

Newsletter Number 44

Nov 1995

Table of Contents

Committee notes Page 2
Committee notes, ago 2
Programme IMS 1995-96 season Page 3
Dr P.M.Austin BourkeObituary Page 4
Barometers and the Irish Connection Page 6 A O'Broin
The year that wouldn't endJohn Flannery Page 11
Summer 1995Rieran Dollard Page 12
EYE ON THE SKY Page 14
A mysterious monthly temperature cycle Page 15
WMO Ozone Report Page 16
Waiting for the Tide James O'Connor Page 18
Europe's Hot Summer in 1994 Page 20
Weathewview and Cloud CornerPage 22 Edward Graham

Committee notes

The Irish Meteorological Society (IMS) includes members not only from Ireland but from all over the world who are interested in weather and weather- related topics. The membership is drawn from the ranks of those who work in Meteorology, Aviation, Marine and Agriculture, from teachers and lecturers and indeed anyone who is interested in meteorology and the environment.

The objects of the Society are :

1) The promotion of an interest in meteorology.

2) The dissemination of meteorological knowledge, pure and applied.

The committee met three times in the new season planning the lecture programme and other activities.

Unfortunately we still have not been able to produce newsletters as frequently as possible. The next issue should be in the Spring.

Committee for IMS 1995-1996

President----- Mr. Bill Wann Vice-President----- to be filled

Secretary------ Mr. Kieran Commins Assist-Sec.---- Mr. Paul Halton

Treasurer------ Mr. Kyran Dollard
Assist-Treas.----- Mr. Paul Halton

Dr. Peter Lynch

Mr. Dermot McMorrow

Dr. Pat Shannon

Mr. John Flannery

Mr. Douglas Gordan

Ms. Philomena Stokes

Mr. Denis Fitzgearld

Editor-----Kieran Commins

Irish Meteorological Society 1995 -1996 Season

Provisional Program

November 10th

Lecture: Physical Exchange processes

Dr PF Hodnett.

at the Ocean Margin

University of Limerick

December 1st

Annual Guest Lecture

"Coping with a Chaotic system - New Developments in Weather Forecasting"

Dr A Hollingsworth, ECMWF

December

Newsletter No.44

January

Annual Dinner

February

Lecture:"Famine Weather"

To be confirmed

April

One Day Meeting

A.G.M

May

Field Trip...

Note: It is planned to have three lectures in the Spring Session. These will be announced as details become available.

Editor's Note:

In this addition we have an article on Irish Barometer manufacturers; Edward Graham with a new cloud corner, John Flannery with an observations spot "Eye on the Sky" and other items. We also have a couple of items of interest from ORBIT, the Astronomical Society's Newsletter.

Dr. P. M. Austin Bourke, 1913-1995



Members of the Irish Meteorological Society will have been saddened by the news of the death on August 1st. this year of Austin Bourke, Director of the Meteorological Service from 1964 until his retirement in 1978. It is a sad irony, or perhaps looked at another way, appropriately fitting, that he should have died in the sesquicentennial year of the Great Famine, since few individuals, if any, have contributed more than he to our understanding of that tragic era. He was, as we know, the unchallenged authority on the epidemiology of phytophthora nfestans, the potato blight that precipitated the unfortunate events of 1845-47, and was, in the wider sense, an

agricultural meteorologist of world repute.

Patrick Martin Austin Bourke was born on May 10th., 1913, in Dungarvan, Co. Waterford, where his father was station-master for the Great Southern and Western Railway. After an early education in Dungarvan and at Mount Sion CBS in Waterford, Austin proceeded to University College, Cork. and graduated with first class honours in Mathematical Science in 1933, being awarded the Peel Memorial Prize as the outstanding graduate of his year. He spent the next 5 years at UCC, completing an M.Sc. and continuing as a lecturer in the College until he joined the newly-formed Meteorological Service early in 1939.

Austin's brilliant academic performance at university was matched by almost equal success in a wide range of extracurricular activities. He became president of the Student's Union, served as editor of the student newspaper, and was actively involved in the College Dramatic Society and the Hurling Club. Most notably, however, he excelled at chess, representing Ireland at the Warsaw Chess Olympiad in 1935, and his interest in the game was ultimately to culminate in his becoming Irish Chess Champion in 1951.

Austin was a member of the first group of seven Irish graduates to join the fledgling Meteorological Service in the late 1930s. He spent periods at both Foynes and Dublin Airport before becoming Assistant Director of the Service in 1948, and succeeding Dr.

Mariano Doporto as its third Director in 1964. It was during his period as Assistant Director that his interest in agricultural meteorology evolved, and he was responsible for the development and implementation of a technique, still in use today, for forecasting the occurrence of potato blight. His success in this area of research led to a twelve-month appointment in 1955 as special advisor to the Government of Chile under a United Nations aid programme, since that country was at the time suffering great hardship from an epidemic of the disease.

Austin himself has described in his writings how he was affected by his experiences in South America: "Of particular interest to an Irishman in Chile was the striking similarity with the Ireland of more than a hundred years earlier. As one stood by a blighted potato patch near Ancud, and heard the cries of a distressed mother faced with the destruction of the main food of her large family, one had the eerie feeling of being transported through time to the Ireland of August 1846." Thus began Austin's interest - the Great Famine. a topic that was to be his congenial obsession over the next 40 years.

