrenheit for every increase of height of 300 feet.

Glaisher noted on page 237 of his paper that:

> The high expectations entertained on the discovery of the balloon have never been realized; and there has been a constant desire, both in France and England, ever since its invention, to apply the balloon to those philosophical experiments whose solution cannot be made in a satisfactory manner without its use; and many committees have been appointed, and many grants of money made, by the British Association to this end ever since its formation.

Cut-away view of balloon basket showing Joseph-Louis Gay-Lussac (left) and Jean-Baptiste Biot with meteorological instruments and a bird in a cage at an altitude of 4,000 metres over Paris on 24 August 1804. From Les Merveilles de la science, ou description populaire des inventions modernes*, by Louis Figuier, published in Paris in 1868 (p.537).*

A committee was appointed at the meeting of the British Association for the Advancement of Science held at Manchester in September 1861, the members being as follows:

- Lord Wrottesley (a founder member of the Royal Astronomical Society who was keenly interested in both astronomy and meteorology);
- Colonel W.H.Sykes (an Army officer, a Member of Parliament and an ornithologist, with a strong interest in meteorology);
- Sir John Herschel (a mathematician, astronomer, chemist and inventor, with a strong interest in meteorology);
- Edward Sabine (President of the Royal Society);
- Admiral Robert FitzRoy (Head of the Meteorological Department of the Board of Trade);
- Dr John Lee (a keen amateur astronomer and meteorologist and owner of Hartwell House, where the British Meteorological Society was founded on 3 April 1850);
- George Biddell Airy (the Astronomer Royal;
- Dr Thomas Romney Robinson (Director of the Armagh Observatory and inventor of the cup anemometer);
- J.P.Gassiot (businessman and amateur scientist);
- John Tyndall (a prominent physicist who made fundamental contributions to understanding of thermal atmospheric processes);
- William Allen Miller (a chemist and astronomer);
- James Glaisher himself (Superintendent of the Magnetic and Meteorological Department of the Royal Observatory at Greenwich).

A distinguished cast indeed!

The objects to be pursued by means of balloons as determined by the committee were listed by Glaisher on page 238 of his paper. The primary object was "the determination of the temperatures of the air, and its hygrometrical states, at different elevations up to five miles". There were ten secondary objects:

- To compare the readings of an aneroid barometer with those of a mercurial barometer up to an altitude of five miles;
- To determine the electrical state of the air;

- To determine the oxygenic state of the air by means of ozone papers;
- To determine the time of vibration of a magnet on the earth and at different distances from it;
- To determine the temperature of the dew-point by means of Daniell's dew-point hygrometer and Regnault's condensing hygrometer, and by the use of the dry- and wet- bulb thermometers as ordinarily used and by their use when under the influence of an aspirator;
- To collect air at different elevations;
- To note the heights and kinds of clouds, along with their density and thickness at different elevations;
- To determine the rate and directions of different currents in the atmosphere;
- To make observations on sound;
- To note atmospherical phenomena in general, and to make general observations.

The ascents described by Glaisher were all made with Coxwell's large balloon. Three were made from Wolverhampton, four from the Crystal Palace at Sydenham and one from Mill Hill, near Hendon.

The first ascent was made on 17 July 1862 from Wolverhampton and reached an altitude of about five miles (a little over 26,000 feet), but Glaisher did not mention Gay-Lussac's altitude record in his paper, presumably because he reached an even greater height on a subsequent ascent. His ascent on 17 July brought a surprise for him, for he found that the temperature of the air increased from 26°F at 13,000 feet to 37°F at 18,800 feet and, indeed, rose to 42°F during the eight minutes the balloon remained close to 19,000 feet. He had encountered an inversion of temperature. Above 19,000 feet, the temperature decreased, to a minimum of 16°F at the highest point reached. Glaisher was keen to go still higher, but Coxwell's advice that they should not do so prevailed. Below them, with a base at about 4,000 feet, there was a layer of cloud several thousand feet in thickness. The ground could not be seen, and Coxwell feared the balloon might descend into the Wash. In the event, it landed near Oakham in Rutland, hitting the ground so heavily that all the instruments which Glaisher had not been able to pack up were broken. From launch at 9.43 am to the rather rough landing at 11.50 am, the flight had lasted a little over two hours.

