Irish Meteorological Society

Newsletter

Number 19 **November 1989**

This newsletter contains :

(a) Flying Boats and the Foynes Air Museum by Anna Nolan, reproduced by kind permission Anna Nolan/Technology Ireland.

(b) The Society's provisional schedule of events for early 1990.

(c) Some articles from the Monthly Weather Bulletin of the Meteorological Service which are reproduced with the permision of the Service.

(d) Blowing Hot and Cold in the Med.

(e) Details of the next lecture which will be preceded by a sherry reception.

A.Kelly

Secretary

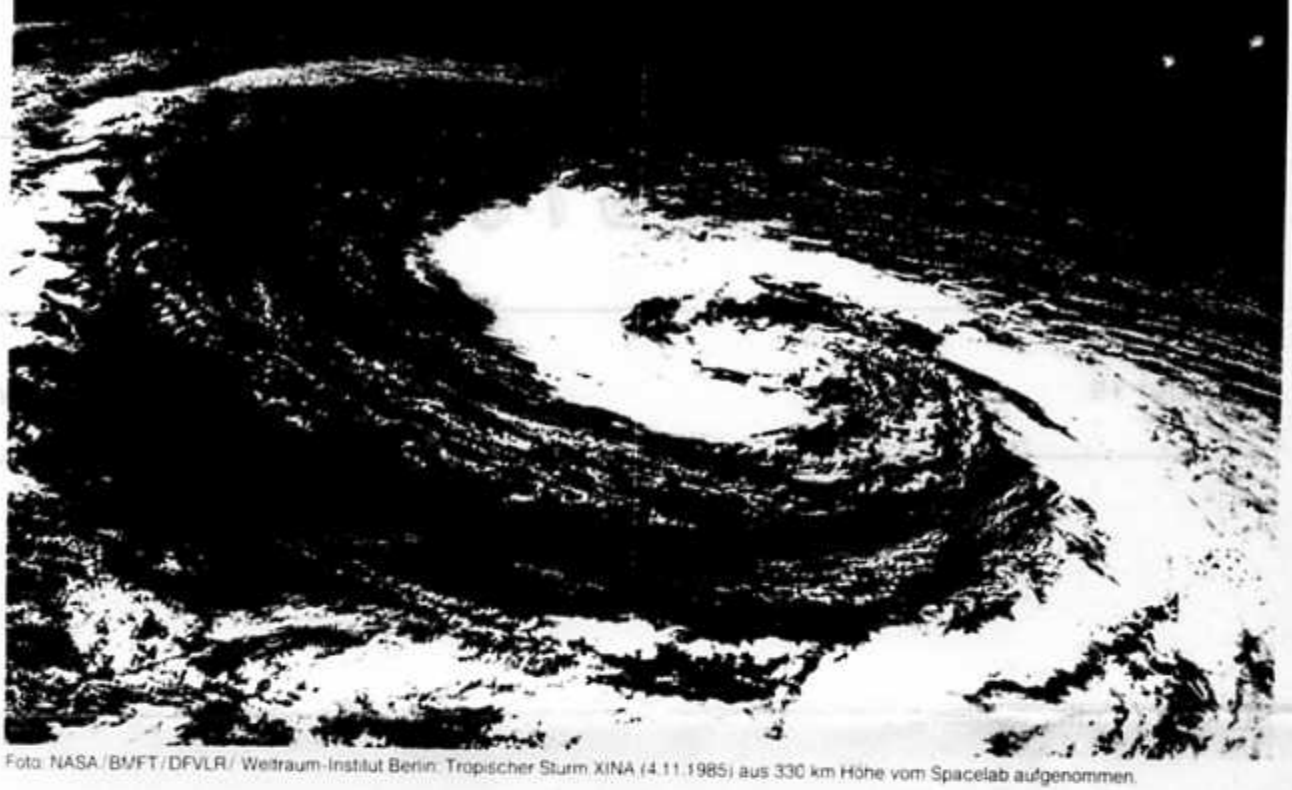


Foto: NASA / BMFT / DFVLR / Weltraum-Institut Berlin: Tropischer Sturm XINA (4.11.1985) aus 330 km Höhe vom Spacelab aufgenommen.