Early work on this theme became the subject of Austin's 1967 Ph.D thesis on The Potato, Blight, Weather and the Irish Famine. A second NUI doctorate, a D.Sc., followed honoris causae in 1973 in recognition of his outstanding contribution to Irish science in general. Several years later, however, he was to disclaim this

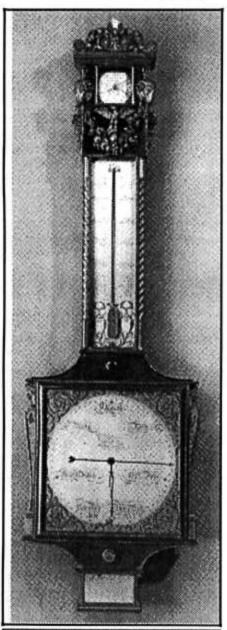
latter honour in somewhat controversial circumstances, by handing it back, as it were, in protest against then US policies in Latin America: the gesture was prompted by the award of an honorary degree to Ronald Reagan by the NUI on the occasion of the US President's visit to Ireland in 1984.

Meanwhile Austin's work in agrometeorology was also receiving international recognition. From 1958 to 1962 he was President of the WMO Commission for Agricultural Meteorology. and in 1975 he was awarded the William F. Peterson gold medal for his work in the field of plant biometeorology. The international dimension to his work was to culminate during the 1980s in his collaboration with Prof. Hubert Lamb of the Climatic Research Centre, University of East Anglia, in a major EU project on the meteorological aspects of potato blight in western Europe during the 1840s.

Austin will be fondly remembered by his many friends in the Meteorological Society as much for his genial, jovial and convivial personality as for the excellence of his scientific work and the felicity of style with which it was invariably presented. We extend our deepest sympathy to Clodagh and her family at this difficult time.

Barometers and the Irish Connection

A O'Broin, Meteorological Service



Wheel Barometer, Woburn Abbey D. Adams, Fleet St, London

When I was stationed in Rosslare my main hobby was collecting books. As specialised auctions in books were rare then, I attended house auctions in the area of Wexford for the few lots in books. As this did not take up too much time I generally viewed the other lots of furniture et cetera. Occasionally I came across barometers and was naturally intrigued by them. With the passage of time I ended up in HQ. Glasnevin where one of the highlights is the Library, well stocked by the librarian Mrs L Shields. I have put together my own small private collection. In these articles I hope to outline the discovery and development of the barometer in general and also more significantly attempt a listing of the barometer makers of Ireland.

It is generally accepted that Evangelista Torricelli discovered that atmospheric pressure varies and that variations have a direct connection with weather changes. Torricelli was born in Faenza on Oct 15th 1609 and in 1641 went to Florence to live and work with Galileo. Galileo died three months after Torricelli had joined him. Galileo had been working on many studies and one that interested Torricelli was that a column of water in a tube could not be raised higher than about 33 feet even if, by means of an air pump, all the air was removed from inside the tube. Torricelli then experimented and found that mercury being 14 times as heavy as water enabled him to use a tube 1/14th of the length. It is generally accepted that it was in the year 1643 that Torricelli discovered that it is the pressure of the atmosphere that governs

the height of the mercury. This is known as the "Torricelli Experiment". He experimented further and was soon threading on dangerous ground as the space in the tube above the column of mercury is known as the "Torricelli Vacuum". The church had indicted Galileo over some of his experiments and one topic which the church was disagreed with existence of a vacuum. So to avoid a clash with the Church. Torricelli, to my knowledge, did not allow the publication of his experiment in his lifetime. Torricelli died of fever in Florence at the early age of 39 in 1650.

iir

re

ea

As

ire

SS

by

up

ne

by

ut

n. he

he re

he

sta

ric

a

es.

5th

ve

ee

m.

ies

nat

be

by

as elli

ury

led

is

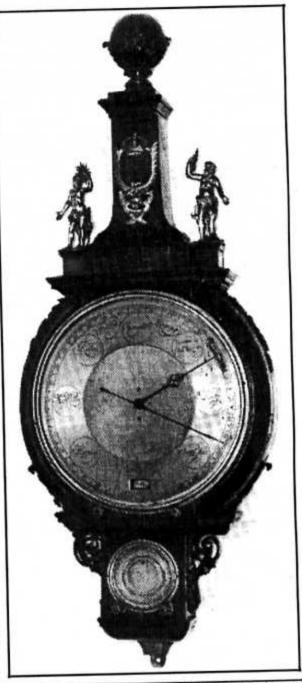
ear

the

rns

Florence at that time was a centre of Scientific knowledge. So many students went there: one was Robert Boyle (1627-1691) who was there at the precocious age of 14. He studied the writings of Galileo knew of Torricelli's and experiment. He is credited with the introduction of the barometer into England. He developed the experiment into a practical barometer being the first to use a graduated scale to record the height of the mercury in the tube.