The next flight described by Glaisher took place on 30 July 1862, from launch at the Crystal Palace at 4.40 pm to landing near Gravesend at 6.30 pm. This one reached an altitude of only 7000 feet and was meteorologically unremarkable. However, the precautions Glaisher took to obtain temperature and humidity readings that were not influenced by the occupants of the balloon's basket were shown by him attaching the instruments to a framework that was fixed to a table which projected over the edge of the basket.

On 18 August 1862, there was another ascent from Wolverhampton, with launch at 1.03 pm and landfall at Solihull at 4.05 pm. The maximum altitude reached was 23,600 feet. Again, the meteorological conditions were unremarkable, with fair-weather cumulus clouds and some patches of cirrus above.

Two days later, at 6.26 pm on 20 August, Glaisher and Coxwell began another balloon flight from the Crystal Palace and soon encountered noteworthy atmospheric conditions. At 6.43 pm, at a height of 4200 feet, "a thick mist or thin cloud was entered" and Glaisher found that the temperature was a degree or so higher at 4400 feet than just below the cloud base. To investigate the temperature variations in, above and below the cloud, a descent was made to 3600 feet followed first by an ascent to 4350 feet and then another descent, this time to 1200 feet, but no inversion was detected. Whilst he and Coxwell were over Kennington, Glaisher said, the hum of London could be heard.

As darkness fell, Glaisher and Coxwell were treated to "a truly remarkable scene", with the bridges that spanned the River Thames and "street after street" lit up, "sometimes in straight lines, sometimes winding like a serpent, or in some places forming a constellation at some place of amusement". At 7.40 pm, Coxwell "determined to ascend above the clouds", and eight minutes later the balloon had reached 5100 feet. There was darkness below them, Glaisher said, "but there was clear sky above, and a beautiful gleam of light appeared". He and Coxwell continued to ascend, and Glaisher noted when they were at 5900 feet that the clouds below them were "tinged and coloured with a rich red". After a further descent, this time to 5300 feet, another ascent was made, to a height of 7400 feet, where the temperature was 55°F, i.e. ten degrees higher than at 5300 feet. Another inversion of temperature had been encountered.

During the subsequent descent, it became too dark both to read the instruments and, as Glaisher put it, "to examine the country beneath". The balloon was now over Mill Hill, near Hendon, some distance from central London, away from street lights. Coxwell's consummate skill as an aeronaut was now displayed. He avoided colliding with the tops of trees and brought the balloon down "so gently that one was scarcely aware of the contact [with the ground]".

The balloon was anchored for the night and another ascent made early the next morning, with a launch from Mill Hill at 4.30 am, this time with five people aboard, Glaisher and Coxwell, plus Captain Percival of the Connaught Rangers, Mr W.F.Ingelow of Kensington, and Lee Glaisher, aged 13, James Glaisher's son.[19] They reached a height of 14,000 feet at 5.34 am and remained between that elevation and 14,500 feet for half an hour before starting their descent. They landed near Biggleswade at 7.10 am.

In his description of this flight, Glaisher showed that he was more than a single-minded scientist. He was also a person who appreciated the beauty of the skyscapes which unfolded before him. Throughout the flight, he recorded dry-bulb and dew-point temperatures and related them to atmospheric conditions as and when appropriate. For example, he noted that "a white mist enveloped the balloon" at 4.57 am, adding that "the temperatures of the air and dew-point were alike, indicating complete saturation". His descriptions of an aesthetic nature included the following:

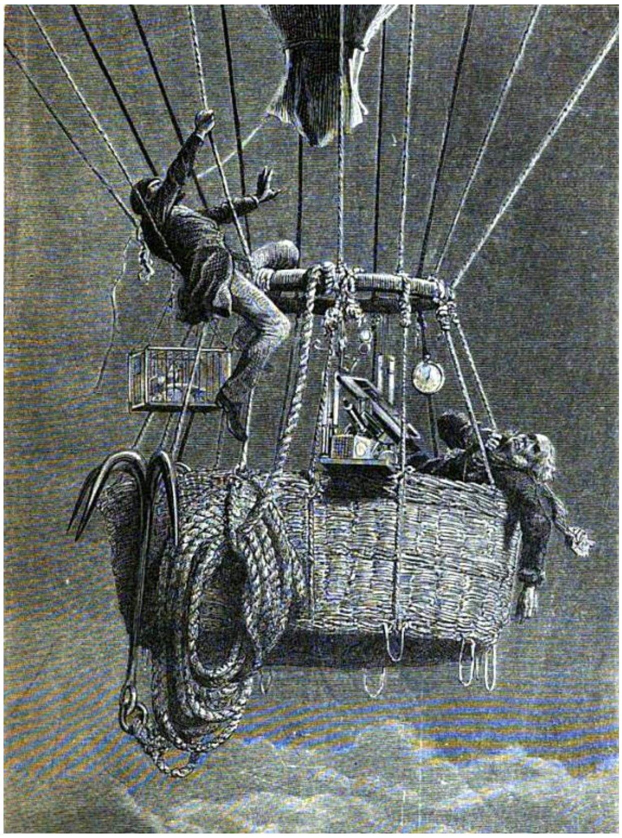
- "The light rapidly increased, and, gradually emerging from the dense cloud into a basin surrounded by immense black mountains of cloud rising far above us, shortly afterwards there were deep ravines of grand proportion beneath open to the view."
- "As the balloon ascended, the tops of the mountain-like clouds were observed to be tinged with silver and gold. … It was a glorious sight."
- "Here arose shining masses of cloud in mountain-ranges, some rising perpendicularly from the plains with summits of dazzling brightness, some pyramidal, others undulatory. Nor was the scene wanting in light and shade; each large mass of cloud cast a shadow, thereby increasing the number of tints and beauty of the scene."

[19] Glaisher's son was born in November 1848 and given the forenames James (after his father), Whitbread after Samuel Charles Whitbread (who subsequently became the first President of the British Meteorological Society) and Lee after Dr John Lee (at whose home the Society was subsequently founded). He was known as Lee.

The sixth flight made by Glaisher and Coxwell took place on 1 September 1862 from the Crystal Palace. The balloon left the ground at 4.52 pm, rose to 4,200 feet and drifted westwards to Woking, where it landed at 6.11 pm. On this occasion, to use the words of Glaisher, "the observations of the barometers and Daniell's hygrometer were made by Mr J.MacDonald, the Assistant Secretary of this [British Meteorological] Society".

Much has been written about the seventh flight made by Glaisher and Coxwell. It could so easily have ended their lives. The flight was made on 5 September 1862, from Wolverhampton, with lift-off at 1.03 pm. The exact altitude reached is not known, because Glaisher became insensible and Coxwell came close to passing out too.

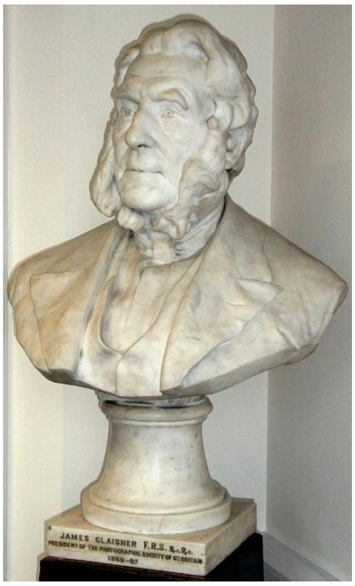
Glaisher's last observation before he became unconscious was made at a height of 29,000 feet, at 1.54 pm, and he could not resume his observing until 2.07 pm, by which time the balloon had descended to 25,500 feet. Whilst Glaisher was unconscious, Coxwell lost the use of his hands and had to seize with his teeth the cord that opened the valve and so cause the balloon to descend. At the



Glaisher unconscious at a height of seven miles, and Coxwell seizing with his teeth the cord that opened the balloon's valve.
From the Illustrated London News.

time when he became insensible, Glaisher said, the balloon was ascending at the rate of 1000 feet per minute, and when he resumed his observations it was descending at 2000 feet per minute. Whilst he was insensible a minimum temperature of minus 12°F was recorded, and a reading of the aneroid barometer made by Coxwell indicated a minimum pressure of 7 inches. Thus, Glaisher estimated that the balloon reached a height of 37,000 feet.

Glaisher was not only a keen meteorologist and astronomer but also a skilled photographer. Indeed, he served as President of the Photographic Society of Great Britain from 1869 to 1887. The bust on the right, which stands in the Meetings Room of the Royal Meteorological Society, was presented to him by the Photographic Society and given to the Royal Meteorological Society by his son.[20]



We learn from Glaisher's account of the ascent on 5 September that he had a camera with him, but using it proved frustrating. As he put it: "Upon emerging from them [clouds] at 1.17 pm, I tried to take a view of their surface with the camera; but the balloon was ascending too rapidly, and gyrating too quickly, to enable me to do so. All that would have been necessary would have been a momentary exposure, as the flood of light was so great and the dry plates with which I had been furnished by Dr Hill Norris so sensitive".

