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.2, 2013

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FORTHCOMING EVENTS

The steering committee of the History Group puts a lot of thought into arranging meetings which it believes will be of interest to the Group's members.

Over the years, meetings have ranged over many aspects of meteorological history and heritage. Some meetings have indeed appealed so much to the Royal Meteorological Society's Meetings Committee that they been adopted by the Society as National Saturday or National Wednesday Meetings.

It seems the committee is broadly satisfying the Group's members, given that no meeting has been cancelled for many years. There is no room for complacency, though, and the committee does sometimes run short of inspiration.

Suggestions are greatly welcomed. Please write in with ideas for meetings. What kind of meetings do you want the committee to arrange? Where would you like them to be held? Are any days of the week more convenient for you than others? Would you support two-day meetings? If so, would you prefer weekends to weekdays? Can you recommend a venue that could host meetings? Etc, etc? Please send your ideas and suggestions to Malcolm Walker (contact details on page 24).

What is in the pipeline for the coming months (and, in fact, years)? Here are dates for your diary.

USES OF AIRCRAFT IN METEOROLOGY

— from the late 1960s to the present day and into the future

Saturday 19 October 2013, 11.00am to 5.00pm
University of Reading, Whiteknights Campus, Palmer Lecture Theatre

This will be the third meeting concerned with uses of aircraft for meteorological purposes. The first, in the autumn of 2011,took the story from the early years of the 20th Century to the 1930s. The second continued the story to the late 1960s. This meeting will take the story to the present day. It is a National Saturday Meeting of the Royal Meteorological Society organized by the History Group.

PROGRAMME

Mike Nicholls
An era of multinational collaboration
Aircraft from all over the world were brought together in the GARP Atlantic Tropical Experiment; more secretive bi-national investigations of stratospheric meteorology were needed in support of Concorde development, and of Cold War operations.

continued on next page

Programme for meeting on 19 October continued…

James Milford
Life in the slow lane
A powered glider was a cheap and cheerful way of looking at structures in the atmospheric boundary layer, using a portable data logger developed in Reading to measure temperature, humidity, pressure and vertical velocity every 50 metres or so along the flight path. With a single, slow aircraft, rapidly developing structures could not be investigated properly, but we completed useful investigations of sea breeze fronts over southern England, and of the boundary layer development during the day in anticyclonic conditions.

Geoff Jenkins
The Meteorological Research Flight (MRF) in the early 1990s
This talk will cover MRF activities in the first half of the 1990s, when the range of kit carried by the C-130 aircraft continued to expand, particularly in the area of atmospheric chemistry, and more and more flights were carried out jointly with universities and NERC, paving the way for the Facility for Airborne Atmospheric Measurements collaboration that replaced MRF in 2003.

Debbie O'Sullivan
Development of the MRF and its transformation into the Facility for Airborne Atmospheric Measurements (FAAM)
This talk will complement the one by Geoff Jenkins. Debbie will speak first. Then, Geoff will speak, and then Debbie will complete her talk.

Kirsty McBeath
The Response of the FAAM Research Aircraft to the 2010 Eyjafjallajökull volcanic eruption
This will run through the timeline of events surrounding the volcano's eruption and how the FAAM research aircraft supported the Met Office in their role as a Volcanic Ash Advisory Centre (VAAC). The presentation will also cover the creation of the Met Office Civil Contingency Aircraft, a dedicated airborne platform capable of responding to a wide range of civil contingency events in UK airspace.

Steve Stringer
Operational observing by commercial aircraft
The first system to make use of commercial aircraft for the provision of operational meteorological observations was developed by the Australian Bureau of Meteorology in the mid 1980s. The benefits of such a capability quickly became apparent, leading to the development throughout the 1990s of a number of regional collaborative programmes involving National Airlines and National Meteorological Services. The number of programmes and participating airlines continues to grow, currently generating in excess of 390,000 daily observations from around the world.

Jeremy Price
The use of Airborne Autonomous Systems for meteorological research
This talk will describe current and possible future use of autonomous aircraft for atmospheric research. Various current systems are presented, including that operated by the UK Met Office.

Malcolm Walker will provide an introductory talk which draws attention to uses of aircraft for meteorological purposes not covered by other speakers, e.g. the JASIN project of 1978 and the acid rain studies of the 1980s.

As usual at History Group meetings –
there will be an exhibition, and it also hoped that a reunion of people who have been involved in the work covered at the meeting can be arranged.

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THE EARTH'S CLIMATE: PAST, PRESENT AND FUTURE

Thursday 9 January 2014
Institute of Physics, 76 Portland Place, London, W1B 1NT
This meeting has been arranged by the Retired Members Section of the London and South East Branch of the Institute of Physics.

PROGRAMME

10:30	Arrival/coffee
11:00	Welcome and notices
11:10	Chris Folland – Past climate
11:45	John Mitchell – The Intergovernmental Panel on Climate Change
12:20	Tim Palmer – Forecasting the future climate
13:00	Lunch
14:15	Ian Strangeways – Observing the climate
14:50	Simon Buckle – Policy considerations
15:25	Shanti Majithia – Developments on the National Grid
16:00	Tea and dispersal

If you wish to attend, please contact John Belling (john.a.belling.secrems@gmail.com, 07986 379935, 42 Cunningham Park, Harrow, HA1 4QJ).

Cost: £35 with a hot lunch, £10 without lunch.

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THE HISTORY OF WEATHER SHIPS

Saturday 22 March 2014, 11.00am to 5.00pm
University of Birmingham, Geography Department
This is a National Saturday Meeting of the Royal Meteorological Society organized by the History Group.

PROGRAMME

Malcolm Walker
Floating meteorological observatories in the 19th and early 20th Centuries

Brian Booth
Panthers and other weather ships on the North Atlantic during the Second World War

Alan Heasman
Ocean Weather Ship events in the 1950s and 1960s with emphasis on Commander Frankcom's pivotal rôle

Norman Lynagh
Personal experiences aboard weather ships in the 1960s

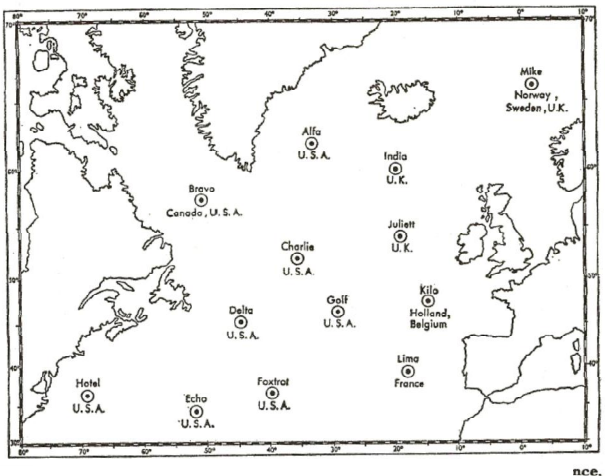
ALSO

It is hoped there will be a talk about wave research from aboard an Ocean Weather Ship in the late 1940s, illustrated with film footage shot at the time.

There will also be a talk about the demise of the ocean weather ships in the 1980s and 1990s.

As with most meetings of the History Group, there will be an exhibition, and it is hoped that there will be a reunion, too.

Details of this meeting will be announced in the Autumn 2013 issue of the newsletter.



Post-war optimism! Positions of the Ocean Weather Ships as agreed in 1946.

THE METEOROLOGY OF D-DAY REVISITED

Saturday 17 May 2014, 11.00am to 5.00pm
The Halton Gallery of the RAF Museum, Hendon
This is a National Saturday Meeting of the Royal Meteorological Society organized by the History Group.

The meeting will not go over old ground (so to speak). Much has been published over the years about the meteorology of D-Day. Rather, the intention is that we explore knowledge that has come to light in the past two or three decades which helps clarify and correct who knew what about weather developments in June 1944 and how they knew. The meeting will consider, *inter alia*, the availability of meteorological data from Ireland, the North Atlantic and NW Europe, the reliability of J.M.Stagg's book *Forecast for Overlord*, and the forecasts for early June 1944 made by the Germans. It is also hoped that a re-analysis of the D-Day weather situation can be made for the meeting by means of modern techniques.

Details of this meeting will be announced in the Autumn 2013 issue of the newsletter.

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HISTORY OF THE GREENHOUSE EFFECT

Wednesday October 2014, 2.00 to 5.30pm
Imperial College, South Kensington, London
This will be a National Wednesday Meeting of the Royal Meteorological Society, a 'Classic Papers' Meeting, organized by the History Group.

October 2014 has been chosen because it coincides with the 50th anniversary of the death of Guy Stewart Callendar, who in 1938 revived the 19th century carbon dioxide theory of climate change with the publication of his paper 'The Artificial Production of Carbon Dioxide and its Influence on Temperature' (*Quarterly Journal of the Royal Meteorological Society*, Vol.64, pp.223-240).

Jean Baptiste Joseph Fourier, generally given the credit for discovering the greenhouse effect.

Details of this meeting will be announced in due course.

Please turn over

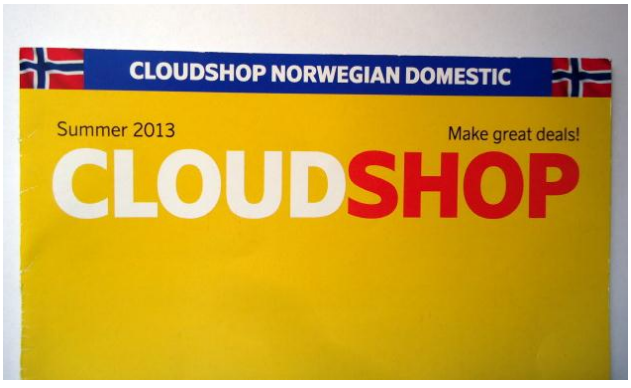
BICENTENARY OF THE 'YEAR WITHOUT A SUMMER', 1816

A two-day meeting (Friday to Sunday) in May 2016 is being planned to mark the bicentenary of the so-called 'Year without a Summer'. The venue for this meeting will be Whitby, and it is intended that the meeting will include both talks and visits.