The Civil wars in England had put a stop on most creative activity. So we now turn to Ireland. The Irish were more or less a tribal race with value in cattle and horses. Now before



Wheel Barometer, Buchingham Palace THO TOMPION, Londini

the invention of the Torricelli barometer, weather glasses of various forms were in common use. I have often speculated on whether the Nua Gael magnates had one of those, such as Kilkenny's Butlers. Also the Plantation of Ulster after the Flight of the Earls brought in mostly Scots but also merchants from London. There may be another source worth investigating. Cromwell's Plantation was mostly by Roundhead soldiers who were not scientists and I doubt their interest in Barometers. However all these lists are worth further study.

So we return to England. The Monarchy was restored in 1688 and scientific studies were enthusiastically resumed. They got support from the Monarch. Charles II who had become very interested in science during his exile in Holland.

Around this time merchants and aristocracy began to commission barometers. There were in operation instrument makers but generally it was the opticians and clockmakers who were the first and main makers of barometers. The two chief instigators were Robert Hooke (1635-1703) and Thomas Tompion (1638-1713). Hooke was a genius and is worth a study in himself. He was an assistant to Robert Boyle and a curator of the Royal Society when it was formed in 1662. Hooke commissioned barometers from Tompion, who made Hooke's theoretical drawings practical. It should be stated that Thomas Tompion was a clockmaker and, from what I have seen illustrated, was the most famous of English clockmakers. His barometers are exquisite. I will give a list of books at the end of these articles but Nicholas Goodison in "English Barometers 1680 - 1860" pages 229 - 238, illustrates the genuine Tompion instruments. To my knowledge at least 20 of his clocks are known. If possible I will obtain illustrations for an article.

Then of course wars with religious overtones became operative. William of Orange becomes King of England and also defeats James II at The Battle of the Boyne. This sets in the Penal Laws in Ireland for the Catholics. However for the Protestants it was a boom period of building mansions. Meanwhile in France Louis IV in 1685 revoked the Edict of Nantes for Henry IV on 18th October. The Huguenots had to flee France. On 24th October Frederick William of Brandenburg offered the Huguenots asylum and the Dutch, Swiss and English followed suit. Over 300,000 fled. William of Orange went further. After the Battle of the Boyne, now secure as King of England, he offered inducements to Protestant craftsmen to come to Ireland. The Huguenots responded in numbers.

Now at last we come to my list:

- (I) Dublin
- (ii) Belfast and Ulster
- (iii) Provincial

It is very difficult to establish actual barometer manufacturers for definite. There

were scientific instrument makers, retailers rather than manufacturers, opticians and clockmakers. However all my lists are open to question and I will welcome corrections. To explain my historical outline in Ireland you will have many foreign names such as Huguenots.

The wheel has turned full circle now. The Big Houses are coming on the market: These sales are usually handled by Sothebys or Christies but lately Mealy's of Castlecomer have obtained the sales. In my day in Rosslare I travelled to the loca auctions. Members of the Society might like to keep a note of auctions in their owr area and if there was a barometer of interest, inform me.

I append a list of Dublin firms who were active in some way in Barometers. The other two lists will follow in a later issue.

V Bianchi	1820 - 1840	
Burnett	1815 - 1870	
Casartelli	1835 - 1855;	2 Fade St
J. Del Vecchio	1820 - 1822;	26 Westmorland St 6 D'Olier St
John Donegan	1839	92004) VIII
Alexander Feroni	1804 - 1810	49 Fleet St
Samuel Fry	1810 - 1830	
Gatty Andrew I	1796 - 1800	
Andrew II	1815 - 1824	
Joseph	1801 - 1814	
Samuel Gregory	1761 - 1762	Sycamore Abbey
Mason	1781 - today	Arran Quay, Essex Bridge,
A famous family		Ormond Quay, Dame St S.C.Rd, Parliment St
James Monaghan	1760 - 1762	Capel St
P.D. Mackey	1820 - 1850	3 Skinners Row
Charles Mahacrida	1805 - 1822	
Anthony Pitzoli	1831 - 1835	86 Pill Lane
F Porri	1835 - 1855	
Prescott		Merrion Row
Anthony Pusterla	1820	143 Chapel St
Round Glass House	1754	
Patrick Sandford	1820 - 1822	45 Henry St
John Tadeo	1755 - 1825	
Tecleo	1830 - 1850	
Yeats A famous family	1790 - today	Ormond Quay, Capel St Dame St, Grafton St

I have consulted the following books:

Vulgar and Mechanick, Old English Barometers

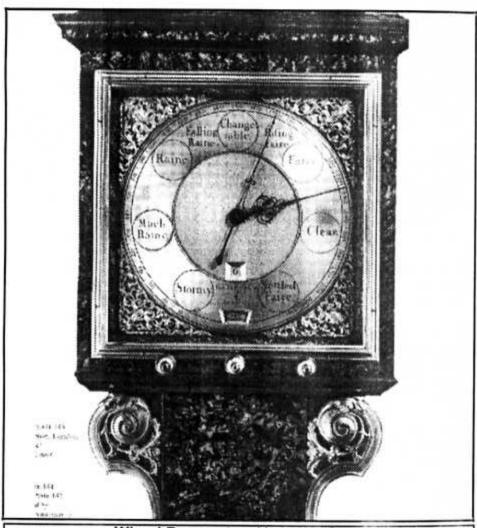
English Barometers 1680 - 1860, A History of Domestic Barometers and Their Makers

Note: Photographs were taken this book.