The flight came to an end at 3.07 pm, when the balloon came down "in the centre of a large grass-field belonging to Mr.Kersall at Cold Weston, seven and a half miles from Ludlow". There appear to have been some scared onlookers. In the words of Glaisher: "A number of country people stood in the corner of the field, like a flock of frightened sheep; and it was not till after a good deal of coaxing in very plain English that any one, excepting Mr.Kersall, would approach us. The country people seemed to think we were not mortal."

[20] Glaisher was born in 1809 and died in 1903. The bust was given to the Royal Meteorological Society in 1904.

The eighth flight was unremarkable and something of an anti-climax. It was made on 8 September from the Crystal Palace and lasted for an hour and 23 minutes, from launch at 4.47 pm to landing near Tilbury at 6.10 pm. The maximum height reached was 5400 feet. Again there was a companion for Glaisher and Coxwell, a colleague of Glaisher, Mr W.C.Nash of the Magnetical and Meteorological Department of the Royal Observatory, Greenwich, who "took the observations of the barometers and Daniell's hygrometer". Glaisher was the Superintendent of that Department.

In his paper, Glaisher included graphs for each flight, showing temperature readings against height, as well as notes on cloud and other sky conditions. He also included tables which listed for each flight readings of dry-bulb and dew-point temperatures at different heights.

As noted earlier, Glaisher's paper was a classic, describing vividly and in enthusiastic terms the pioneering balloon flights he and Coxwell made in 1862. The paper is well worth reading today for its clear exposition, from which one can easily imagine what it was like to be in the balloon with Glaisher and Coxwell. Oh that scientific papers were all so readable today!

Glaisher's flights did not go unnoticed by the press. For example, there was comment in *The Times* newspaper on 11 September 1862; and the piece this newspaper published was reproduced on pages 268 to 270 of the November 1862 issue of the *Proceedings of the British Meteorological Society*.

"We have just had an ascent such as the world has never heard of or dreamed of", enthused *The Times* correspondent. "Two men have been nearer by some miles to the moon and stars than all the race of man before them".

Space does not allow us to reproduce the whole piece from *The Times*; and it was also rather verbose and in some parts written in rather flowery language. Suffice to conclude this article with another quotation from the piece: "The aerial voyage just performed by Mr.Coxwell and Mr.Glaisher [that of 5 September] deserves to rank with the greatest feats of our experimentalizers, discovers, and travellers".

Indeed so!

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.

BROOKS, N., 2012. 'The August 1912 floods in Norfolk', *Weather*, Vol.67, pp.204-205.

BURT, S., 2012. *The weather observer's handbook*, Cambridge University Press, 456 pages.
Paperback ISBN 978-1-107-66228-5
Hardback ISBN 978-1-107-02681-0

CAMUFFO, D. and BERTOLIN, C., 2012. 'The earliest spirit-in-glass thermometer and a comparison between the earliest CET [Central England Temperature] and Italian observations', *Weather*, Vol.67, pp.206-209.

GORDON, A.L., 2012. 'Circumpolar view of the Southern Ocean from 1962 to 1992', *Oceanography*, Vol.25, pp.18-23.

HAINES, C., 2012. 'Obituary of Ingrid Holford', *Weather*, Vol.67, p.250.

HAUER, K. and PFEIFER, N., 2011. 'Reporting on historical severe storms: two examples of Utrecht (1674) and Abtenau (1796)', *Atmospheric Research*, Vol.100, pp.580-585.

HOUGHTON, J.T. *et al*, 2012. 'The GCOS at 20 years: the origin, achievement and future development of the Global Climate Observing System', *Weather*, Vol.67, pp.227-235.

KEANE, T. *Establishment of the Meteorological Service in Ireland: the Foynes years, 1936-1945*, Varsity Press, 170 pages.
Paperback ISBN 978-1-908-41718-3

KENNEDY, J., MORICE, C. and PARKER, D., 2012. 'Global and regional climate in 2011', *Weather*, Vol.67, pp.212-218.