In 1816, summer climate abnormalities caused average global temperatures to decrease by 0.4-0.7°C, resulting in major food shortages across the northern hemisphere. It is believed that the anomaly was caused by a combination of an historic low in solar activity coupled with a succession of major volcanic eruptions capped in April 1815 by the eruption of Mount Tambora, in the Dutch East Indies (Indonesia), the largest known eruption in over 1,300 years and possibly 10,000 years.

Details of the Whitby meeting will be announced in due course. Meanwhile, we are delighted to say that several speakers have already promised to give talks, not only on the infamous summer of 1816 but also on:

- the seafarer, explorer and scientist Luke Fox, who in the 17th Century tried to find a way through the North West Passage;
- the explorer and scientist William Scoresby Junior, whose papers, log books, instruments and botanical specimens were left to the Whitby museum;
- whaling logbooks and climate research;
- a distinguished Whitby photographer of the late 19th Century and early 20th.



No! Don't expect to find cut-price cumulus or sales-only stratus. This is not a belated effort by the Bergen school of meteorology!

Photograph by David Pedgley

JEHUDA NEUMANN MEMORIAL PRIZE

The Prize for 2012 has been awarded to Brian Booth. Here is the citation:

> Brian has published a number of substantial well-researched articles in *Weather* during the past five years and has contributed significantly in other ways to the history of aviation meteorology and other aspects of meteorology, most notably by researching in great detail and producing catalogues of those of the Met Office who have died on active service and those of the Office who have died in peacetime in the course of their duty. In respect of the latter, he pressed for their commemoration to be marked by a memorial in the Met Office, and this was unveiled in September 2012. He can be regarded as an authority on meteorology in the two world wars. His approach to the history of meteorology is extremely thorough, involving the use of original sources in the National Archives and the National Meteorological Archive, as well as, in the course of his studies of C.K.M.Douglas, C.J.P.Cave and others, contact with family members. He has spoken at a number of History Group meetings and at Society Local Centre meetings.

Congratulations, Brian. A most worthy winner indeed. As Brian was unable to receive the award at the Annual General Meeting of the Royal Meteorological Society on 15 May 2013, it was presented to him in the Society's Reading Headquarters on 20 June. Below is a photograph of the presentation being made by Malcolm Walker, Chairman of the History Group. Luke Howard (top left) watched the ceremony approvingly!

LECTURE REVIEW
by Austen Birchall

Towards the end of January of this year (2013), I attended the following lecture, which was held at the Met Office, Exeter:

'Books, trees, ice, mud, and rocks: observing climate change over hours and eons', by Philip Brohan of the Met Office Hadley Centre. The Abstract was as follows:

The present-day climate system is extraordinarily well observed, benefiting from weather stations, observing ships, aircraft, radiosondes, buoys, drifters, and satellites; giving us a detailed and precise view of today's climate and weather. But to understand today's climate we need to put it into context – to compare it with the changes and variations over the past hundreds, thousands, and even millions of years. We build our records of past climate from a diverse set of much more limited observations: historical records from documentary archives, tree-rings, coral samples, ice-cores, ocean and lake sediments, and other environmental indicators. In spite of the limitations of these records, palaeo-climate researchers have pieced together a good picture of the climate of the past 100 million years.

This was part of the Observations Programme seminar series for 2013 and I felt that a review of it might be of some interest to the Newsletter's readers:

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Dr. Philip Brohan is a Climate Scientist in Palaeoclimate Research at the Hadley Centre and, as such, is obviously an expert in this field. However, the first thing that Philip said was that in his lecture, rather than give an in-depth survey of some of the latest cutting-edge research in palaeoclimatology, instead he would give a State of the Field survey and in particular look at what data are available for some different time periods. In addition to doing this, Philip also briefly showed graphs that illustrated how these data have been analysed by scientists in order to gain estimates of the climatic conditions that may have existed over long timescales, and these were of great interest to much of his audience. For this reviewer, however, concerns around the historical data were of the most interest and it is on these that I will concentrate on here.

The first time period that Philip covered was the 20th Century, and for this he stated that there are enough observations both by geographical and time spreads for these to be 'fed back' into our current climate models in order to build up a near perfect representation of what the climate was at any particular time. Having said this, though, Philip also stressed that in certain places, e.g. in some parts of the World south of the equator, and for certain time periods during the First World War, that the data that are available are much more limited in scope than is the case for say the North Atlantic during the second half of the century. However, the overall impression remained that when taking the 20th Century as a whole its historical climate could be determined with a very high degree of accuracy.

The next period that Philip considered was the 19th and earlier centuries, and, as he stated, data from these become scarcer and harder to find. Somewhat light-heartily he suggested that if you wanted to obtain data for these periods then you would need a 'time machine', but, as I'm sure those readers who have 'done their time' in such devices will recognise, these do exist, and he put up a picture of the National Archives in Washington D.C. as an example of one! Overall, the data from these centuries are most common for places such as the British Isles and the North Atlantic, so when looking outside these areas the climatic data that are available become scarcer again. However, it seems that some data can be obtained from the various logs and records that were kept by Royal Navy and British commercial ships that travelled the globe during these centuries, and as an example of this and of particular interest to those of us who have connections with the Met Office, Philip said that he had used logs that came from HMS *Beagle* herself and, in addition, that some of his colleagues in the United States were currently looking at the logs that came from some other famous ships that can be found in their archives.

But as Philip said, there is an absolute limit of approximately the mid 18th Century before which observations that were made by humans are too few and limited to be useful, so if scientists wish to build up a picture of what the climate looked like prior to this then they have to work with different types of data. Luckily, it is possible to *infer* the probable and/or possible climatic conditions that existed at a point in time by looking at data that were produced by natural means. Perhaps the most well-known of such datasets are tree rings, and the thickness and densities of individual rings can give an indication of the climatic conditions that existed when they were being laid down. According to Philip, tree rings can be used to determine the

climate for up to four to six thousand years ago with the most 'useful' trees being those that are regularly stressed by cold or drought, such as those that can be found in the Scandinavian countries for example. Going back further still as Philip described, scientists can look at the specific properties of things such as ice cores that have been taken from the huge glaciers that exist in places like northern Canada and Greenland, at the properties of cores that are (at great expense) taken from the floors of the oceans and even at the properties of fossils (particularly those that contain records of spores and pollens) in order to produce models of what the climate was going back progressively further back in time, although, as Philip noted, and perhaps not surprisingly, there is plenty of disagreement among scientists as to the exact form that these models should take.

I have to declare an interest here and say that I am currently finishing off an Open University degree in History and as such have done more than one analysis of a primary source, which as the majority of readers will know can be defined as document or object that was produced at the same time as event that it describes or relates to. This may be an obvious point to make but it struck me that this is exactly what Philip and his colleagues do in their work when they build up pictures or models of past climates by looking at those data that relate to specific time periods. As such, the subject matter of this lecture was certainly of great interest from a historical point of view. Furthermore, Philip was an engaging speaker, and if you would like to know more about the work that he and his colleagues are doing then I suggest you do as I have done and take a look at his website, which can be found at:

http://www.brohan.org/~philip/index.html

and/or if you wish to get a feeling for some of the types of data that might be available in the archives then, perhaps as a first step, it will be worthwhile taking another look at the *Unsung Heroes of Meteorology* series of articles, which are available in the back copies of this newsletter.

HISTORICAL ARTEFACTS ON DISPLAY

At the Annual General Meeting (AGM) of the Royal Meteorological Society on 15 May 2013, several of the historical artefacts owned by the Society were displayed. They included books, medals, a full-size copy of the Society's Royal Charter, and the bell-pull from 49 Cromwell Road, London, which was the Society's home from 1921 to 1971. The books included bound volumes of British Meteorological Society nomination papers from the 1850s, among them papers for Henry Negretti, Joseph Zambra, George James Symons and Admiral (then Captain) Robert FitzRoy. Negretti, Zambra and FitzRoy joined the Society in 1855, Symons in 1856.

For many years, candidates for election to membership of the British (later Royal) Meteorological Society were required to gain the support of three members of the Society, of whom at least one was required to certify his/her personal knowledge of the candidate. Nominations were read out or displayed at Ordinary Meetings of the Society before ballots for election to membership took place. No formal qualification in meteorology was required. The only condition for election to membership was a genuine interest in the subject. Soon after the Second World War, the election process was simplified, in that the ballot of members was discontinued and Council approved nominations. Nowadays, the title FRMetS is a professional designation and restricted to people who possess the necessary qualifications and/or experience.

Symons was the leading member of the Royal Meteorological Society from the 1860s until his untimely death at the age of 62 in 1900. He was an ingenious inventor of meteorological instruments but is remembered most for the network of voluntary rainfall observers he established, a network which became known as the British Rainfall Organization soon after his death.

The bell-pull from 49 Cromwell Road, South Kensington, London.

Several items related to Symons were on show, among them the Legion of Honour Medal and Ribbon presented to him in 1891, and the silver and gold medals presented to him by the Society of Arts in, respectively, 1894 and 1897. The Testimonial Album presented to him in 1879 by Fellows of the (then) Meteorological (later Royal Meteorological) Society was also on show. So, too, was the very first Symons Gold Medal, which was instituted in his memory. The actual medal on display was the first ever presented, to the Scottish meteorologist Alexander Buchan on 15 January 1902.

Symons was elected a member of the Société Météorologique de France in 1872 and twice served on its Council. For his meteorological achievements in general and his contributions to the work of the French Meteorological Society in particular, he was appointed a Chevalier de la Légion d'Honneur. The distinction was conferred on him by the President of the French Republic on 29 May 1891 and presented to him by the French Ambassador in London three weeks later, on 18 June.