METEOROLOGISCHER KALENDER 1990

Der Kalender hat das Thema „Quellwolken: Vom Schönwettercumulus bis zum Tornado". Er erhält Bilder von Schönwettercumuli, Passat-, Föhn- und Gewitterwolken, Mammatus- und Kühlturmwolken, Blitzen, Regenbogen und Halos, einem Tornado und einem Gewitter im Radarbild.

Der Meteorologische Kalender 1990 hat eine erheblich aufwendigere Ausstattung als in den Vorjahren: Über dem Deckblatt liegt eine Klarsichtfolie; alle Bilder sind kunststoff-lackiert. Wie in den Vorjahren hat er das Format DIN-A-3 (29 mal 42 cm), eine Spiralbindung und eine feste Pappрückwand. Alle Bilder (Deckblatt und 12 Monate) sind vierfarbig gedruckt. Die Bildinhalte werden auf der Rückseite, z. T. mit erläuternden Skizzen, in deutscher und englischer Sprache erklärt. Außerdem enthalten die Rückseiten zahlreiche klimatologische Informationen, dazu Betrachtungen zum Thema „Wetter und Verkehr", verbunden mit grafischer und tabellarischer Information.

Die Kalender-Bilder sind auch als Postkartensatz (15 mal 10,5 cm), gefällig zusammen verpackt, erhältlich. Sie sind auf 250 g/m² Chromolux-Papier gedruckt und hochglanzkalandriert.

METEOROLOGICAL CALENDAR 1990

This calendar has the theme "Cumulus Clouds: From Fair Weather Clouds to Tornado". It contains pictures of fair weather cumuli, trade wind, foehn, and thunderstorm clouds, mamatus and power plant clouds, lightning, rainbows, and haloes, a tornado, and of a thunderstorm in a radar picture.

The Meteorological Calendar 1990 has a considerably better outfit than the years before: The cover picture is protected by a clear foil, now, all pictures are synthetically varnished. It is DIN-A-3-sized (29 by 42 cm), has a spiral binding and a hard cardboard back. All pictures are printed in four colours. They are described in German and English on the reverse sides, partly by means of explanatory sketches. Moreover, the reverse sides contain many climatological data and contributions to the subject "Weather and Traffic" with tables and graphs.

The pictures are also obtainable as postcards, high-glazed, in sets of 15 cards, nicely packed.

***Price of the calendar**: DM 17,50.— plus wrapping (DM 1.—) plus postage. Ten calendars and more will cost DM 15.— each, free of any charge for postage and wrapping; for 20 ordered calendars one copy free of charge.*

***Price of the postcards**: DM 7.— for a set of 15 cards (plus postage if sent extra), ten sets and more will cost DM 6.— each; for 20 sets one set free of charge.*

Please send your order to the publishers:

Deutsche Meteorologische Gesellschaft
Zweigverein Berlin
c/o Inst. f. Meteorologie der
Freien Universität Berlin
Dietrich-Schäfer-Weg 6-10
D-1000 Berlin 41

Berlin, August 1989

Flying Boats

For seven years, from 1939 to 1946, the small town of Foynes on the Shannon Estuary was the centre of the aviation world, a European port for the flying boats crossing the North Atlantic. For much of the time its operations were cloaked in secrecy because of the exigencies of World War II. By the time the war was over, land plane technology had overtaken that of flying boats, and the flying boat facilities in Foynes were put to other uses or removed. Now that hidden chapter of aviation history has been revealed in the GPA Foynes Flying Boat Museum, opened this summer. *Anna Nolan* visited the museum, and watched the arrival of its prized exhibit, a Sunderland Flying Boat.

A scene at Foynes taken in the late 1930s showing the piggy-back combination used to launch a flying boat.

The museum tells the story of the first North Atlantic flights, as well as the details of the early flights into Foynes and the prominent passengers who passed through it. There is additional detail in a well-illustrated annual publication on sale in the museum.