Dublin Historical Record

Barometers; makers and retailers 1660 - 1900

I wish to thank Mrs L Shields for all her help and Mr C Carroll for his guidnace and help.



Wheel Barometer, Hampton Court THO TOMPION, London

The year that wouldn't end ...

The citizens of Rome must have wondered whether the year 46 BC would ever end. It went on ... and on ... and on ... for 445 days in fact. The long wait for 45 BC came about as the Roman general and statesman Julius Caesar restructured the calendar.

The calendar in use until then - the Roman republican calendar - had become hopelessly out of step with the seasons. The spring equinox, which should have coincided with the end of March, was arriving in the middle of May. The calendar, devised some time between the 5th and 1st centuries BC, was based on lunar months of 29.5 days. It consisted of 12 months and originally began on March 1, the start of the farmers' year and the time when Roman officials took up office. There were 355 days, 10.25 days short of the solar year.

In an attempt to prevent a slip in the seasons, so that midsummer would always fall in June, for example - an extra, short month was added every other year. But this resulted in an average year of 366.25 days, one more than the solar year.

In 46 BC, Caesar commissioned Sosigenes, a Greek astronomer, to devise a new calendar. Sosigenes recommended a calendar based on the solar year, with a 365-day year and an extra day every fourth year - the first leap year. But before the new, Julian, system could be put in effect, the discrepancy between seasons and date had to be corrected.

An extra 23 days were due anyway in February of 46 BC; Caesar added another 67 days in the form of two extra months between November and December, so that 46 BC lasted a total of 445 days. It became known as the Year of Confusion. But by its end January fell where March had been, and the spring equinox was back around the end of March.

Why we have sixty seconds ...

Hours and degrees of longitude are divided into 60 minutes and minutes into 60 seconds because 60 was the number base used by the Sumerians in Mesopotamia, the first people known to have written down a workable counting system 5000 years ago.

Why we have 24 hours ...

The custom of dividing each day into 24 periods seems to have originated with the ancient Egyptians in about 3500 BC. They divided daylight and darkness into periods of 12 hours each. But this meant that the length of each hour changed during the year as the night lengthened and shortened. It was Babylonian astronomers who, in about 3000 BC, adopted the now universal practice of making all 24 hours equal in length, regardless of when the Sun rose and set.

In Europe, however, equal hours did not become standard until about AD 1350 some 70 years after the introduction of mechanical clocks.

Extracts from "ORBIT" a newsletter of the Irish Astronomical Society

Warmest summer on record

It was the warmest summer (June, July, August) on neord almost everywhere, with mean temperatures (avg. of the 3 monthly means) over 2 degs, above normal in most places. Among the long-term records broken were- mean temp, of 16.6 °C measured at both Phoenix Park and Valentia Observatory -the highest in over a century of recordings in each case. The highest air temperature of the summer (at either synoptic or climatological weather stations) was \$1.5 °(* (89°15), recorded at Carlow(Oak Park) on the 2nd August®. Temperatures rose to around 30°C on a number of days at end of June and up to the middle of August(Shannon's August maximum of 29.8 Coccurring on 17th August). Nightime minima remained above 15°C for much of the second half of July and first half of August. The synoptic station at Kilkenny recorded a total of 27 days during the summer with temperatures in excess of 25°C. The lowest air temperature of the season was 0.1°C -almost an air frost- recorded at Ardee. Co. Louth on June 13th.

It was also an exceptionally dry summer with less than half the normal rainfall recorded over most of the eastern half of the country. It was the driest summer on record at Malin Head, Casement and Cork airport, while at the Phoenix Park the total of 65.1 mm was the lowest since 1887. However there were some days with localized heavy thundery downpours (Shannon recorded 39.3mm on 29th July).

This was the <u>sunniest summer for at least 25 years</u> generally and the sunniest since 1899 at the Phoenix Park -Malin Head recording 16.0 hours on June 26th for the highest daily total.

Mean sea surface temperatures ranged in August from 15 16.5 °C on the north coast to about 18 - 19 °C in the south (at least 2 to 3 degs. above 30-year normal values).

Summer extremes of air temperature in Ireland 1881-1995

The highest recorded in summer is 33.3°C at Kilkenny Castle(June 26th 1887).

The lowest recorded in summer is -3.3°C at Clonsast, Co.Offaly(June 1st 1962).

Met.Service Synoptic Network

RAINFALL (mm)

SUMMER 1995

TEMPERATURE (°C)

SUN (hours)