The story behind the Symons Gold Medal is as follows. The Royal Meteorological Society's Council agreed on 19 June 1901 that, in memory of him, a gold medal would be awarded for distinguished work in connection with meteorological science. An image of him would appear on the obverse and a representation of the Tower of the Winds at Athens on the reverse. In the event, the medal was designed by Mr Frank Bowcher of Chiswick and the dies for it were furnished and executed by Mr John Pinches of 27 Oxendon Street, London, SW. The design for the reverse of the medal showed the Tower of the Winds with the inscription 'Royal Meteorological Society' around it. This was adopted as the logo of the Society in 1902 and appeared on the title page of the Society's *Quarterly Journal* from 1903 onwards. Although a new logo was introduced by the Society in 2004, the Tower of the Winds design is still used on the medal.

From 1926 to 2006 inclusive, the Society's programme of meetings included a Symons Memorial Lecture, but the lecturer and the winner of the gold medal were not the same person. Indeed, the lecture was given annually (usually in March), whereas the medal, the Society's premier award, has always been presented biennially. There is nothing in the Society's Council or committee minutes or annual reports to explain why the memorial lecture was introduced. It was decided in 2007 that the winner of the gold medal would in future be asked to deliver the Symons Memorial Lecture, and this new arrangement came into effect in 2008. Thus, the lecture is now given biennially.

Left: *The Legion of Honour medal and ribbon presented to Symons in 1891.*
Above: *The image of Symons on the obverse of the 1902 Gold Medal.*

There have never been silver or bronze versions of the Symons Medal other than the original designs which were displayed at the AGM on 15 May 2013.

Among the other items on display was the Luke Howard Medal awarded to Cadet Robert Goldreich in 1913. The Royal Meteorological Society's Council decided in 1898 that a silver medal would be awarded each year to the cadet on the Nautical Training Ship HMS *Worcester* who submitted the best essay on a meteorological subject selected by officers of the Ship and the Society. This was a personal initiative of a member of the Society's Council, Captain David Wilson Barker, who later (1903-04) served as the Society's President. The die for the medal was presented by Francis Campbell Bayard, who was the Society's President for the years 1898 and 1899, and the first Luke Howard Medal was struck from it. The first award was made on the recommendation of the examiner appointed by the Council (Dr R.H.Scott, FRS), and the recipient was Cadet A.E.C.Harris, for the best essay submitted on 'The Meteorology of the Atlantic'. The medal on display was awarded to Cadet Goldreich in 1913 for his essay on 'The meteorology of the West Indies'. The last time the medal was awarded was in 1923.

Another item on display was a Hugh Robert Mill Medal, which is awarded biennially by the Royal Meteorological Society for original research into the distribution or variation of rainfall or its application to meteorology or a related science. The prize was instituted in 1949 and the first award was made to Dr Hugh Robert Mill himself in March 1950, just a

few weeks before his death. Dr Mill directed the British Rainfall Organization for many years after the death of George James Symons, until, in 1919, the Organization was absorbed into the Meteorological Office. To quote the citation for the first award, Dr Mill "was a source of inspiration in rainfall research; and his work was of great importance in many practical aspects of climatology, agriculture, water supply and water power, as well as in pure science".

An item on display which is not awarded by the Royal Meteorological Society, and never has been, was a Benjamin Franklin Medal. The story behind this item is as follows. The American Philosophical Society invited the Royal Meteorological Society to send representatives to the celebration of the 200th anniversary of the birth of its founder, Benjamin Franklin, held at Philadelphia from 17 to 21 April 1906. Sir George Darwin KCB FRS represented the Royal Meteorological Society and presented to the Americans a letter of congratulation signed by

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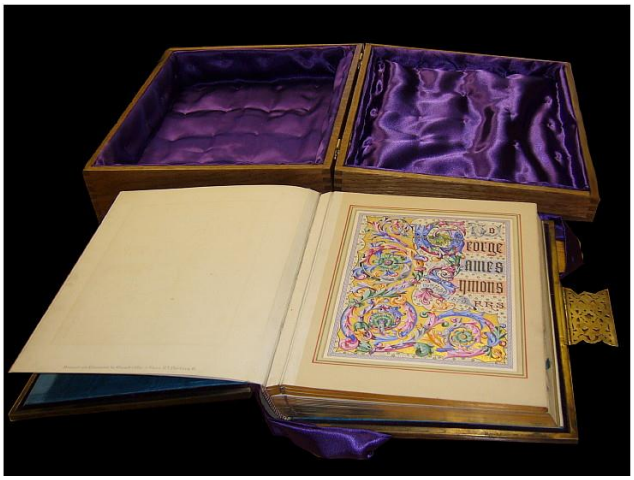


The Testimonial Album presented to Symons in 1879 and the box in which it is kept. This Album contains nearly 200 photographs of Fellows and an illuminated address that reads as follows: Presented by a large number of Fellows of the Meteorological Society to George James Symons, Esquire, Fellow of the Royal Society, Member of Council of the Royal Botanic and of the French Meteorological Societies, etc. etc., in friendly recognition of the valuable work done by him for the Society, by inspecting its stations and testing the instruments used by the observers, independently of the services rendered by him, for several years, as one of their Secretaries.

Richard Bentley, the Society's President. Sir George was a son of the naturalist Charles Darwin. The medal on display was that presented to Sir George to commemorate the Franklin anniversary. At the time, he was a Fellow of the Royal Meteorological Society but not a Council member.

The Royal Meteorological Society's Charter.

The British Meteorological Society became 'The Meteorological Society' in 1866, when it was incorporated by Royal Charter. It became the Royal Meteorological Society in 1883, when Queen Victoria granted the privilege of adding 'Royal' to the title. The charter displayed at the AGM on 15 May 2013 was that of 1866. Nothing so grand was received in 1883. Permission to add the prefix 'Royal' came in the form of a letter from Godfrey Lushington, Assistant Under-Secretary in the Home Office. The principal consequence of the incorporation in 1866 was that members could now style themselves 'Fellow' and use the letters FMS, instead of MBMS, as heretofore. The first lady Fellow of the Society, as distinct from the first lady member, was Eleanor Anne Ormerod, who was admitted on 20 February 1878.* The main consequence of adding 'Royal' to the title was that Fellows could now use the designation FRMetSoc, but not FRMS, as these letters were, and still are, used by Fellows of the Royal Microscopical Society.

* Two ladies joined the British Meteorological Society on the second day of the Society's existence, 4 April 1850.

Logo of the Meteorological Society, incorporated 1866.

As explained on page 8, the British Meteorological Society became, simply, the Meteorological Society in 1866 and acquired the handle 'Royal' in 1883.

Photograph by Howard Oliver

Another logo used by the Meteorological Society

30 Great George St
Westminster S.W.
May 9 1872

OVER AND BACK
IN 39 HOURS 6 MINUTES
Newfoundland-Scotland-Newfoundland
The first wintertime experimental round-trip flight across the North Atlantic Ocean, December 2-4, 1943
by Charles C. Bates

Article communicated by History Group member Brian Booth.

In mid-November, 1943, an unknown weather forecaster in the United Kingdom "busted" a wind forecast used by an Air Transport Command (ATC) general officer making a return flight across the North Atlantic Ocean. As a consequence, the general's four-engine plane bucked 90 miles per hour head winds that required him to land at the Royal Canadian Air Force base at Gander Lake in eastern Newfoundland with nary a bit of fuel remaining. Moreover, he held sufficient rank to order immediately that the ATC's aircraft stop making west-bound flights across the far North Atlantic Ocean for the remainder of the winter of 1943-44.

As a result, the 8th Weather Squadron's weather forecast team at the busy Stephenville Air Base in western Newfoundland began seeing far less of the skilled flight crews of the American and Trans-World (TWA) Airlines. These flew high-priority passengers and cargo from the States, through Stephenville (Figure 1), to the Royal Air Force (RAF) base at Prestwick, Scotland. For doing so these crews used the new land-based four-engine C-54A aircraft (Figure 2), also known as R5-D's in the US Navy and Douglas Skymaster in the RAF. In fact, the reunion interval for seeing these crews jumped from TWO to TEN days. What was happening was that the crews and their much needed aircraft were returning to Stephenville only after having flown as far south as the Equator along the track of Prestwick - Casablanca - Dakar (Africa) - Natal (Brazil) and Borinquen (Puerto Rico) before arriving back at a Stateside starting point such as Washington, D.C. (Figure 3).

Overcoming this devious routing became a major challenge. However, because of aircraft icing and navigational problems, even crossing 'The Pond' eastwards in winter with a favourable tailwind was a dangerous thing to do. For example, during November, 1940, the Canadians tried this with 28 two-engine Lockheed Hudsons and lost three

Figure 1

Figure 2

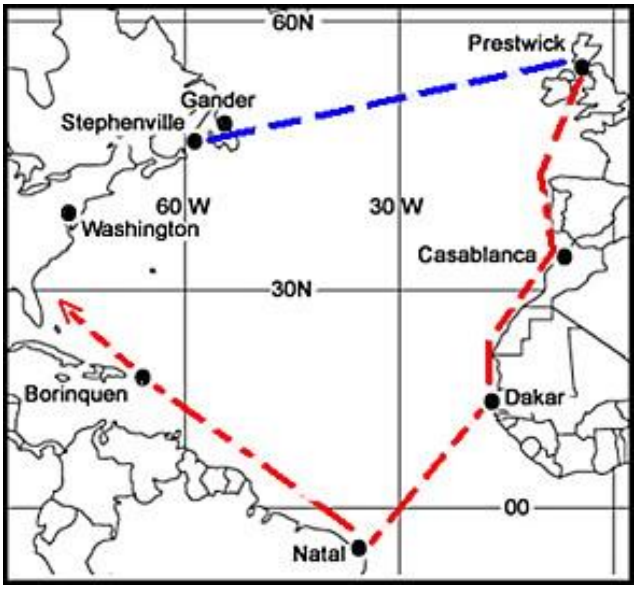


Figure 3

aircraft and their crews while doing so. But now the ATC had an aircraft that could fly non-stop for 4,000 miles with five tons of cargo aboard. Moreover, with a cruising speed of 190 mph the 'bird' could stay aloft for up to 21 hours if need be.