The first aircraft to make the 2000 mile North Atlantic crossing was a flying boat flown by a member of the US Navy. It was a daunting task. Instrumentation as we know it today was non-existent, and the North Atlantic weather was treacherous and uncertain (no satellite forecasts then!).

A string of warships, 68 in all, were spaced at 50-mile intervals across the ocean, using their searchlights to show the way, and five battleships were deployed as weather stations. In May 1919, three flying boats set off: one arrived, via the Azores and Lisbon, at Plymouth in England.

Once the technological and psychological barriers were breached, the attempts came fast and furious. Alcock and Brown landed in a Co Galway bog 16 days later. Over the next few years, more and more heroic exploits hit the headlines, until gradually the idea of a commercial flying boat service across the North Atlantic took hold.

Airships preceded flying boats on the commercial route, with passengers crossing the North Atlantic in the height of luxury. In 1937, the destruction of the German airship *Hindenburg*, with loss of life, meant the end of this venture.

Meanwhile, the Irish government had conducted surveys during 1935 and 1936 to find the most suitable location for an airport and seaplane base. Even then it was realised that landplanes would eventually take over from flying boats on the North Atlantic route, and in any case, it was necessary to interconect the two services.

The histories of the present Shannon Airport and Foynes were bound together. The airport was to be located at Rineanna in Co Clare, with flying boats landing in a lagoon. The port of Foynes, ten miles down the estuary from Rineanna, and on the opposite side, was to be used until the new airport was ready.

At the time, Foynes had been in use as a port for nearly 100 years, and had a new pier and oil storage facilities. There was a railway nearby. No major changes were required to make it ready for flying boats, apart from the provision of weather forecasting and radiocommunication services.

The first flying boat landed at Foynes on February 25th 1937, when an Imperial Airways Cambria touched down. It had flown from Southampton. The next to arrive was the *Caledonia* on July 4th, en route to New York. It arrived safely in Port Botwood after a flying time of 15 hours 9 minutes. Meanwhile, a flight going the opposite way arrived in Foynes after a journey of 12 hours and 31 minutes. Then, as now, the prevailing winds meant it was quicker to fly from west to east than in the opposite direction.

This pair of flights was the start of a series of surveys which prepared the way for the first passenger flight. It didn't take long. The first passenger flight with invited guests (and several bags of mail, the first to arrive in Foynes from the US) arrived in Foynes on June 28th 1937, and the same plane, the Pan Am *Yankee Clipper*, brought the first scheduled passenger flight across the North Atlantic to Foynes on July 9th 1939.

The fare was US$375 single and US$675 return (equivalent to about US$4000 in today's terms), but passengers had luxuries such as fresh strawberries and cream for breakfast and a shoe polishing service.

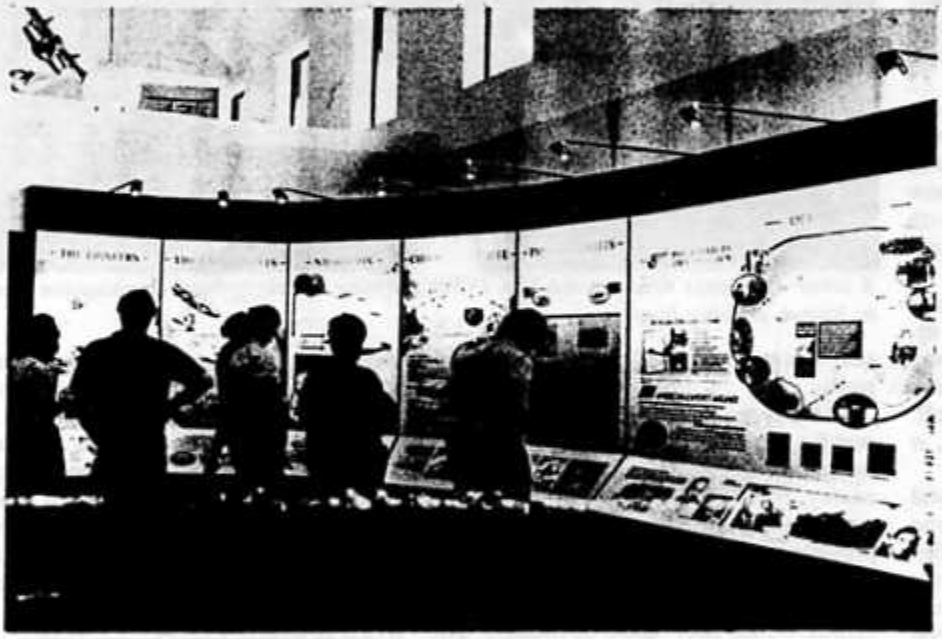
With the outbreak of war in September 1939, Pan Am announced the cancellation of all future services to Southampton, stating that the neutral port of Foynes would be the new terminal where the flights would turn round. As it turned out, circumstances changed and there were, in fact, no Pan Am flights to Foynes from October 1939 to May 1942.