KENWORTHY, J.M., 2012. 'Meteorologist's profile – Charles Ernest Pelham Brooks I.S.O., D.Sc. (1888-1957), *Weather*, Vol.67, pp.235-237.

LEWIS, J.M., FEARON, M.G. and KLIEFORTH, H.E., 2012. 'Herbert Riehl [1915-1997]: intrepid and enigmatic scholar', *Bulletin of the American Meteorological Society*, Vol.93, pp.963-985.

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ISBN 978-0-824-83431-9

NICHOLSON, S.E., DEZFULI, A.K. and KLOTTER, D., 2012. 'A two-century precipitation dataset for the continent of Africa', *Bulletin of the American Meteorological Society*, Vol.93, pp.1219-1231.

PETERSON, T.C., STOTT, P.A. and HERRING, S., editors, 2012. 'Explaining extreme events of 2011 from a climate perspective', *Bulletin of the American Meteorological Society*, Vol.93, pp.1041-1067.

SEIDENFADEN, E., 2011. 'Found: a diagram of the 1630 Rome halo display', *Applied Optics*, Vol.50, pp.F60-F63.

STRANGE, C. and BASHFORD, A., 2008. *Griffith Taylor: visionary, environmentalist, explorer*, University of Toronto Press, 287 pages.
Paperback ISBN 978-0-802-096630.

WEBB, J.D.C., 2012. 'Severe thunderstorms disrupt the Diamond Jubilee on Midsummer Day 1897', *Weather*, Vol.67, pp.174-175.

WHEELER, D. and BELL, A., 2012. 'The Gibraltar climatic record – Part 4. The earliest records', *Weather*, Vol.67, pp.240-245.

FORTHCOMING EVENTS

☐ **ON WEDNESDAY 21 NOVEMBER 2012**, there will be a **'Classic Papers' meeting**, at the **University of Reading, in the Madejski Lecture Theatre, Agriculture Building**. The meeting will begin at 2.00 pm and end at 5.30 pm. Its title is:
Hot in the city: advances in urban meteorology, measurement and modelling.

The abstract for the meeting is as follows:

The foundations of urban meteorology were laid nearly two centuries ago by Luke Howard, who recognized, described and analysed the heat island phenomenon. Further fundamental advances were made by Tony Chandler and co-workers half a century ago with their pioneering temperature traverses across London and other cities using bicycles and private cars. Since then, sophisticated techniques for investigating urban meteorology have developed, and modelling capabilities have improved to such an extent that the impacts of areas such as London's Hyde Park on local forecasts can now be seen. This meeting will focus on the advances in knowledge and understanding of urban meteorology which have been made in recent years and on the endeavours that are currently being made to increase that knowledge and understanding.

The speakers at this meeting will be:

John Thornes (University of Birmingham)
Thermal mapping – from pedal power to satellites via Tony Chandler
A talk about Tony Chandler's pioneering work on measuring urban heat islands using mobile transects – which fed into John's research on the thermal mapping of roads etc.

Sue Grimmond (King's College, London)
Somerset House: Contrasting studies of urban climatology in the 19th and 21st Century
From Luke Howard's 19th century work on measurements of urban heat islands at Somerset House in London, this presentation will link to contemporary work on surface energy balance measurements and urban climate dynamics today very nearby in Central London.

Janet Barlow (University of Reading)
Rising above the roof-tops: urban boundary layer observations
A review of what has been learnt from urban boundary layer observations, ranging from Chandler's work in London on the BT Tower and its legacy today; helicopters over St Louis as part of the METROMEX campaign; and the increasing use of remote sensing techniques.

Xiaoming Cai (University of Birmingham)
Taking the challenge: wind around buildings
Since Castro & Robbins pioneered the wind tunnel study of air around a cube and Deardorff pioneered large-eddy simulation of atmospheric boundary layer in 1970s, we are now taking challenges of numerically simulating turbulent eddies around buildings and dispersion of pollutants inside the urban canopy as part of an emerging discipline, urban meteorology. This talk will review a few milestones in history and current work in this topic.

Peter Clark (University of Surrey)
Concrete, canyons and canopies. Key developments in the representation of urban areas in weather forecast models
Twenty years ago, most urban areas occupied less than one grid box in Numerical Weather Prediction models. Now we can see the impact of Hyde-Park on the local forecast. As forecasts have improved in resolution, requirements for the representation of urban areas have changed, along with their potential applications. Urban parametrizations are now too numerous to mention. This talk will outline the development of key concepts in the evolution of urban representation in NWP, from early days of 'rough concrete', through the 'idealised canyon' to the 'urban canopy', epitomised by the work of Valéry Masson, Alberto Martilli and others.