To take advantage of this extra capability, the ATC decided to learn more about the exact feasibility of flying westbound over the North Atlantic during the rest of the winter. To do so, it fostered a competition between the skilled crews of its two contracted airlines. As a consequence, each airline was assigned a C-54A for such flights, but with no need to haul either passengers or cargo during the hazardous return leg. Once news of this decision

reached 'Base Weather' at Stephenville, the author asked Captain William Daniels, his station chief, to allow 2nd Lt. Bates (Figure 4) to accompany the first of these pioneering flights as a "weather officer per VOCO (Verbal Orders, Commanding Officer)". Daniels agreed, as did Captain Jack Catchings, the command pilot for American Airlines Flight ATC-281.

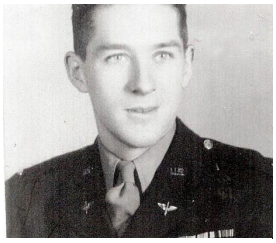


Figure 4

Thus it came to be at 23:25Z (19:45 local time) on December 2, 1943, that Bates joined a flight crew of two Chief Pilots (Captains Jack Catchings and Perry Cunningham), two co-pilots (Art Vasold and E. T. Fischer), a navigator (Marvin Carton), a radio operator, and a flight engineer in transporting a load of urgently needed P-51 fighter drop tanks to the United Kingdom. Ten minutes later, the heavily loaded aircraft was lumbering during climb-out over icy St. Georges Bay through heavy snow. Unfortunately, the snow chose to stick onto the plane's wings. Silence reigned on the flight deck. The aircraft's speed quickly fell to below 120 mph. The altitude dropped from 200 to 100 feet. But then the flight behaviour quickly improved. Six minutes later the aircraft was at an altitude of 4,500 feet and reversing course to a heading of 045 degrees true while on its way to a cruising level of 9,000 feet as of 24:00Z.

(*continued at the top of the next column*)

After reaching this level, American Airlines ATC Flight 281 became routine. Thus, only mild to moderate turbulence and light rime icing was experienced, as indicated in Bates' forecast, when crossing a cold front that extended southwards from Greenland (Figures 5 and 6).

CONFIDENTIAL

Form UNF-06 Report Serial No. _____

UNITED NATIONS AIR FORCES

FLIGHT FORECAST

Based on 0630Z (Time) Chart Dec. 2 (Date) 1943

Point of departure JT — 2130Z, Dec. 2 (Estimated time of departure)

Point of arrival PWK — 1000Z, Dec. 3 (Estimated time of arrival)

Intermediate stops, if any None.

Track Great Circle (Direct, Airways, Great Circle, Rhumb Line)

Form issued: 2030Zebra (Time) 2 December (Date), 1943

To Captain Jack Catchings (Name of Captain) Aircraft America Airlines C-54

From Stephenville, Nfld. (Issuing office or base of departure) By Charles Bates, 2nd Lt., US Army Air Corps. (Forecaster or other official)

Forecast prepared at JT Mtg. Stephenville, Newfoundland (Name of forecasting office)

(THIS FORM IS TO BE TURNED IN AT TERMINAL)

(WB—7-22-42—2M) 291-92

Figure 5

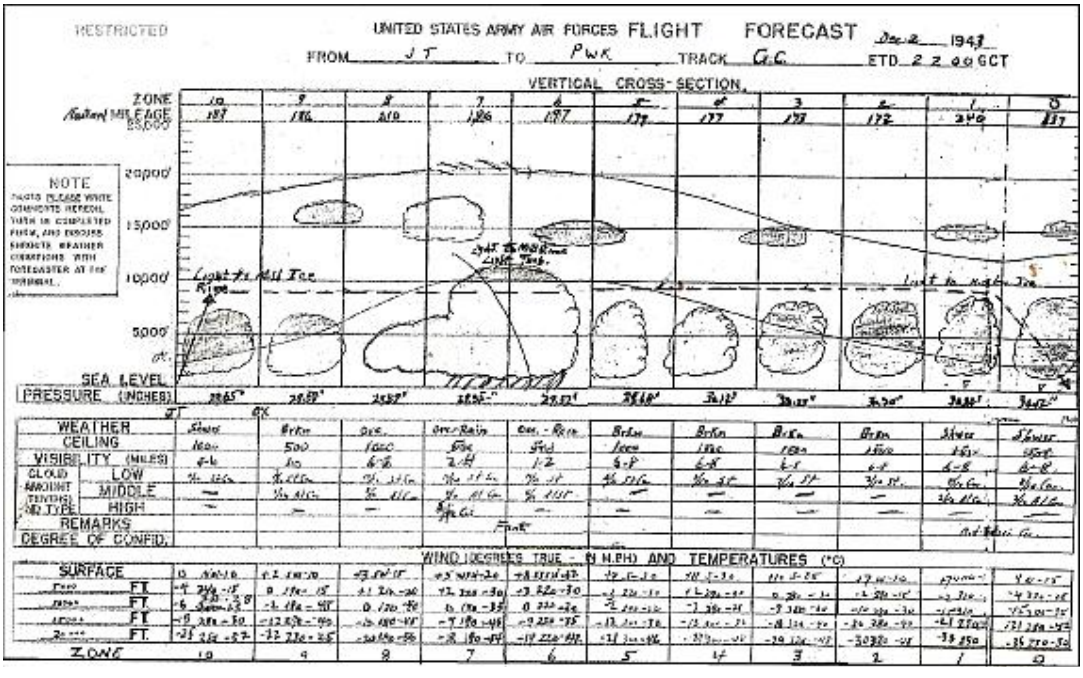


Figure 6

Although the C-54A carried a new-fangled classified electronic navigation device called LORAN-A, Carton still chose to rely on the old tried and true navigation method using star fixes and the prime reason for making Atlantic crossings at night rather than in the daytime.

However, roughly four hours from landfall Captain Catchings noted a suspicious light on the far horizon. To make sure that it was a star and not a far-ranging German Focke-Wulf patrol aircraft, the author was told to man the navigator's transparent blister and track it long enough make certain it was harmless. Fortunately, that proved to be so. Then the next excitement came while making landfall over Northern Ireland at 10:00Z at an altitude low enough to view donkey carts traveling country lanes. As for Prestwick, touchdown came at 11:15Z. Overall, the flight had traveled 2,300 miles with an average speed of 196 mph.

To take advantage of the mandatory crew rest time, the author boarded a local train at nearby Ayr, the birthplace of the poet, Robert Burns, and proceeded to grimy Glasgow. There was little to see and less to buy. Moreover, sunset came at 15:51Z. Consequently, the excursion ended quickly so as to fit in some personal 'shut-eye' prior to the new take-off time of 00:40Z during December 4, 1943.

Once aloft, the reverse flight at 8,000 feet altitude, with headwinds of 35 mph, became routinely tedious. As for the author, he completed and had transmitted FERIMET reports at roughly two hourly intervals throughout the crossing.[1] Finally, landfall occurred at 14:15Z, 90 miles north of Gander Lake. Then came touchdown at Stephenville at 15:11Z (11:41 local time) – or just in time for lunch.

In summary, the flight back from Prestwick required 14 hours 31 minutes, at an average speed of 160 mph. Thus, during an elapsed interval of 39 hours 6 minutes, it had taken 2 hours 41 minutes longer to fly some 2,300 miles east to west than in the opposite direction. Even so, with an experienced flight crew, a negligible amount of cargo, and a modicum of 'good' weather, it had been quite feasible to deadhead a C-54A directly from Prestwick to Stephenville rather than forcing it to fly to the Equator and back for accomplishing the same purpose during December, 1943.

- - - - - - - - - - - - - -

[1] FERIMET was the acronym for '**MET**eorological reports from **FER**ry aircraft".

Dr Charles Bates

Charles was drafted into the US Army during the spring of 1941 and subsequently trained in meteorology and oceanography at the University of California, Los Angeles (UCLA), the University of Chicago and the Scripps Institute of Oceanography. On completing his studies he served as a pioneer specialist in sea, swell and surf forecasting for amphibious operations.

Early in 1944 he was attached to the three-man Swell Forecast Section in the Admiralty Headquarters in London, where he played an important role in developing the techniques used in forecasting sea conditions for D-day. Although not personally involved with the telephone conferences between James Stagg and the three forecast centres during the run-up to D-Day, Charles followed the discussions by a separate telephone link, and was on duty as the invasion force crossed the English Channel during the night of 5-6 June.

After the war he enjoyed a distinguished career in oceanography and, now retired and aged 94, lives in Green Valley, Arizona.

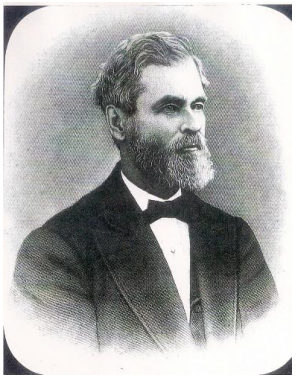
What is the connection between this sea star and a meeting of the History Group of the Royal Meteorological Society?
See pages 22-23.

UNSUNG HEROES OF THE U.S. WEATHER BUREAU / METEOROLOGY

by Bob Gilbert

History Group member in New York State, USA.

It was unfortunate that those who criticized the Great Lakes climate could not have beheld the same December sunrise as Professor Increase Allen Lapham of Milwaukee, Wisconsin. Granted it was cold as expected, however, there was neither a cloud in the sky nor a trace of snow on the ground with only two and a half weeks until Christmas. The widower in his late 50s returned to the warmth of his house where he entered the weather data in the appropriate columns of his standardized Smithsonian Institution form. One blank column must have reminded 'Wisconsin's First Scientist' that although much progress had been made in American meteorology by the end of 1869, there was still much more progress yet to be made.