	-	Suv Arno	Aug.	remmer	0.5	June	•	Vinc	•	August		Summer	36	Summer	
TationName	70-21	Total	Total	1	10.4	(.gva)	:	(avg.	•	(avg.)	٤			Daily	0
				1000	· 6AD	Max	Min	Max	Min	Max	Min	Highest	Lowest Mean	Mean	AVO
STODETS	28.3	149.3	24.7	232.3	89	18.2	10.4	19.6	14.3	22.0	14.0	28.3	6.1	5 76	116
Shannon AP	25.9	128.6	4.2	158.7	76	20.5	11.0	21.4	14.5	24.2	14.5	30 2	7	n	5
Jublin AP	6	70.2	7 2	900		0)			1		0.5	0.10	677
dalin Hand						10.1	8.1	20.9	11.6	22.9	11.9	27.1	4.0	7.39	131
	23.0	27.9	13.3	104.2	44	14.5	9.9	18.7	12.5	19.5	13.5	25.2	7.9	32	35
3elmullet	29.1	93.3	17.7	140.1	61	17.4	10.4	19.7	13 1	20 8	17 0	9			1
lones		07 3	1 0		,							80.0	0.0	0.01	116
					20	19.3	9.5	20.5	12.4	23.3	12.8	29.3	3.4	o	155
	*	58.9	19.7	87.8	49	16.4	11.3	19.2	13.8	21.0	14.8	24.7	9.0	7.73	121
- Laremorris	10	116.2	13.9	161.6	67	19.0	9.2	20.3	12.1	23.1	11.9	29.0	5	h	
Mullingar	1.1	76.8	6.9	104.9	49	19.0	9.1	20.4	12.4	23.1	11 5	20 2		, ;	
Kilkenny	35.0	68.2	6.5	110.7	D)	200	s J	,		1 1		60.0	4.0	9.98	144
	e.	o.	-					61.13	16.6	25.4	12.0	30.8	. 8	6.80	134
		M			ě	18.4	8.6	21.3	12.4	23.5	12.1	28.8	2.1	6.84	127
AV MIC.	1	2.18	11.5	114.0	50	18.8	10.0	19.6	13.1	22.6	13.9	28.0	n	71	
In	::.7	59.0	35.0	111.7	57	19.9	9.1	21.2	13.1	24.0	11.9			7 7 7	1 1

change)

EYE ON THE SKY

John Flannery

How often have you really seen a rainbow? Not just simply glanced at it but been aware of other related optical effects? Phenomena such as Alexander's dark band, supernumerary arcs or reflected light bows - all associated with the humble rainbow.

If you appreciate just simply observing the sky around us, then you've got an idea of what this new column is all about. Through these pages we'll delve into the world of optical phenomena - and more - and encourage casual skywatchers to contribute their observations to the newsletter. While your observations may not generally be scientifically important, you will enrich your awareness of the everchanging skies overhead.

The couple of observations that follow, made over the past few months, serve to give you a flavour of what magical sights await our discovery.

Blueness of the sky:

On occasions this Summer, I was struck by the intense deep blueness of the sky. I was able to follow the blue right up to within a fraction of a degree of the solar disk on these days and the blue was intense even low down near the horizon.

What does all this mean? To explore the question, we must ask ourselves "Why is the sky blue?". If we venture beyond the protective blanket of our atmosphere, we experience the harshness and blackness of space. Therefore we can say that the blue sky is not a solid vault at an infinite

distance, but is in the atmosphere itself.
It is due to the blue component of sunlight being scattered more strongly than the other wavelengths of light.

We often notice that there is less blue in the sky on humid, bazy days when there is much moreture and dust in the atmosphere. The dust particles and water droplets scatter all wavelengths of light about equally and we find much white light diffused and sent to us from all parts of the sky. The days of deepest blue that I experienced were rare moments of an exceptionally pure and clear atmosphere.

But we could go further; you may even notice different stanters of blue in the sky at the same based in a future column we will delay deeper into the wonders of the blue sky.

Clouds with a silver lining

The Summer months also find twilight lingering right through the night with the sky never getting truely dark from our latitudes. It is an ideal opportunity to look for noctifucent clouds (NLC's) residents of the ranked air 80 km above the Earth. It has been suggested that they are composed of meteoric dust apparently covered by some ice. Others believe that volcanic dust ejected high into the upper atmosphere may be the nuclei for these clouds to form.

These clouds are a phenomenon of deep twilight (making June to late July the favoured period of observation), illuminated by the long departed Sun while the world below is in darkness. NLC's shine a silvery, blue colour and

can appear as "waves" or "billows". Speeds as high as 600 km/h have been observed as their structure changes over time.

Magnificent displays were noted this past June on the 11th, 23rd and 30th, with the clouds on the 30th observed to have a pale green, almost "flourescence-like" colour.

Going further

Other common and not-so common sky-sights have been made their way into my observations notebook over the past while. A friend described to me how he saw an "upside-down" rainbow directly overhead recently. Although it was in reality a circumzenithal arc - and more related to the halo family of phenomena - in a way his mind is now open to the wider beauties of the sky that few are aware of. In the next issue I will review some popular books on the subject of atmospheric optics. In the meantime, why not write in and share your own observations - no matter how trivial - with the Society members.

A mysterious monthly temperature cycle

John Gribbin New Scientist 29/1/95

AVERAGE Midday temperatures around the world show a regular monthly variation averaging 0-2 °C, a meteorologist in Italy has found. If you have any idea what might cause this monthly cycle, meteorologists would like to hear from you, because they are completely baffled by the discovery.

The mystery monthly variation has been uncovered by Clive Best of the European Union's Institute for Systems Engineering and Informatics in Ispra, Italy. He analysed data gathered by the European Centre for Medium Range Weather Forecasting in Reading, covering the five-year period from 1986 to 1991. These data consist of temperature measurements taken at 51200 places around the world at noon GMT each day.