In May 1942, the month of Pan Am's return, another US airline, American Export Airlines, began operating to Foynes. Its first flight was commanded by Captain Charles Blair, who was to have a long association with Foynes. His wife, film actress Maureen O'Hara, donated many of his personal memorabilia to the Foynes Museum, and officiated at the opening on July 8th this year, 50 years after the first commercial crossing.

During the war years, there was a news blackout on much of what was happening at Foynes, but highly placed politicians and military personnel used its facilities. The museum exhibits fascinating lists from some of the flights. Hostilities in Europe ended in September 1945, and the government priority on commercial air travel was lifted in October.

By this stage however, the days of the flying boat for North Atlantic travel were

Some of the radio equipment used to help pilots land safely at Foynes. All the radio, navigation and met equipment in the museum's radio room were used in the 1930s-40s.



A charted history of Foynes in the 1930s and '40s is part of the exhibition.

numbered. Because of the war, a number of air fields had been developed on both sides of the Atlantic and the landplane had been technologically advanced. Although flying boats continue to be used in niche applications such as links between islands, and for landing in remote places without airstrips, their days on the North Atlantic route came to an end.

So it was that the last BOAC, American Export and Pan Am flights all left Foynes in late October 1945. There were only four eastbound services in the remainder of that year, on the Baltimore — Bermuda — Foynes — Poole route. In March 1946, a BOAC Sunderland flew in from Poole to collect the remaining equipment and spare parts belonging to BOAC.

Aviation activity was now centred on the airport at Rineanna, which today is the thriving Shannon International airport. Various buildings were put to other uses, but the passenger terminal now houses phase one of the GPA Foynes Flying Boat Museum.

The Museum

The GPA Foynes Flying Boat Museum is compact, at 4,700 sq feet, but compresses a lot of history into a conveniently viewable space. One room shows the history of North Atlantic flight, and the history of Foynes itself, on panels well illustrated with reproductions of old photographs. A small cinema shows a short film covering the history, with some exciting contemporary footage. Film of the more daring technological experiments is shown, among these the Mayo composite and in-flight refuelling.

The Mayo composite, where a large plane took a smaller aircraft up piggy-back style, took off from Foynes in July 1938. The mother aircraft *Maia* carried the smaller *Mercury* well out to sea before they separated, the *Mercury* continued on to Montreal.

The *Mercury* set three records, according to the Foynes Annual. It was the first commercial Atlantic airmail flight, the first east/west crossing from Foynes to Montreal, and the fastest time for an east/west crossing of the Atlantic. This method of taking off was thought to be too alarming for passengers, however, and only mail could be carried. The British Air Ministry rejected the project in 1939.

The idea behind the composite was to save the large amounts of fuel used by an airplane in becoming airborne. In-flight refuelling was another method used in an attempt to solve the problem. British Imperial Airways (later called BOAC) tried it in 1939. Two flying boats, the *Cabot* and the *Caribou*, made eight round trips from Foynes to Newfoundland. They were refuelled in the air by a converted Harrow bomber that took off from the grass runway at Rineanna.

A rocket-propelled harpoon was used to shoot a cable from the tanker to the flying boat. The cable was attached to a hose, and the hose was locked into the fuel tank of the flying boat: gravity did the rest.