Lapham

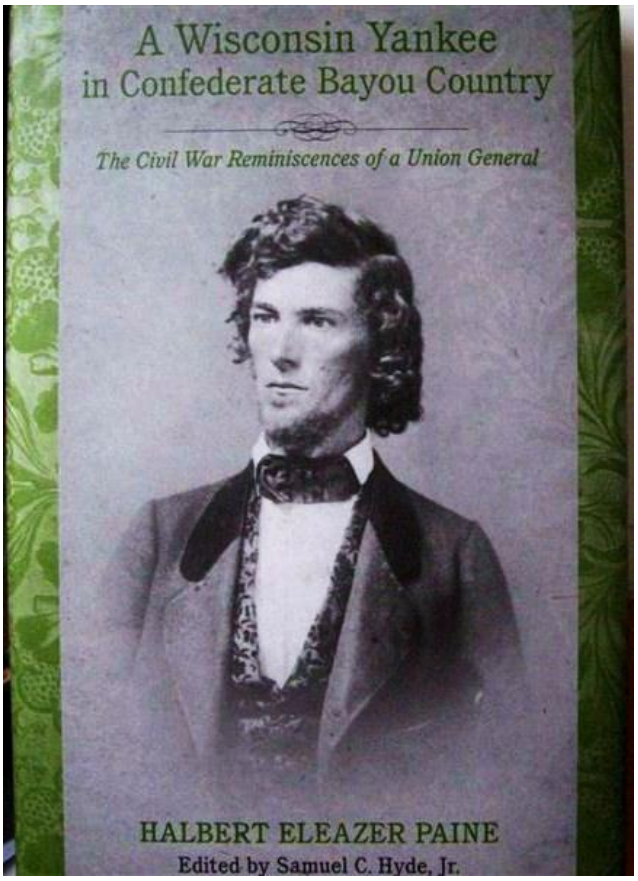
Insufficient funding of Professor Joseph Henry's nationwide volunteer observer corps meant that Increase Lapham's anemometer could not be replaced or fixed any time soon, to say nothing of being paid for services rendered. There was gratification knowing exactly how much had been learned about America's diverse climate and how the public reacted favourably to a large daily weather map displayed at the famous Smithsonian castle. The most indescribable frustration stemmed from Congress's unexplained refusal to endow the Smithsonian with the authority to issue forecasts and warnings to the public despite all the data that had been collected three times per day for almost twenty years. Only a miracle could change this political culture, and fortunately for the maritime community, Lapham's Quaker faith included miracles.

The commercial shipping industry was also fortunate that the newspaper delivered to the Quaker's house that sunny morning included a shipwreck report so long that it would be impossible for anyone to miss. The name of each boat and ship sunk or damaged on the Great Lakes during 1868 and 1869 was carefully listed by marine editor Louis Bleyer. Perhaps Congress would not be able to ignore the loss of 530 lives in the 3,078 'casualties' which totalled more than $7 million in property damages. Suddenly, there was more to add to the daily routine of walking to the local telegraph office to send the morning weather report to Washington, D.C.

The 'counting-room' of *The Milwaukee Sentinel* provided a professionally printed copy of Bleyer's work as advertised on the front page of their Wednesday edition. The meteorologist next added a weather chart made in March of 1859 as if to say, "Our region's ship captains could have been forewarned a decade ago." The final touch was an appeal addressed to Radical Republican Halbert E. Paine serving in the U.S. House of Representatives.

Paine

"Dear Sir, I take the liberty of calling your attention to the accompanying list of disasters to the commerce of our great lakes during the past year, and to ask whether its appalling magnitude does not make it the duty of the government to see whether anything can be done to prevent, at



least, some portion of this sad loss in future."

Paine wasted no time writing a bill which was read for the first time in the House of Representatives on December 16, 1869, just eight days from the date on Increase Lapham's newspaper and petition. Not long after debate began regarding H.R. 602, Representative Paine's office received a visitor inquiring about this revolutionary storm warning service funded by the federal government. Brevet Brigadier General Albert James Myer, the founder of the U.S. Army Signal Corps, was searching for a the kind of peacetime mission which would prevent his regiment from being permanently deactivated like so many other army units.

Myer

Congress established the Signal Corps in 1860 while the northern and southern sections of the United States confronted irreconcilable differences. The basis for this new regiment was Myer's patented signal system which sent encoded messages by waving large square red & white flags by day and swinging signal lanterns or torches by night. He was promoted from major to brevet brigadier general because his invention either directly or indirectly determined the outcome of many battles and campaigns. The Union Navy even adapted Myer's useful signal code. Halbert Paine appreciated what Myer and the Signal Corps achieved under the most stressful wartime situations imaginable.

There is no formal account of what Paine and Myer discussed about the storm warning service legislation, but the two Civil War veterans had a lot in common. They had grown up close enough to Lake Erie to understand the Great Lakes weather pattern and both fought for the Union. A general tried unsuccessfully to court martial Paine for disobeying an unlawful order while Secretary of War Edwin Stanton tried to revoke Myer's unanimously recommended promotion to colonel without any justification. Paine and Myer triumphed over adversity equally determined to benefit the public as much as possible.

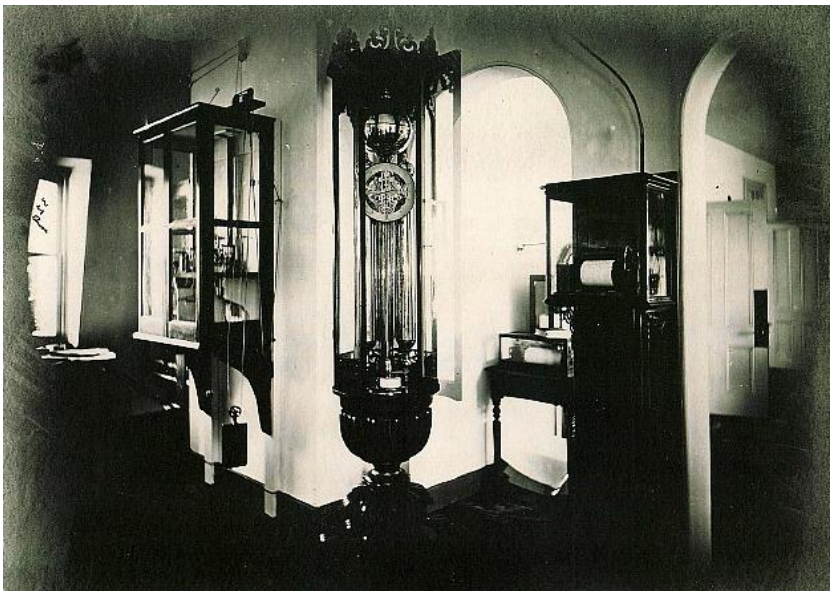
The U.S. House of Representatives and the Senate passed Paine's bill in less than eight weeks without a single dissenting vote during the holiday season. It was a tribute to Paine's commitment to the welfare of his constituents and the appreciation for meteorology he received in college from Professor Elias Loomis, 'The Father of Synoptic Meteorology'. President Ulysses S. Grant became the third Civil War veteran to play a major role in establishing federally funded storm warning telegraphy in America when he signed Public Resolution No. 9 into law on February 9, 1870.

Although Myer didn't wait for the political process to take its course in the days leading up to Christmas, he now had to wait for General Orders 29 to be published in mid March. Not long after being authorized to take, "meteorological observations … and for giving notice on the northern lakes and seaboard of the approach and force of storms", the general and his staff prepared for operations by November 1, 1870. Brevet Major Lemuel B. Norton, the Signal Corps hero at the Battle of Gettysburg, wrote letters to acquire telegraph maps, weather instruments and textbooks from reputable suppliers and scientists around the United States and Europe. Any shipping delays were more attributable to the Franco-Prussian War cutting off mail services in Paris, France than any failure on the part of Myer or his officers.

In April, Signal Service headquarters moved from a small brick row house into a bigger building destined to be featured in illustrated newspapers and visited frequently by anyone with an interest in meteorology. Captain Charles March Pyne, a Civil War veteran whose left leg had been amputated below the knee like Halbert Paine's, began recruiting enlisted soldiers to be trained as weather observers. 1st Lt Adolphus Washington Greely was tasked with constructing enough telegraph lines around the continent to reduce what was initially a total dependence upon civilian telegraph companies like Western Union.

After ordering Professor George Washington Hough's self-registering barometer in person at the Dudley Observatory in Albany, New York in May, General Myer spent mid-June with the superintendents of telegraph companies based in New York City. Using a weather chart borrowed from Professor Cleveland Abbe, the Signal Corps founder demonstrated a circuit system capable of routing 'tri-daily' weather reports around the continent without interfering with regularly

scheduled messages. Myer's wartime cryptologic skills served him well in the form of a money-saving brevity code needed to offset charges assessed according to the messages' length and the distance telegrams were transmitted. While the Chief Signal Officer travelled, his capable staff continued preparing for the 'Gales of November'.



The inside of General Myer's Headquarters, showing, left to right: self-registering barograph designed and produced by Professor George Washington Hough at the Dudley Observatory in Albany, NY; Rochester Barograph, most likely produced at a shop in Downtown Rochester, New York; Gibbon Rain Gauge, named after David John Gibbon.

Sgt David John Gibbon, blinded in the left eye during wartime service with Co. K, 5th Ohio Volunteer Infantry Regiment, was charged with maintaining, calibrating, and improving weather instruments arriving from suppliers while designing his own devices. 1st Lt Richard P. Strong supervised the expanding Signal Service school next to Arlington National Cemetery at Fort Whipple, Virginia. In addition to signalling methods, Strong's instructors would teach meteorological theory and how to operate standardized sets of weather instruments carried by the graduates to 25 stations located generally east of the Rocky Mountains. Hand-carried clocks synchronized to the time at 1719 G Street were just as important as the barometer, thermometers and anemometer.