Superimposed on the large temperature changes due to seasonal variations, Best found a regular oscillation which repeats roughly every 30 days (Geophysical Research Letters, vol 21, p 2369). The variation is strongest near the poles, and is bigger in the northern hemisphere than the southern. This, Best believes, is because the northern hemisphere contains more land, which tends to cool and heat up more quickly than the sea. The cycles in the northern and southern hemispheres are precisely out of step with one another. When northern regions reach their monthly temperature peak, the southern hemisphere is at the coldest part of the monthly cycle.

The most obvious cause of any monthly cycle is the Moon, which orbits the Earth once every month. Changes in the tilt of the Moon's orbit, which varies over an 18-6-year cycle, have been linked with rainfall variation in some parts of the world. But it is not clear how the Moon could exert a large monthly effect on temperature.

OZONE REPORT

Winter 1994/1995

WORLD METEOROLOGICAL
ORGANISATION
A SPECIALISED AGENCY OF THE
United Nations

No. 558 WMO REPORTS UNUSUALLY LOW **OZONE** LEVELS OVER SIBERIA AND EUROPE

Geneva, 14 February—After the recordbreaking low ozone levels last September and the extremely large ozone hole in Antarctica, the World Meteorological Organisation (WMO) announced today that unusually low ozone value have persisted during most of January and the first half of February over the northern middle latitudes, particularly over Siberia and extending westward to Europe.

During a press briefing held in Geneva today, Dr Rumen Bojkov, Special Advisor to the Secretary-General of WMO, told journalists that ozone deficiencies during the second half of January reached 5 per cent below normal over Siberia and persisted during the first half of February. During several weeks record low ozone levels of about 250-270 Dobson Units (ozone units) were reported. The longterm normal monthly mean values for February are 470 Dobson Units in Eastern Siberia and 410 Dobson Units over an area east of the Ural mountains in Western Sibebia. A 10 per cent deficiency was observed for the entire month of January over the 40-60°N latitudinal belt.At the same time, over

Europe the deficiency from the long term mean exceeded 10-12 per cent, which is close to the statistical limit of what is considered as a normal function. Over North America the deficiency is 5-10 per cent although there were also a few episodes with as low as 20 per cent.

This information is based on provisional data gathered from more than 95 ground-based stations of -the WMO's Global Atmosphere Watch (GAL) Global Ozone Observing System (GAS) and the WMO Northern Hemisphere Ozone Mapping Centre operated on behalf of WMO by the Laboratory of Atmospheric Physics, University of Thessaloniki, Greece.

This Northern Hemisphere winter started in November-December 1994 with 5 to 10 per cent ozone deficiencies over the mid-latitudes which is what could be expected from models predicting a continuation of the ozone decline that started in the 1970s. This has already caused a cumulative decline of close to 11-13 per cent during the winter-spring season. However, during the past few weeks (second half of January and first half of February) the ozone deficiency was stronger than 20%, occurring for a number of days over Europe and reaching as low as 35% over Siberia.

Such low ozone values were not reached there even during the record setting January-February 1993. "At that time there was considerable speculation that the low ozone was due mainly to the ozone destruction caused by aerosols from the Mount Pinatubo

cruption in 1991; however, presently there are no remnants from volcanic aerosols left in the stratosphere", said Or Boikov. "But, with the availability of chlorine oxide (CIO), a by-product of man-made chlorofluorocarbon (CFC) transported from the Arctic to the sunlit areas of the 60-45°N belt over Europe and Siberia, where the lower stratospheric temperatures are 8-10°C below normal, chemical ozone destruction is quite possible ", he added. The extremely low ozone value in the northern middle latitudes this winter are in part aggravated by the hampering of the transport of ozone-rich air from the equatorial stratosphere by the current westerly phase of the quasi-biennial oscillation (QBO). "Previous studies have shown that during this phase, the winterspring ozone values in the northern middle and polar latitudes could be as much as 6-8 per cent below longterm averages," said Dr Boikov. "However, now we have observed a 20 to 35 per cent deficiency which could be attributed to chemical destruction", he added.

Although most countries have agreed, through the Montreal Protocol, to take measures in phasing out ozone destructive chemicals such as Chlorofluorocarbons (CFC) by the end of this year, chlorine concentrations in the stratosphere will continue to rise to peak values of 3.9 ppbv- (parts per billion per volume) by the end of the century. Model scientific assessments estimate that only in the next decade will it start to eventually decline to the pre-ozone hole values of 2 ppbv sometime in

the middle of the next century. During the next ten years the worst of the ozone destruction is expected to occur especially during periods with very low stratospheric temperatures.

Despite the extremely low ozone values WMO advises that there is no immediate need for special precautionary measures against a possible increase of Ultra-violet B radiation because the sun is relatively low in the northern middle latitudes and skies are frequently covered by clouds.

WMO, the authoritative scientific voice on atmospheric issues within the UN family of agencies, provides near-real time information on the state of the ozone layer in order to keep the public and decision makers aware of the fragile state of our atmosphere. 'This is made possible thanks to Members who contribute to the WMO Global Ozone Observing System (GO3,OS), according to Professor G.O.P. Obasi, Secretary-General of WMO. "Improvements to the GO3,OS and related research activities are essential for a better understanding of ozone issues. Governments should also continue working together towards the implementation of the Montreal Protocol and its amendments", he said.