It is not necessary to book in advance for this meeting.

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☐ **ON SATURDAY 16 MARCH 2013, from 11.00 am to 5.00 pm,** there will be a meeting **in London** which will focus on: (a) the winter of 1962-63, the most severe over England and Wales since 1740;
(b) advances in monthly, seasonal and long-range forecasting which have followed from that winter.

The meeting will be held at **Imperial College**, in the **Blackett Lecture Theatre, South Kensington Campus, London SW7 2BW**.

The title of the meeting is: **The long-range forecasting problem: mythology, science and progress**.

The abstract for the meeting is as follows:

After the winter of 1962-63, the coldest over much of the British Isles since 1740, the Met Office began to publish weather prospects for a month ahead. This came about in response to government pressure, which was applied to the Office after it appeared that long-range forecasts published by the United States Weather Bureau had predicted Britain's severe winter successfully. To mark the fiftieth anniversary of that winter, this meeting first puts the winter in context and then considers subsequent developments in monthly, seasonal and longer-range forecasting. A question will be addressed in the meeting: could the winter of 1962-63 or, indeed, any other extreme season be predicted today?

The story behind this meeting is as follows:

In the House of Commons on 27 February 1963, Mr Gresham Cooke MP asked the Secretary of State for Air whether, "in view of the reliable forecasts put out by the United States Weather Bureau of British weather in January", he would seek guidance from American forecasters as to the possibility of predicting any severe conditions next winter. In reply, Mr Hugh Fraser said that the US Weather Bureau considered its 30-day predictions had shown "some modest success" but warned users that experience over a number of years had not shown that its 'outlooks' for the northern hemisphere as whole could be relied upon as a guide to forthcoming weather over the British Isles, which lay

in an area of particularly variable weather. Mr Cooke pointed out that the 30-day forecasts for December 1962, January 1963 and February 1963 which the Americans had issued for the British Isles had proved remarkably accurate. He believed the Office also produced 30-day forecasts but only for its own internal use. Would it not be "a good thing" for it to produce a similar 30-day forecast for the British Isles next October or November to provide a warning should another severe winter be threatened?
Mr Fraser urged caution. Only 32 of 108 outlooks issued by the Americans had proved correct. Long-range forecasting was, as yet, far from perfect. He agreed that forecasts for the current winter had been extraordinarily accurate but thought this could have been a fluke.

Government pressure was, though, applied to the Met Office, and the Office's annual report for 1963 contained a statement that a decision had been taken in the autumn to initiate a series of thirty-day 'weather prospects' which would be promulgated by regular publication of a monthly bulletin with a mid-month supplement.

To support this work, the Office's Climatology Research Branch was sub-divided into a Synoptic Climatology Branch, which was given responsibility for preparing the thirty-day prospects, and a Dynamical Climatology Branch, which was to focus on theoretical approaches to the general circulation of the atmosphere. Publication of the new series of monthly bulletins, called *Monthly Weather Survey and Prospects*, began on 1 December 1963.

Thus began for the UK's Met Office the publication of weather forecasts for periods of more than a few days ahead.

The programme for this meeting is almost complete, with talks already in place for most of the following topics:

- the winter of 1962-63 and its climatological significance
- the global context of the 1962-63 winter and recent work on the predictability of that winter
- the age-old weather lore that was long used to foretell seasons
- synoptic-climatological approaches of the 1960s and '70s
- teleconnections and the significance of El Niño and La Niña
- forecasts for rainy seasons in Africa and other places in the tropics
- operational monthly to seasonal forecasting and taking forecasts to users
- the reliability of monthly, seasonal and long-range forecasts today

There will be an exhibition of weather records, photographs, newspaper cuttings etc at the meeting. It is hoped that many of those who attend the meeting will take along material for display.

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☐ **ON WEDNESDAY 26 JUNE 2013**, there will be a meeting at **the National Oceanography Centre, Southampton.** Provisionally, this will begin with coffee/tea at 10.30 am, with talks beginning at 11.00 am. There will be talks on historical and modern oceanographic instruments and advances in observing techniques, and there will be a two-hour tour of the Centre. Further details of this meeting will be announced in due course.