1st Lt Henry W. Howgate, promoted to brevet captain for exceptional cryptologic services performed during General Sherman's Atlanta Campaign, was in charge of the enlisted men graduating America's first school dedicated to meteorology. Success depended upon how strictly observers complied with Howgate's instructions. The first chief of the 'Division of Telegrams and Reports for the Benefit of Commerce' would judge the efficiency of his observer corps by Howgate's performance evaluations and regular inspections conducted by staff officers.

1719 G Street, N.W., Washington D.C. Signal Office from April 1870 to August 1888.

"Reports received from all stations except Augusta, Key West, Mobile and Montgomery. Time one hour." was the message sent by 1st Lt Howgate to his superior officer on November 1, 1870. Like many great leaders, Myer spent the first day of weather service operations in Buffalo, New York, and not just because of his connections growing up in this city. Buffalo was one of the busiest ports in the United States. Therefore, the weather station not far from the Erie Canal terminus was particularly worthy of close supervision. Seven days later, Myer was in Chicago supervising the first government-issued storm warning in American history.

Professor Loomis' textbooks formed a large part of the army weather school syllabus. Joseph Henry's advice and standardized observation forms were helpful, and Abbe's weather chart served its purpose, but no full-time civilian meteorologist was assigned to Myer's organization. Loomis could not be faulted for not wanting to leave Yale University, just as Henry

could not be expected to leave the Smithsonian which he'd founded. Halbert Paine vouched for Increase Lapham's abilities and character, so it should have surprised no one that Lapham authored the army's historic first storm warning on November 8, 1870.

"To all observers along the Lakes. Bulletin this at once: A high wind all day yesterday at Cheyenne and Omaha. A very high wind reported this morning at Omaha. Barometers falling with high wind at Chicago and Milwaukee. Barometers falling and Thermometers rising at Detroit, Toledo, Cleveland, Buffalo, and Rochester. High winds probable along the Lakes." Sergeant James Mackintosh took Lapham's warning to the telegraph office as instructed by General Myer, making this a team effort. It was only the beginning to what would become a national service beneficial also to river boat captains, railroad engineers and superintendents, farmers, and the general public. A few months after Cleveland Abbe was hired in January of 1871, Americans would become accustomed to the daily 'probabilities' printed in newspapers, yet another historic first.

Rarely has an organization so quickly and completely fulfilled its charter, and it was just the start of a life-saving service "capable of infinite expansion". A debt is forever owed to all who made what the news media eventually called 'The Weather Bureau' a reality.

SUDDEN STRATOSPHERIC WARMINGS – HOW IT ALL BEGAN
by Alan Heasman

As readers may know, the unusually persistent cold north-easterly winds of early 2013 over the UK were attributed, at least in part, to a 'Sudden Stratospheric Warming' (SSW) event which was first detected in the Northern Hemisphere stratosphere in late December 2012. Although it is somewhat of a 'chicken and egg' debate, the general consensus is that during the northern hemisphere polar winter, long-wave disturbances in the troposphere begin to affect the 'normal' strong west to east flow of the Polar Night Jet in the stratosphere to the point when the dynamics of the flow break down and it is replaced by a strong east to west flow. This is followed by a subsidence of the stratospheric air into the upper troposphere accompanied by significant dynamic warming – hence the SSW. The east to west flow then penetrates even lower into the troposphere and may at times lead to an onset of a cold flow from the Arctic and the east which in Britain can cause a persistent cold situation, as occurred in early 2013. More detailed descriptions of the SSW process can be found on various websites.

The first regular and continuous measurements of the stratosphere (up to 40 km/ 2mb level) were made by Professor Richard Scherhag in 1951 from Berlin. This led him to make the first recorded observations of an SSW in early 1952. Since then, the mechanisms of the SSW had been studied in detail, especially since the advent of satellite-based stratospheric temperature measurements in the 1970s. However, it is interesting to note the original comments made by Professor Scherhag shortly after his discovery and reported by W. Schmitt in the September 1952 edition of *Weather* magazine under the title 'Solar Eruptions and Stratospheric Weather'. The following are extracts.

"On the afternoon of 24 February 1952, radio links and even long-distance traffic on carrier-frequency channels broke down practically over the whole world. The universally abnormal ionospheric situation lasted for several days and normal conditions did not return until the middle of March. Professor Scherhag gives interesting facts about the gigantic solar eruptions during the early morning of 24 February which caused such disruption of communications and exerted an influence on the weather. (He) states that, owing to a notable achievement in radio-sonde development, the radio-sonde station at Berlin has been able to yield most interesting data on the influence of the solar eruption on the distribution in the stratosphere of temperature, pressure and wind. On 24 February, a temperature of minus 64°C was measured at the 17mb level (27 km) during the 09:00 GMT ascent; this is a quite normal value for the height and season. However, the 17:00 GMT ascent indicated a rise to minus 47°C ... and by the following morning a value of minus 17°C was observed. Within less than 24 hours the temperature at 27 km had risen by nearly 50°C! Owing to this tremendous change in the temperature distribution, the pressure field changed completely and the normal westerly winds round the circumpolar vortex were replaced by an easterly storm of 60 knots around a powerful stratospheric 'high' over Europe. The remarkable increase in temperature in the higher stratospheric layers proceeded steadily downwards and at 20 km the temperature rose from minus 66°C on

26 February to minus 39°C on 29 February. It would seem that the effects of the great solar eruption of 24 February were felt much further afield. A Siberian cold wave stopped suddenly on 27 February and two storm depressions developed almost simultaneously on the same day at Bermuda and the Azores. This development could not be readily explained from the previous tropospheric situation and is therefore being investigated by Professor Scherhag".

Despite the many articles and explanations which can be found on websites, few if any now seem to mention a link between solar eruptions and the SSW. So was the event of late February 1952 just a 'coincidence'? Personally, I still favour a link between the variations of solar activity and broad-scale stratospheric and tropospheric patterns. After all, the sun does provide all the 'heating' which drives the weather of our planet. I hope to provide another article from the *Weather* archive on a similar theme in the next newsletter.

OLD PROBABILITIES
by Howard Oliver

An impressive book has recently been published detailing the 125 year history of the National Geographic Society. It includes an interesting historical section describing its formation in January 1888. Among the 33 eminent names of the founders is that of **Cleveland Abbe.**

Cleveland Abbe (1838-1916) was one of the leading meteorologists of his era. In the late 1860s he began to set up systems to produce weather forecasts in the USA. He realised that reports from across the country would need to be clear and also provided quickly at consistent times if they were to be used to put a forecast together. To this end, he initiated a strict data reporting protocol, obtained agreement for free use of the telegraph and established the system of time zones. His first official weather report was in early 1871, and by 1872 maps and bulletins were being widely disseminated as well as being exchanged for European meteorological data. In the same year he also initiated to journal *Monthly Weather Review*.

The title of this article comes from the speech by Mark Twain in 1876 which said that *Old Probabilities* [as Abbe was known!] had "a mighty reputation for accurate prophesy".

continued top of next column

He was elected a fellow of the Royal Meteorological Society in 1891, and in 1912 he was awarded the *Symons Memorial Gold Medal*, which cited his contribution "to instrumental, statistical, dynamical, and thermodynamical meteorology and forecasting".

An excellent full biography can be found on NOAA's "Giants of Science" web site:

www.history.noaa.gov/giants/abbe.html

A GUIDE TO INTERPRETING BAROMETRIC TENDENCY

The Professor was speaking to the Warden. "You'll be glad to hear," he was saying, "That the Barometer's beginning to move - - "

"Well, which way?" said the Warden – adding to the children, "Not that *I* care, you know. Only *he* thinks it affects the weather.

He's a wonderfully clever man, you know. Sometimes he says things that only the Other Professor can understand. Sometimes he says things that *nobody* can understand!

Which way is it, Professor? Up or down?"

"Neither!" said the Professor, gently clapping his hands. "It's going sideways – if I may so express myself."

"And what kind of weather does *that* produce?" said the Warden. "Listen, children! Now you'll hear something worth knowing!"

"Horizontal weather" said the Professor and made straight for the door.

"*Isn't* he learned?" the Warden said, looking after him with admiring eyes. "Positively he runs over with learning!"

[He later returns with umbrellas fixed to his legs that he had specially designed for horizontal rain]

from *Sylvie and Bruno* by Lewis Carroll, pp.13-14, Macmillan 1889.

THE LONDON PARTICULAR
by Alan Heasman

The saying goes that 'a picture paints (or is worth) a thousand words', but sometimes words from the pen of a great author can challenge or even surpass that standard.

2012/2013 is the 160th anniversary of the publication (in 20 parts) of Charles Dickens's *Bleak House*. Partly set in London and in 'real time', it is considered by many to be one of his finest novels. As with several of his books, it tackled a genuine social issue, in this case the stagnant state of the law courts in London. In Chapter 1, he set the scene of London in the early 1850s with the following graphic 'meteorological' description.

"Fog everywhere. Fog up the river where it flows among green aits *[small islands]* and meadows; fog down the river where it rolls defiled among the tiers of shipping and the waterside pollutions of a great (and dirty) city. Fog on the Essex marshes, fog on the Kentish heights. Fog creeping into the cabooses of collier-brigs; fog lying out on the yards and hovering in the rigging of great ships; fog drooping on the gunwales of barges and small boats. Fog in the eyes and throats of ancient Greenwich pensioners, wheezing by the firesides of their wards; fog in the stem and bowl of the afternoon pipe of the wrathful skipper, down in his close cabin; fog cruelly pinching the toes and fingers of his shivering little 'prentice boy on deck. Chance people on the bridges peeping over the parapets into a nether sky of fog, with fog all around them, as if they were up in a balloon and hanging in the misty sky. Gas looming through the fog in divers places in the streets, much as the sun may, from the spongey fields, be seen to loom by husbandman and ploughboy. Most of the shops lighted two hours before their time- as the gas seems to know, for it has a haggard and unwilling look."