Waiting for the tide

by.James O'Connor

Once upon a time - it was quite a number of years ago - I almost missed giving the correct answer to a question in a quiz contest through knowing too much about a subject. It was in the far-off days of the 50's when we had the benefit of weekly lectures in the Astronomical Society from our Honorary Lecturer, the late Vincent Deasy. The series covered not only astronomy but related subjects such as geology, meteorology, chemistry and biology. From him we learned that there wasn't just one "missing link" in Darwin's theory of the origin of the species, that the (extinct) "sabre-toothed tiger" wasn't really a tiger at all and, nearer to home realities, why it is that sodium street lamps glow red for a time after they are switched on, before turning to their characteristic yellow. And, together with all the other things, he told us a fair bit about the mechanisms giving rise to the phenomenon of the tides.

The quiz to which I referred was a "Trath na gCeist" (Question Time) on Radio Eireann and the question was one which in the normal course would have been right up my alley. It was "By how much are the tides later on successive days?" I knew from Mr Deasy's lectures (and, indeed from my schooling with the Christian Brothers) that the average delay was about 50 minutes - the period between successive passages of the moon across the central meridian but my problem during the ten seconds allowed

for reflection related to the fact that Mr Deasy had explained that the overall picture was by no means as simple as that. He had told us that the actual delay from day to day varied greatly. from a minimum of about 28 minutes to a maximum of about 84 minutes, a difference amounting to a factor of three. I wasn't sure whether what was wanted was the average figure or a more detailed statement describing the variations and so hesitated until my time was almost up before plumping for the simple answer. It turned out to be all that was required - obviously the setter of the questions hadn't been to Mr Deasy's lectures!

Of course, Mr Deasy wasn't content with just pointing to the fact of the variation; he also explained the cause of it. In passing it on, I will make the reasonable assumption that all our members know that the tides are caused by the differing gravitational pulls of the sun and moon on (a) the main body of the Earth, (b) the waters facing these bodies and (c) the waters averted from them. Indeed, the fact that the tides can be attributed to the sun and moon has been known for a very long time - Pliny, the Roman philosopher, stating, in the first century of our era, that "Causa est in Sole Lunaque" - but it was not until the year 1687 that Isaac Newton finally explained the phenomenon as part of his epoch-making Principles of Universal Gravitation, I will also assume the reader knows that higher than average "spring" tides occur at new and full moon when the sun and moon act in unison and lower than average "neap" tides at first and last

quarters when they act against each other.

O

0

As mentioned, the average period between tides is about 50 minutes. corresponding to the period by which the moon is later in crossing the meridian each day. This period had a certain inherent, though relatively small, variation arising from the fact that the Moon's orbit about Earth is in the form of an ellipse rather than a circle and that its orbital movement is faster than average at perigee and slower than average at apogee. This variation has, however, little to do with the inequality (which is referred to as the "priming" and "lagging" of the tides) described by Mr Deasy. The effect is, in fact, due to a consideration which would not. I think, readily spring to mind.

Illustrations illustrating the cause of the tides invariably relate to the times (new and full moon and first and last quarters) when sun and moon either pull directly together or directly against each other. But it is the times in between which are, in a way, the more interesting. At these times, the two bodies pull in all manner of varying angles to each other. The reader will at least instinctively know what happens to an object which is subjected to two sources of traction acting at an angle to each other. The object moves, not in the direction of either source, but in a direction somewhere in between. Similarly, the tidal bulge on the waters of the Earth is, most of the time, not related to the position of either sun or moon but to a point in between.

It is sometimes in advance of and sometimes behind, the point where a purely lunar tide would be, causing the priming and lagging effect which is so conspicuous in any examination of the tidal tables. The priming effect is in evidence in the periods before and after new and full moons and the lagging effects in the periods before and after the quarter phases.

So, if you notice that the tides do not seem to be obeying the 50minute rule that you learned about at school, don't think that the laws of physics are being broken! They are just being obeyed!

FOR THE LATEST WEATHER FORECAST FROM THE MET SERVICE CALL WEATHERDIAL ON

MUNSTER.......1550 - 123 - 850 LEINSTER......1550 - 123 - 851 CONNACHT......1550 - 123 - 852 ULSTER......1550 - 123 - 853 DUBLIN......1550 - 123 - 854 SEA AREA & GALE WARNINGS1550 -123 - 855 CALLS COST 58P PER MINUTE

WEATHERDIAL FAX.....1570 - 131 - 838 (enter code 0000)

CALLS COST £1.00 PER MINUTE (VAT INCL.)