Radio communications were of the utmost importance for operations, and the radio room at the museum shows some of the radio, navigation and meteorological equipment used during the 1930s and '40s. Engines from a wrecked 1943 Sunderland aircraft are on display in the courtyard.

The glory of the museum will be the Short Brothers & Harland S-25 Sunderland G-BJHS, which flew into Foynes on the August bank holiday this year, to the delight of a huge crowd of on-lookers. Although this particular flying boat had not been used at Foynes, it is similar to some that were, and is said to be the last of its type of Sunderland still flying. At one stage it was owned by Captain Blair, who had such a strong association with Foynes.

Its maximum passenger loading is 44 people, wing span 112 feet, length 86 feet, draught 5 feet. It has four Pratt & Whitney 1830-90D radial engines. It is of a non-amphibian type, and a slipway is to be built to bring it on land for viewing.

Following its August bank holiday début, the flying boat had to return to England for some further work and, at the time of writing, had not yet returned. When it does, it will undoubtedly excite great interest.

The Sunderland is being made available to the museum through the sponsorship of Ryanair. The main sponsors for the museum are GPA and Shannon Development, and financial assistance has also been provided by Aer Lingus, Aer Rianta, Pan Am and a variety of other bodies and individuals. The existing 47,000 sq feet comprise phase one, and further expansion is planned.

Anna Nolan is a regular contributor to Technology Ireland.

Tornadoes in Ireland

In the September bulletin there was mention of damage sustained in Co Monaghan from violent, winds; these were associated with intense shower activity enhanced by the passage of trough-line which gave further uplift in an already unstable weather situation. A tornado is a relatively narrow vortex, from a few metres to a few hundred metres in diameter, with an intense vertical current at the centre capable of lifting heavy objects into the air.

Usually, there is a funnel cloud extending downwards from the base of a (parent) shower cloud. Their paths vary in length from a few hundred metres to some kilometres. The precise conditions which cause tornadoes to form, rather than merely thunderstorms, are not fully understood.

Local outbreaks occur in a range of showery situations and somewhat more widespread outbreaks may occasionally be associated with the passage of very active fronts or troughs. In Ireland tornadoes are not often reported and are never as devastating as in the central plains of the United States.

They are rarely observed in the period February to May but are reported mostly in the period June to November. In England tornado activity has been observed in December and January.

A well-documented case of damage occurred at Killeagh, Co. Cork on 8th August 1967. In an unstable southeasterly airflow, caused by a depression centred just to the southwest of the country, a tornado caused considerable damage as it moved northwestwards on a path which varied from about 80 to 300 metres wide.

Soil Moisture Deficit

Soil loses its moisture by evaporation or evapotranspiration as well as through percolation and drainage. The process of transpiration requires a transport of water through plants which offers resistance to flow. A soil is said to be at field capacity when it contains all the moisture it can freely hold against gravity. Clearly this quantity varies with the soil characteristics such as pore size and the hydraulic conductivity.

Excessive moisture may lead to a state of saturation or even water-logging but after a low rainfall period the soil will return again to its field capacity state. Further evaporation, or where there is a crop cover, evapotranspiration, leads to a Soil Moisture Deficit (SMD). If evapo-transpiration continues to exceed incoming rainfall or irrigation the SMD will increase, whereas if excess rainfall occurs the SMD may be reduced or eliminated.

SMD is usually expressed in terms of depth of water in the same manner as rainfall amounts. The amount of rainfall needed to replenish the SMD can easily be calculated whereas if irrigation is undertaken, the volume of water required is estimated considering the area, e.g. to reduce SMD by 25mm over a hectare of ground requires an application of 250,000 litres of water.

Tillage is best undertaken when the soil is dry - the existance of SMD makes for improved cultivation and good trafficability. While a moderate SMD in April is good for spring sowing conditions, a large SMD in April/May can lead to poor establishment and uneven emergence of crops. High SMD in June may not be unwelcome to those concerned with silage and hay making but excessively large soil moisture deficits in July and early August can inhibit the growth of many crops, especially the shallow rooted or bulking root crops, e.g. grass or potatoes. Again in August or September, a moderately large SMD leads to good harvesting conditions. See graph of 1989 values inside.