From that, you can almost 'feel' the fog!

A little later in *Bleak House*, as one of the main characters is entering London for the first time, she asks her coachman "whether there was a great fire anywhere?" For the streets were so full of dense brown smoke that scarcely anything was to be seen. "Oh, dear no, miss", he said. "This is a London particular". I had never heard of such a thing. "A fog, miss," said the young gentleman. "Oh, indeed" said I."

One of the meanings of 'particular' is 'favourite' and is often used for a 'favourite drink' especially 'London Particular' referring to a rather dark Madeira wine supplied to the London market at that time. Thus, it was used colloquially for the dense red/brown, smoke-laden fogs of London. With these words, Dickens cleverly conjures up in the reader's mind the truly bleak picture of the gloom of London in that age, as effectively as any the great painters might have done.

Later in the 19th century, the phrase 'pea souper' was also applied to the fogs of London especially when they were of the greenish-yellow variety! Whatever the colour, these soot-laden 'smoke fogs' or more appropriately 'smogs' were a feature of London throughout the 19th century and well into the 20th, causing, directly and indirectly, thousands of bronchial related deaths.

NOTE:
For more information about London fogs, see the article by Dick Ogden which was published in *Weather* in 2000 ('London Particulars and all that', Vol.55, pp.241-247).

These photographs were taken at a meeting of the History Group. See pages 22-23.

The photograph on the left shows an ODAS Buoy, 'ODAS' standing for "Ocean Data Acquisition System".

The photograph below shows AUTOSUB 6000, the United Kingdom's deepest diving robot submarine, which can dive to a depth of 6,000 metres.

BAROMETER FOR THE SOUTHERN HEMISPHERE, PORT ALBERT, VICTORIA, AUSTRALIA

Photographs by Mick Wood

MEETING REPORT
The long-range forecasting problem: mythology, science and progress, Saturday 16 March 2013

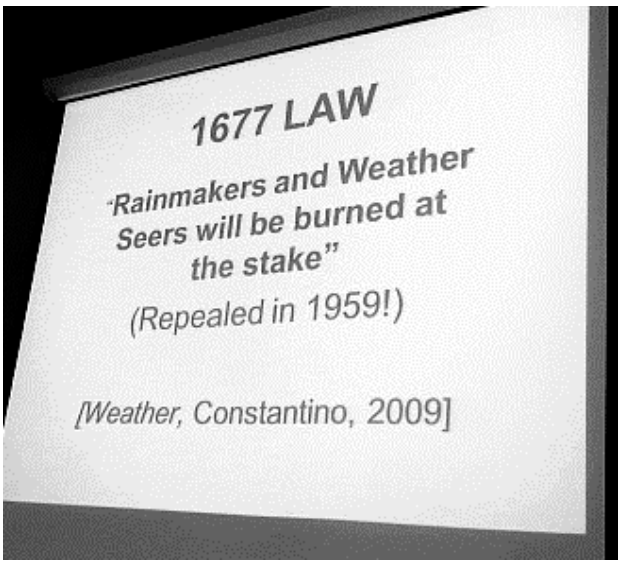
Held at Imperial College, London, this meeting marked the fiftieth anniversary of the 1962-63 winter, the coldest over much of the British Isles since 1740.

In his Introduction, **Malcolm Walker** first showed (in his PowerPoint presentation) several newspaper photographs of snowy and icy conditions during the winter in question and then explained that the Met Office had begun to publish weather prospects for a month ahead towards the end of 1963 in response to government pressure which had been 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. A question that would be addressed during the meeting was, he said, as follows: could the winter of 1962-63 or, indeed, any other extreme season be predicted today?

continued on page 20

In his review of the bitter winter, **Stephen Burt**, reported that the cold weather had arrived just before Christmas 1962 and snow had followed just after. The weather in the first three weeks of December had not been notable, apart from the Great Smog in London in the first week of the month, but the weather of January, February and the first few days of March had proved quite a contrast. To quote the words of Gabriele Messori, in his review of the meeting published in the July 2013 issue of *Weather* (Vol.68, pp.193-194), "the anomalously cold weather persisted throughout January and February, making it one of only three winters on record to register sub-zero mean temperatures for central England (the others being 1683/1684 and 1739/1740)". "Its peculiarity", he went on, "lay not so much in record lows as in the persistence of below-average temperatures and snow cover". "The circulation associated with these phenomena was characterised by anomalous easterly winds driven by a very negative North Atlantic Ocean (NAO) index". Stephen noted that snow accumulations had been large in southern parts of England and Wales, not least at Tredegar, where the depth had been 165 cm on 7 and 8 February; and, he said, earth temperatures in Reading had fallen below 0°C at 30 cm depth.[2]

The talk by **Howard Oliver** on early attempts at seasonal forecasting by means of weather lore contained the warning shown on the image below.



[2] At Birmingham, Malcolm Walker reported, the frost penetrated so deep into the ground that a water pipe burst two feet below the kitchen floor of his digs. The ice on the lake across the road from his digs was more than two feet thick when the thaw came in early March.

Fortunately, as it says on the slide, the law has been repealed! Howard reviewed weather wisdom down the ages, starting with wisdom in the Bible and the contribution of Theophrastus (*c*.300 BC), who believed that the weather in one season could portend the weather in the following. Pliny (1st Century AD) believed this, too, and so did Francis Bacon (1561-1626), who believed that a serene autumn denoted a windy winter. Howard went on to mention *inter alia*:

- John Pointer, who in 1723 published *A rational account of the weather, showing the signs of its several changes and alterations, together with the philosophical reasons of them*;
- John Mills FRS, who in 1773 published *An essay on the weather; with remarks on the Shepherd of Banbury's Rules for judging of its changes; and directions for preserving lives and buildings from the fatal effects of lightning. Intended chiefly for the use of husbandmen*;
- Joseph Taylor, who in 1813 published *The Complete Weather Guide; a collection of practical observations for prognosticating the weather; drawn from plants, animals, inanimate bodies, and also by means of philosophical instruments; including the Shepherd of Banbury's Rules explained on philosophical principles*;
- Orlando Whistlecraft, who in 1840 published *The Climate of England; or a Guide to the Knowledge of the Atmospheric Phenomena of England shewing the manner in which the changes succeed etc*.

Howard also mentioned Luke Howard, who published, in 1842, *Cycle of eighteen years in the seasons of Britain; deduced from meteorological observations made at Ackworth, in the West Riding of Yorkshire, from 1824 to 1841,* and he drew attention, too, to the classic work of Richard Inwards, called, simply, *Weather Lore*. He ended his talk with twenty-eight signs of rain according to Edward Jenner (1749-1823).

The next talk, by **Brian Booth**, was called "A moment in time – the first published Meteorological Office monthly forecast". Brian first reviewed attempts made in Britain in the 1930s and 1940s to forecast weather up to fifteen days ahead by means of analogue techniques, and he then focused on the Met Office's pioneering work in the 1950s to produce long-range forecasts based on anomaly charts. He mentioned the campaign by Gresham Cooke MP in 1963 to get long-range forecasts published by the Met Office (following the perceived success of the Americans in predicting Britain's 1962-63 severe winter); and he went on to show

that the campaign bore fruit, for the government announced, on 13 November 1963, that monthly weather prospects were to be published, the first of them on 30 November. The underlying procedure employed for producing the forecasts was to look for specific synoptic circulation analogues and use them to predict future weather. From 1963 to 1966, Brian was a member of the team that produced the monthly forecasts (see picture below), and he recalled some of his experiences.

When it was announced that monthly forecasts were to be published, Sir Graham Sutton, the Met Office's Director-General, issued cautionary statements about the reliability of the forecasts, and his words of warning proved, over the years, well-founded. Publication of monthly forecasts ceased at the end of 1980. Long-range forecasting clearly left much to be desired.

One of several display panels prepared for the meeting by the National Meteorological Archive. This one shows members of the team who produced the monthly forecasts in 1963, notable among them M.H.Freeman, J.M.Craddock and H.H.Lamb.

Julia Slingo reviewed attempts at monsoon seasonal forecasting made in India in the late nineteenth and early twentieth centuries and stressed the economic and social importance of being able to produce such forecasts. Henry Blanford, the first Director of the India Meteorological Department, explored links between Himalayan snow cover and monsoon behaviour and drew attention to apparent links between rainfall over the Indian sub-continent and pressure patterns over countries surrounding the Indian Ocean. Thus, the concept of 'teleconnections' was born. Sir Gilbert Walker continued the search for empirical patterns in weather data and developed regression equations which related monsoon behaviour over India to barometric pressures and rainfall amounts in parts of the world far away from India. He pioneered statistical forecasting and also introduced the terms 'Southern Oscillation' 'North Atlantic Oscillation' and 'North Pacific Oscillation'. He did not favour the terms 'seasonal prediction' or 'seasonal forecasting'. Rather, he preferred 'seasonal foreshadowing'.

Chris Folland showed in his talk that progress with understanding sources of seasonal climate predictability had been considerable since the early 1960s and had come from both observational and dynamical investigations. His talk particularly emphasised studies carried out in the Met Office, from the recognition of the importance of sea-surface temperature anomalies in the 1960s to recent investigations of anthropogenic and solar forcing. Chris noted that pioneering work on seasonal forecasting had been carried out by Jerome Namias in the 1950s in the United States and major dynamical contributions had later been made by John Sawyer, Peter Rowntree, Tim Palmer and others in the United Kingdom. Among the factors that were significant in long-range forecasting, Chris noted, were North Atlantic sea-surface temperatures, the Quasi-Biennial Oscillation, tropical volcanoes, and changes in ultra-violet radiation.