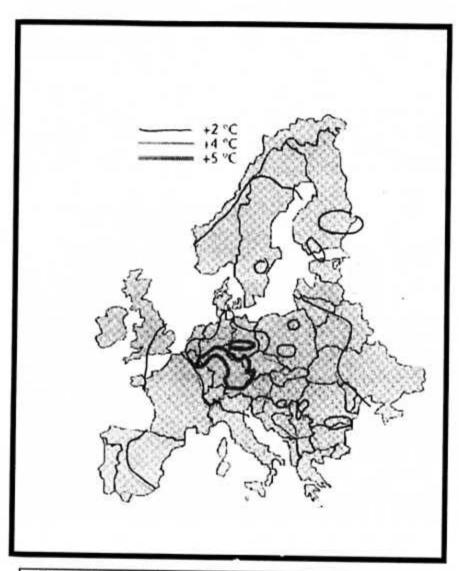
EUROPE'S HOT SUMMER 1994

After unusually cool conditions had dominated most parts of Europe (with the notable exception of Ireland) during late spring and early summer 1994, above-normal temperatures spread from the southwest at the end of June and initiated one of the hottest spells that has ever afflicted central Europe. The very warm weather persisted for more than six weeks, until cold and moist air from the Arctic Sea penetrated during the second half of August. The warmest mean temperatures for the period occurred in Germany, where they were 4-6 °C higher than normal. Temperatures soared to new, all - time records at several locations and July 1994 was the hottest calendar month registered since the beginning of regular weather observations at several sites, including Hamburg, Germany. Examples of some of the highest temperatures reported are: Lycksele in northern Sweden, 36.7°C on 7 July; Volkel, Netherlands, 36.1°C on 4 August; Virton, Belgium, 38.9°C on 3 August; Paris, France, 36.1°C on 4 August; Budapest, Hungary, 36.3°C on 30 july; Berlin, Germany, 37.8°C on 1 August; and

Murcia in southern Spain rose to a searing 46.1 C on 4 July.

The hot spell was accompanied by predominantly dry weather, except for scattered showers—some of which, such as those in some parts of France and southern Germany, were very heavy and caused flooding. But, in many places, dry conditions had persisted since late May, which adversely affected agriculture. The dryness, combined with the high temperatures, caused regional water shortages and led to fires, which scorched huge land areas, especially in Spain and Poland, In an attempt to reduce smog conditions, motorists in the United Kingdom and Germany were asked to curtail driving and, in Germany, speed limits were impose on highways

Sources: Information provided by the Deutscher Wetterdenist. Seewetteramt. Germany, with input from climate centres of Finland, France, Hungary, Spain and the USA.



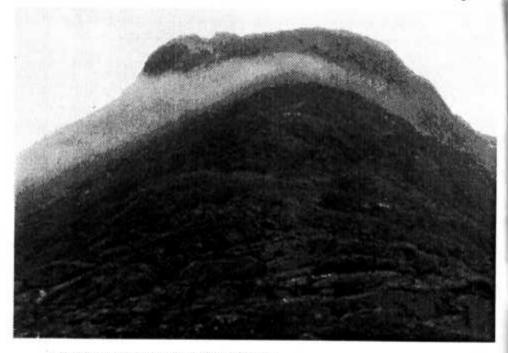
Plot of Eurpoe with the regions which suffered the hot summer highlighted.

Weatherview & Cloud Corner



Edited by E.Graham of Reading University.

Photo 1: This photo of a mountain cap-cloud was taken on was a light valley blowing up the mountain from the left and the air is saturating as it cooled white ascending the mountain. The atmosphere appears to be very stable however, and the air is unable to progress much beyond 600m, so it diverts around the side of the mountain. Note also the excellent example of a mini-rain shadow; the air that does get to



6/11/93 on the slopes of Ben Gower mountain in the Twelve Bens, Connemara. The mountain is 666m high; the photo was taken at about 450m on the northern slopes. There

the far side of the mountain is much drier and the cloud evaporates quickly on descent. This is despite only a fine drizzle or fog being deposited on the mountain slopes. Our maritimetropical southwesterlies often operate like this on a larger scale; the saturated lower few hundred metres are often capped by an inversion which hinders the progression of the moist surface layers northward beyond Irish mountain ranges; hence leeward areas can often see less than 20% of the rainfall experienced on windward slopes in circumstances.

The thunderstorm occurred in a cool, westerly, maritime polar airflow. The cumulonimbus shown had actually passed over the Connemara area earlier that afternoon, but was not particularly severe with no thunder; it would seem more active convection occurred inland over the Connemara mountains and the plains of Galway maturing the cloud considerably.



Photo 2: This is a picture taken by C.E.Graham looking eastwards from Ballyconnelly, Connemara at 1600 hrs on 27/8/92. At that time, a severe thunderstorm was reported from Galway city with torrential rain.

If you have a favourite weather photo, maybe you could send it in to us at the Met. Society, Glasnevin Hill. We will of course return your photo after publication.

Attention, Schoolteachers, Scientists, Weather Watchers!

Do you or a friend have access to a PC with e-mail, and if so, would you like to set up a weather station (or at least a wind station) at a school or home in 1996?

It is possible that all or some instruments will be provided free, together with some teaching practice on the weather for your class / person.

Interested?. Contact Eddie Graham at 15 Hillside Court, Ailcroft Road, Reading, RG1 5DJ or e-mail to : C.E.D.Graham@reading.ac.uk

INTERNET SURFERS

Are you interested in developing an Irish weather page(s) in the future?

I would hope to contain as much info, possibly about Irish, European and Global Weather. I would very much welcome any ideas on it's possibility and feasibility in the coming year.

Contact Eddie Graham at the above address.