Proposed Lectures for 1990

1) Lecture in early January with Solar Energy Society on Wind Generating Systems in Irish Lighthouses.

2) Lecture in February on Aviation Meteorology.

3) March 23rd is W.M.O. day and has as it's theme " Natural Disaster Reduction - How can Meteorological and Hydrological Services help?".
The Society hopes to have a suitable lecture arranged to mark the occasion.

4) The Society's Annual General Meeting has been confirmed for April 28th at the Royal Marine Hotel , Dun Laoighre. The Annual 1-day meeting will take place on this day also.

5) We still plan to have the Annual Outing to Mace Head Field station but this is not yet confirmed.

Would members please note that subscriptions for 1990 fall due on Jan. 1st and cheques should be made payable to " Irish Meteorological Society".

Subscriptions should be forwarded to the Treasurer,
Irish Meteorological Society,
c/o Irish Meteorological Service,
Glasnevin Hill,
Dublin 9.

On behalf of the committee I would like to wish all our members a happy Christmas and a prosperous New Year.

A Kelly

Blowing Hot and Cold in the Med.

Meteorological phenomena have not proved to be a very fruitful area for car manufacturers when selecting names for new models. There are a few exceptions though – Volkswagen named their recently discontinued coupe after the **SCIROCCO**, the warm and sometimes humid wind that blows in the Mediterranean.
A more powerful version of this model was named the **SCIROCCO STORM**.

More notable in the usage of wind names has been ***MASERATI*** of Italy, who, in the sixties and seventies produced a number of sports cars and called them after winds prevalent in the Mediterranean area.

In 1964 they produced a 6-cylinder 4014cc 2-seater sports car, styled by Frua of Turin and called it the **MISTRAL**. The Mistral is more at home in the South of France blowing cold air through the Rhone Valley.

Two years later came the **GHIBLI** in the guise of a 4719cc dohc V8 which was designed by Ghia, with the ability to reach 60 mph from rest in just over 7 seconds. The Ghibli had been around for a long time before 1966 as the Arabic name for a hot, dry Southerly wind in Libya, occurring mainly in the Spring and Early Summer and bringing much hotter air from the interior to coastal areas.

The **BORA** is a dry, cold and gusty wind affecting the Adriatic coast and was the name given to the mid-engined 4719cc model penned by Giugiaro in 1971. With a reputed top speed of 168 mph and a 0-60 time of 6.0 seconds, it received anything but a cold reception from motoring critics, some classifying it as an all-time-great.

The last wind-named model from ***MASERATI*** was the **KHAMSIN** in 1974, a front-engined 4-seater coupe designed by La Carozzeria Bertone. It's 4930cc engine could blow it to 60 mph in around 5.6 seconds and on to a terminal speed approaching 170 mph.
Like the Ghibli, the Khamsin is an Arabic name for a hot, dry Southerly wind, and though the Khamsin can also blow from an Easterly direction they both result in significantly raised temperatures in coastal regions - and in drivers.

A. Kelly

Solar Radiation and Sunshine

The main points about the annual course of the sun in these latitudes are:

— In late June the sun rises north of east and sets some 17 hours later at a point in the northwestern sector of the observer's horizon circle. Its altitude at the maximum is about 60° and is achieved at solar noon.

— In late December the sun describes a smaller arc as it rises in the southeast and sets some 7 to 8 hours later in the southwest having a maximum altitude of less than 15°.

— On March 21st and September 23rd (termed the equinoxes because the sun rises due east and sets due west giving a solar day of 12 hours) the maximum altitude is about 37°.

The 1951 - 1980 sunshine averages show that:

— May has the highest average sunshine except at some stations near the south and southeast coasts where June is sunnier than May.

— December is month of least sunshine.

— Coastal areas are sunnier than neighbouring inland areas.

— Eastern and southern areas get more sun than northern and western regions, the southeast corner being the sunniest area in the country.

— Mountain areas have got less sunshine than nearby lowlands. The leeside or sheltered side of a mountain also has the advantage over the windward slope.