The next speaker, **Alberto Arribas**, reviewed the progress made in operational monthly to seasonal prediction systems in the last ten years and described current capabilities. During the last 25 years, he said, an important change had taken place: the move from empirical relationships to dynamical forecasting. He gave two main reasons: empirical relationships were weak in most areas of the world; and dynamical models were the best tool we had to integrate

everything that played a rôle in long-range forecasting. Alberto called the last 25 years a "roller-coaster", on which there had been excitement and the first 'modern' systems in the 1990s, evolution and pause in the 2000s, and excitement again in the 2010s, with long-range forecasting again taking centre stage. He addressed the question of how seasonal forecasts were made, outlining the complexity of models, explaining how improved surface and deep ocean observations were so necessary in both quality and quantity, and mentioning that ensemble approaches were now being employed. Indeed, models were now so advanced that the latest had 85 levels, and the Met Office's GloSea5 ensemble prediction system had a resolution of 50 km.

Richard Graham considered recent developments in the use of prediction systems that were based on climate models in the preparation of seasonal rainfall outlooks for regions of Africa, showing that models are yielding considerable success. He pointed out that the forecasting of Africa's rainy seasons is an international activity in which there are collaborative national, regional and international contributions. On a continent which has regions prone to recurrent drought or devastating floods and millions of people live in poverty, there are many social, agricultural, economic and political reasons for improving rainfall predictions. A great deal of progress has been made in the past three decades, but, as Richard said, challenges remain.

The final speaker was **Adam Scaife**, who reviewed a variety of recently-identified sources of seasonal forecast skill for Europe in winter and assessed how well they were represented in the numerical models that were used today to make operational forecasts. He assessed several recent cold-winter events for evidence of predictability on seasonal timescales and presented a case study of re-forecasts of the 1962-63 winter. Thus, the meeting returned to the question of whether the winter of 1962-63 or, indeed, any other extreme season could be forecast today. Adam stressed the importance of the North Atlantic Oscillation as a contributory factor to European weather patterns and explained that Arctic sea ice, winds in the stratosphere and the El Niño Southern Oscillation phenomenon were all now known to be highly significant.

In conclusion, as Messori (*op.cit.*) put it:

The presentations on long-range forecasting all highlighted how the field has seen incredible progress since the winter of fifty years ago. Advances in the understanding of sources of seasonal predictability and the advent of dynamical forecasting have given a major impulse to forecasting skill. Finally, seasonal forecasts are becoming useful tools for mitigating the economic and societal impacts of weather and climate extremes. Moreover, some of the present forecast systems, such as the Met Office's GloSea5, still have not reached their full capability, making the future of long-range forecasting look very exciting!

EXPLORING THE OCEANS

As **Malcolm Walker** said in his introduction to this meeting of the History Group at the National Oceanography Centre, Southampton, on Wednesday 26 June 2013, "humans have been exploring the oceans since time immemorial".

Seafarers of Ancient Greece ventured beyond the Pillars of Hercules (the mountains on either side of the Strait of Gibraltar) and the Ancient Romans also travelled far and wide. The *Periplus of the Erythraean Sea*, written in the first century AD, provides documentary evidence that Graeco-Roman sailors maintained trade links between the Middle East and India and also understood monsoon winds well enough to sail by direct routes between the Red Sea and India. By the 8th century, Arabs were trading regularly between the Persian Gulf and China, and before that seafarers of the south-west Pacific had learned to exploit winds, ocean currents and visual cues such as cumulus growth over islands to navigate from A to B and back to A and back again to B, and so on. By 1699, knowledge of the oceans had advanced so much that William Dampier was able to publish his *Discourse of winds, breezes, storms, tides and currents*, which became a standard work on meteorology and oceanography for seafarers for more than a century.

By 1872, when HMS *Challenger* sailed on its voyage of scientific exploration, much was known about prevailing winds and ocean currents and about temperatures and salinities well below the surface waters of the oceans. However, models of the ocean-atmosphere system were but embryonic, and systematic studies of the oceans had not yet begun.

As **John Gould** said in his talk entitled *Ocean observations – from HMS Challenger to Argo and beyond*, the four-year *Challenger* Expedition was of great importance, for it laid the foundations of modern oceanography. Even so, subsequent progress was not exactly rapid. He summarized the

1870s to the 1950s as the period when marine scientists mapped the mean state of the oceans but also learned how to interpret observations.

In the 1960s and 1970s, John said, oceanographers learned about variability, and he mentioned in this context the Mid-Ocean Dynamics Experiment of 1973. To facilitate study of the oceans, instruments were developed, notably the conductivity-temperature-depth probe, the expendable bathy-thermograph, and the Swallow Float. Moreover, in 1978, by means of SEASAT (the first dedicated oceanographic satellite), the shape of the ocean surface could easily be measured and the resolution of the satellite was such that the wakes of ships could be seen. In the 1990s, in the World Ocean Circulation Experiment, the biggest oceanographic expedition ever mounted, sophisticated instruments provided data which allowed sub-surface currents to be mapped in some detail. Nowadays, thousands of Argo Floats provide data about surface and sub-surface oceanic conditions. Nevertheless, marine scientists have an insatiable demand for data, and so also do weather forecasters and climate scientists, who make much use of observations provided by marine buoys and sub-surface floats.

Alex Megann focused on the rôle of the oceans in climate in his talk entitled *Oceans and climate: a modelling perspective* and showed that models are nowadays achieving impressive results. As he showed, the oceans are important to understanding of climate not just through air-sea temperature and moisture interaction and long-distance transport of heat but also as reservoirs of carbon dioxide. Today's models are remarkably sophisticated and, as Alex concluded, the future is exciting.

After the talks, there was a tour of the National Oceanography Centre which included a viewing of numerous display cases which contained historic documents, instruments and other artefacts, and there were visits of great interest to various facilities, including the research aquarium, the deep-sea vehicle hanger, and BOSCORF (the British Ocean Sediments Core Research Facility).

This meeting attracted 26 participants and appears to have been greatly enjoyed, judging by the many letters and emails received afterwards.

For photographs taken in the aquarium and the deep-sea vehicle hanger, see pages 12 and 18.

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.

APLIN, K.L., 2013. 'Meeting report: C.T.R.Wilson – honouring a great Scottish physicist'. *Weather*, **68**, 96.

BURT, S., 2013. 'An unsung hero of meteorology: Charles Higman Griffith (1830-1896)'. *Weather*, **68**, 135-138.

DUDLEY, J.M., SARANO V. and DIAS, F., 2013. 'On Hokusai's "Great Wave off Kanagawa": localisation, linearity and a rogue wave in sub-Antarctic waters'. *Notes & Records of the Royal Society*, **67/2**, 159-164.

EDWARDS, R. *et al*, 2013. 'Tornado intensity estimation'. *Bulletin of the American Meteorological Society*, **94**, 641-653.

EL FADLI, K.I. *et al*, 2013. 'World Meteorological Organization assessment of the purported world record 58°C temperature extreme at El Azizia, Libya (13 September 1922). *Bulletin of the American Meteorological Society*, **94**, 199-204.

JANKOVIC, Vladimir, 2010. *Confronting the climate: British airs and the making of Environmental Medicine*. New York: Palgrave Macmillan, pp.vii+229. ISBN 978-0-230-10475-4.

ODELL, L. *et al*, 2013. 'The *Braer* storm revisited'. *Weather*, **68**, 105-111.

SCHULTZ D.M. and KNOX, J.A., 2013. 'Young Lewis Fry Richardson in Yorkshire'. *Weather*, **68**, 66-67.

SHEIN, K.A. *et al*, 2013. 'Revisiting the statewide climate extremes for the United States'. *Bulletin of the American Meteorological Society*, **94**, 393-402.

RIP

Sadly, two members of the Group have passed away this year: Mike Collins and Michael Field. Both had been members of the Group for many years.

Sadly, too, Ernie Pepperdine has also died. He had been a member of the Group for many years until a year or so ago, when he resigned on grounds of failing health.

May they rest in peace.

2013 MEMBERS

Rob Allan (Exeter)
Alberto Ansaloni (Milano Italy)
Oliver Ashford (Didcot)
Graham Bartlett (Slough)
Austen Birchall (Exeter)
Rodney Blackall (Buckingham)
Brian Booth (Devizes, Wiltshire)
Ron Bristow (Maidstone, Kent)
Tony Brown (Exeter)
Stephen Burt (Stratfield Mortimer)
Anna Carlsson-Hyslop (Manchester)
Jacqueline Carpine-Lancre (Beausoleil, France)
Victoria Carroll (London)
M J Chapman (Royston)
Alan Cobb (Gerrards Cross)
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)
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, Kent)
Alexandra Harris (Oxford)
Eric Harris (Crowthorne, Berkshire)
Alan Heasman (Marlborough, Wiltshire)
Althea Howard (Reading)
A M Hughes (Oxford)
Lord Hunt of Chesterton FRS (London)
Jane Insley (London)
Geoff Jenkins (Yateley)
Arnold Johnson (Maidenhead)
Keith Johnson (Twatt, Orkney)
Simon Keeling (Wombourne, Staffs)
Joan Kenworthy (Satley, County Durham)
Martin Kidds (Biggleswade)
John Kington (Norwich)
Daudu Kuku (London)
Richard Link (Croydon)
Allen Lock (Reading)
Norman Lynagh (Tideswell, Derbyshire)
Joyce MacAdam (Watford)
Ian MacGregor (Ivybridge, Devon)
Julian Mayes (West Molesey)
Anita McConnell (Cambridge)
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)
Sarah Pankiewicz (Exeter)
David Pedgley (Wallingford)
Anders Persson (Sala, Sweden)
R W Phillips (Lincoln)
Peter Rackliff (Fareham)
Nick Ricketts (Exmouth)
P R Rogers (Sevenoaks)
Catherine Ross (Exeter)
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 <u>YOUR</u> NEWSLETTER

Please send comments and contributions to:
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The next newsletter will be published in the autumn of 2013. Please send items for publication to Malcolm Walker by 1 October 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.