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☐ **ON FRIDAY 6 and SATURDAY 7 SEPTEMBER 2013**, there will be a meeting at **the University of East Anglia (UEA), Norwich, to mark the centenary of the birth of Professor Hubert Lamb**, founding Director of UEA's Climatic Research Unit.

The meeting will begin in the early evening of the Friday with a talk and dinner at which we hope members of Hubert's family will be present. The Saturday morning will be given over to talks and the afternoon set aside for a visit to the Climatic Research Unit. Overnight accommodation has been booked.

Further details will be announced in due course.

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☐ **Provisionally**, **PART 3 of 'THE USE OF AIRCRAFT IN METEOROLOGY'** series of meetings (1960s onwards) will be held on **Saturday 12 October 2013 in London.** Further details will be announced in due course.

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☐ A meeting on **the history of weather ships** has been proposed for **March 2014**.

2012 MEMBERS

Rob Allan (Exeter)
Alberto Ansaloni (Milano Italy)
Oliver Ashford (Didcot)
Graham Bartlett (Slough)
Austen Birchall (Exeter)
Rodney Blackall (Buckingham)
Brian Booth (Devizes)
Ron Bristow (Maidstone)
Stephen Burt (Stratfield Mortimer)
Anna Carlsson-Hyslop (Manchester)
Jacqueline Carpine-Lancre (Beausoleil, France)
Victoria Carroll (London)
M J Chapman (Royston)
Alan Cobb (Gerrards Cross)
Mike Collins (Frinton on Sea)
Philip Collins (Merton, Devon)
Andrew Cook (Newport on Tay, Fife)
Stan Cornford (Bracknell)
Maurice Crewe (Watford)
B D Dagnall (Lymington)
Peter Davies (Reading)
Tony de Reuck (London)
Federico de Strobel (La Spezia, Italy)
Margaret Deacon (Callington)
Storm Dunlop (Chichester)
Philip Eden (Luton)
Michael Field (Arundel)
Tom Fitzpatrick (Glasgow)
Robert Gilbert (North Chili, NY, USA)
Brian Giles (Auckland, New Zealand)
John Goulding (Middlesborough)
Valerie Green (London)
Richard Gregory (Woodbridge)
Richard Griffith (Horsham)
Margaret Haggis (Cuxton)
Alexandra Harris (Oxford)
Eric Harris (Crowthorne)
Alan Heasman (Marlborough)
Althea Howard (Reading)
A M Hughes (Oxford)
Lord Hunt of Chesterton FRS (London)
Jane Insley (London)
Arnold Johnson (Maidenhead)
Keith Johnson (Twatt, Orkney)
Simon Keeling (Wombourne, Staffs)
Joan Kenworthy (Satley, County Durham)
Martin Kidds (London)
John Kington (Norwich)
Daudu Kuku (London)
Richard Link (Croydon)
Norman Lynagh (Chalfont St Giles)
Joyce MacAdam (Watford)
Ian MacGregor (Ivybridge)
Julian Mayes (West Molesey)
Anita McConnell (Stowmarket)
Eric Mills (Halifax, Nova Scotia)
Reg Milne (Farnborough)
Alison Morrison-Low (Edinburgh)
John Norris (Gerrards Cross)
Howard Oliver (Swanage)
Alan O'Neill (Twyford)
Sara Osman (London)
Andrew Overton (Doncaster)
Sarah Pankiewicz (Exeter)
David Pedgley (Wallingford)
Anders Persson (Lehmo, Finland)
R W Phillips (Lincoln)
Nick Ricketts (Exmouth)
P R Rogers (Sevenoaks)
James Rothwell (Southwell)
Peter Rowntree (Crowthorne)
Marjory Roy (Edinburgh)
Andrew Russ-Turner (London)
Joan Self (Exeter)
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)
John Wilson (Nottingham)
Sir Arnold Wolfendale FRS (Durham)
Mick Wood (Bracknell)

THIS IS YOUR NEWSLETTER

Please send comments and contributions to:
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💻 MetSocHistoryGroup@gmail.com

The next newsletter will be published in February 2013. Please send items for publication to Malcolm Walker by 9 February 2013.

Malcolm would particularly welcome reminiscences of life in the Met Office (at home or abroad) in the 1950s, 1960s and 1970s, also recollections of meteorological activities in universities, research institutes or the services (at home or abroad) in those decades. He would also welcome comments and letters for publication.