The long-term averages of radiation have a broadly similar pattern to the sunshine and in all months show a decrease from south to north. June has a higher long-term average than May although May has more sunshine— the mean daily radiation arriving at the top of the atmosphere is some 9% higher in June than in May and in the long run this more than compensates for the decrease in sunshine.

Because of the increased cloudiness in Ireland, diffuse and direct radiation account for some 60 per cent and 40 per cent respectively of global radiation. Inside there is a more detailed analysis of the connection between sunshine and solar radiation.

AURORA

This term (Latin for 'dawn') is applied to the phenomenon in which visible light is emitted by the high atmosphere.

In the 'auroral zones' of maximum frequency, some 20° from the geomagnetic poles, aurora is visible on almost every clear night; the northern auroral zone lies just north of Norway, south of Iceland and Greenland, over northern Canada and north of Siberia. The estimated mean annual frequency of nights of visible aurora, but for the intervention of cloud, twilight and moonlight, is about 150 in northern Scotland and about 10 in southern England; the corresponding frequencies of overhead displays are about 10 and 1, respectively. The terms 'aurora borealis' or 'northern lights' and 'aurora australis' or 'southern lights' apply, respectively, to the northern and southern hemispheres.

In Ireland, aurora is usually seen near the northern horizon as a 'glow', or as a quiet 'arc', a grey-white feature with relatively sharp lower border. In a great display, during which the aurora may extend so far equatorwards as to be visible in the tropics, other auroral forms appear, with much movement and colour, of which the most characteristic are yellow-green and red. Greenish 'rays' may cover most of the sky polewards of the magnetic zenith, ending in an arc which is usually folded and sometimes with red lower border, the display then resembling a moving 'drapery'. If the display passes overhead, the parallel rays moving along the lines of force appear, by perspective, to converge at the magnetic zenith, thus producing a 'corona'. The later stages of a great display are usually marked by 'flaming', in which light surges upwards from the horizon. The display ends with a polewards recession of the auroral forms, the rays often then degenerating into diffuse surfaces of white light. Numerous reports of audible aurora and of aurora reaching almost to the ground in great displays are generally discredited.

The distribution of aurora in time and space has been determined by visual observation and by simultaneous photography from a number of stations. More recently, 'all-sky' automatic cameras and radio-echo equipment have also been used. The observations have shown that aurora is most frequent (in places equatorwards of the auroral zone) towards midnight and near the equinoxes, that auroral processes occur also during the day, and that auroral light originates at heights varying between 70 and 1000km, with a marked peak frequency at about 100km.

Aurora, like geomagnetic disturbance with which it is very closely associated, is caused by the entry into the high atmosphere of a stream of charged solar particles which are deflected by the earth's permanent magnetic field and precipitate over limited regions of the atmosphere.

IRISH METEOROLOGICAL SOCIETY

Mr. Gerald Fleming

(Meteorological Service and R.T.E.)

will speak on

The Greenhouse Effect

in the Ussher Theatre, Trinity College Dublin
on Friday 8th December 1989
at 8.00pm

The lecture will address the topic of increased carbon dioxide levels in the atmosphere and the likely consequences. An explanation will be given of how increasing the concentration of certain gases can lead to the atmosphere warming up.
Various mathematical estimates of the temperature increases will be discussed, along with the uncertainties inherent in these calculations. The consequences for mankind of a substantial global warming will be touched upon.

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Irish Meteorological Society
c/o Meteorological Service, Glasnevin Hill, Dublin 9

The President, Dr. Aodhagan Roddy and the Committee of the Society request the pleasure of your company at a sherry reception being held in Trinity College Dublin on Friday 8th December 1989 and afterwards at the Society's final lecture in 1989 , by Mr. Gerry Fleming on 'The Greenhouse Effect'.

The reception will be held in the New Common Room, Trinity College, at 7.15pm and the lecture will be given in the Ussher Theatre, Trinity College, at 8.00 pm.

Dress Informal

R.S.V.P. : Dr. J. Hamilton 01-424411

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An invitation to the Sherry reception is enclosed with this newletter. You are invited to bring a guest as well as attending yourself.