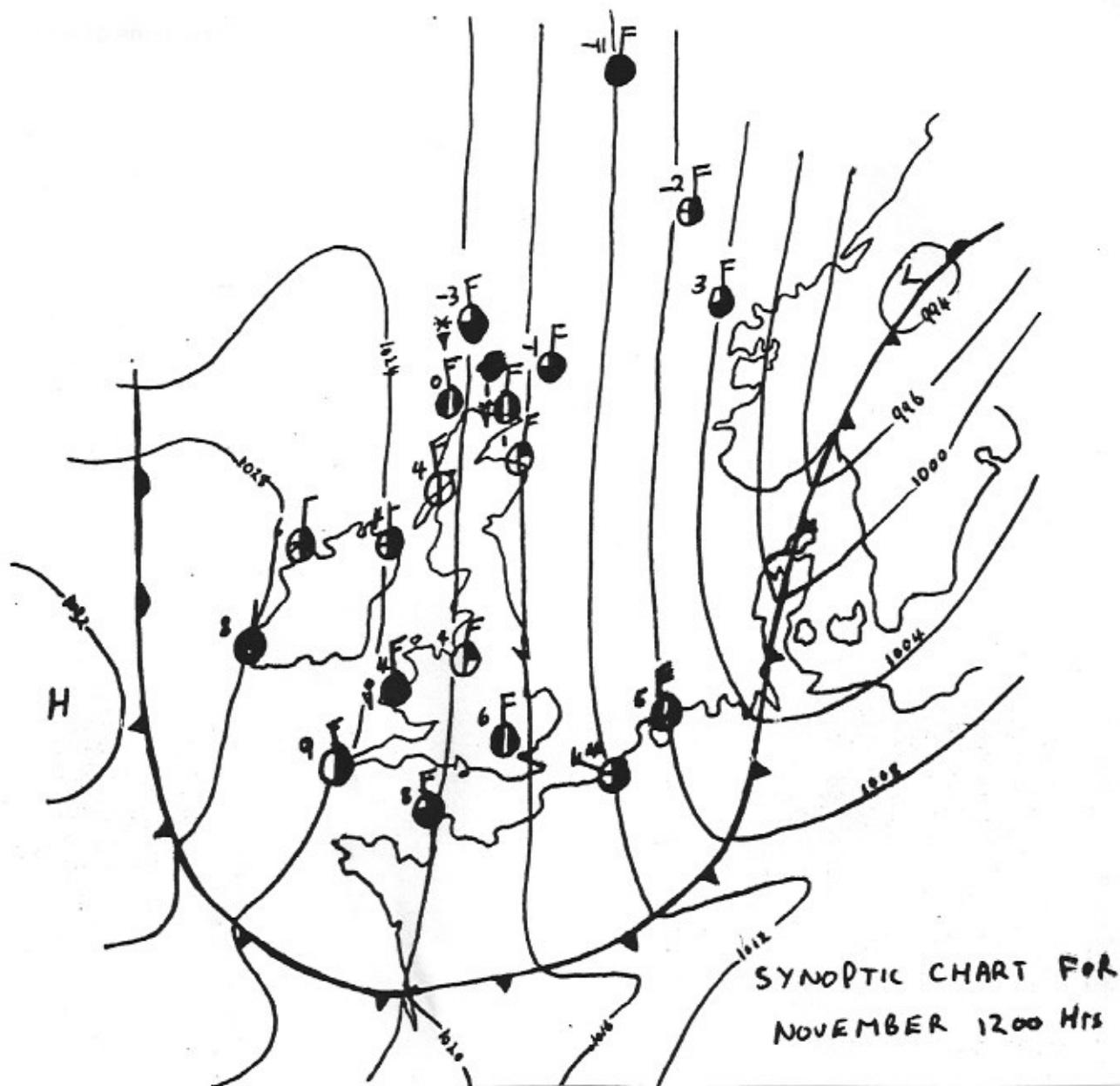


THE MARITIME ARCTIC AIR MASS



Maritime Arctic air mass

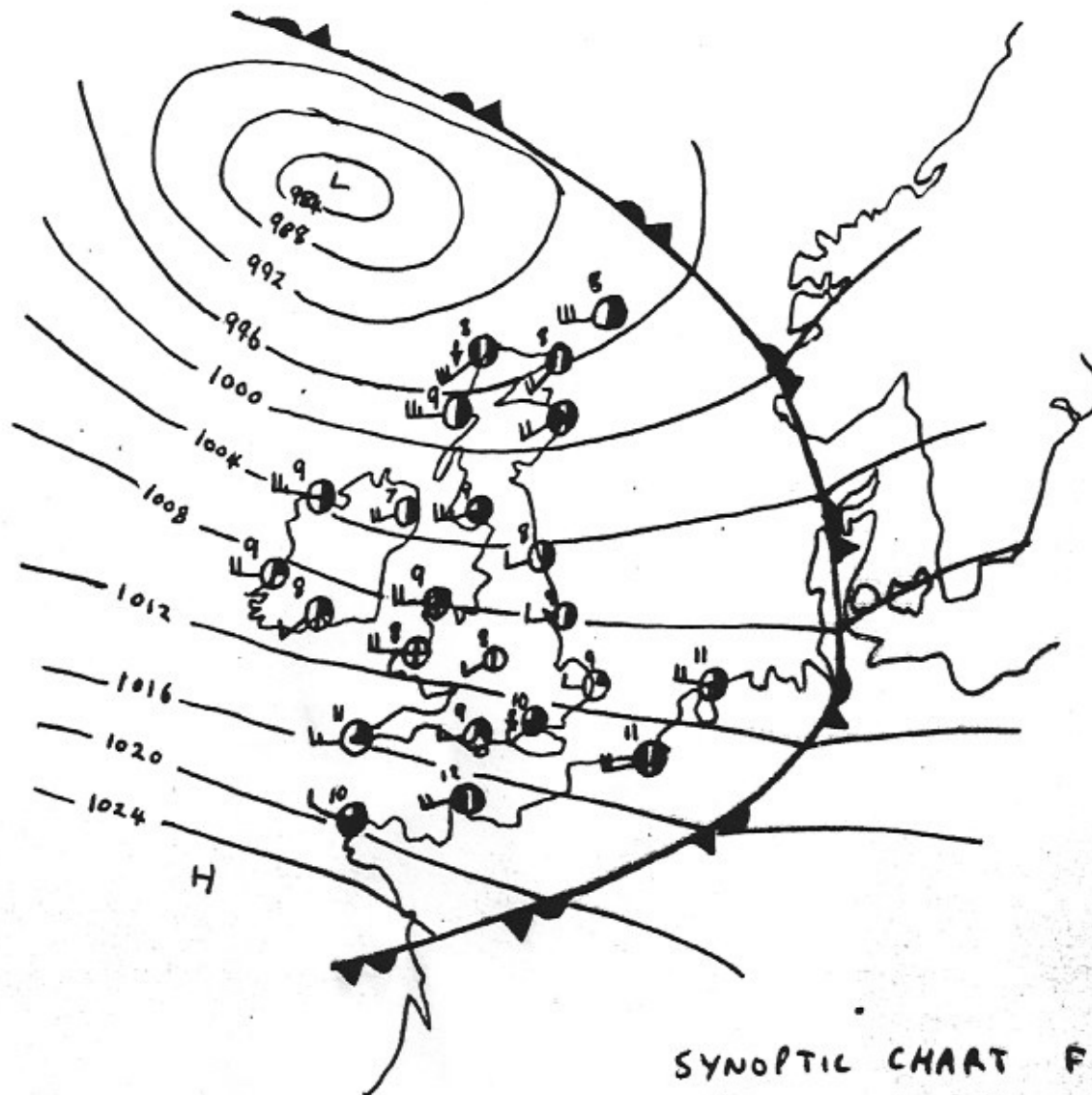
The synoptic chart shows a strong northerly airstream of the maritime Arctic (mA) air mass over the British Isles. The southernmost limit of this air mass is marked by the cold front that sits over northern France and the Benelux countries.

The isobars are squashed between a high pressure to the west over the Atlantic Ocean and a low over Scandinavia. This produces a steep pressure gradient and wind speeds of 15 to 20 knots in Scotland and a stronger 30 knots over northern Holland. Over the west of the British Isles where the pressure gradient is less wind speeds reduce to 5-10 knots.

This northerly airstream brings very cold air all the way from the Arctic basin and temperatures to the north of the chart are as low as -16°C . As the air mass moves south over warmer sea surfaces the temperature rises to -3 to 0°C over northern Scotland and 4 to 6°C over England and Wales, and even 9°C over the south west of England.

The surface warming of the air mass causes increasing instability that prompts the build up of cumulus and cumulonimbus cloud. This instability also produces showers of snow to the north of Scotland and rain showers in Wales. This is the typical weather associated with mA air, cold with scattered showers and sunny intervals.

THE MARITIME POLAR AIR MASS



SYNOPTIC CHART FOR
MAY 0600 Hrs.

Maritime Polar air mass

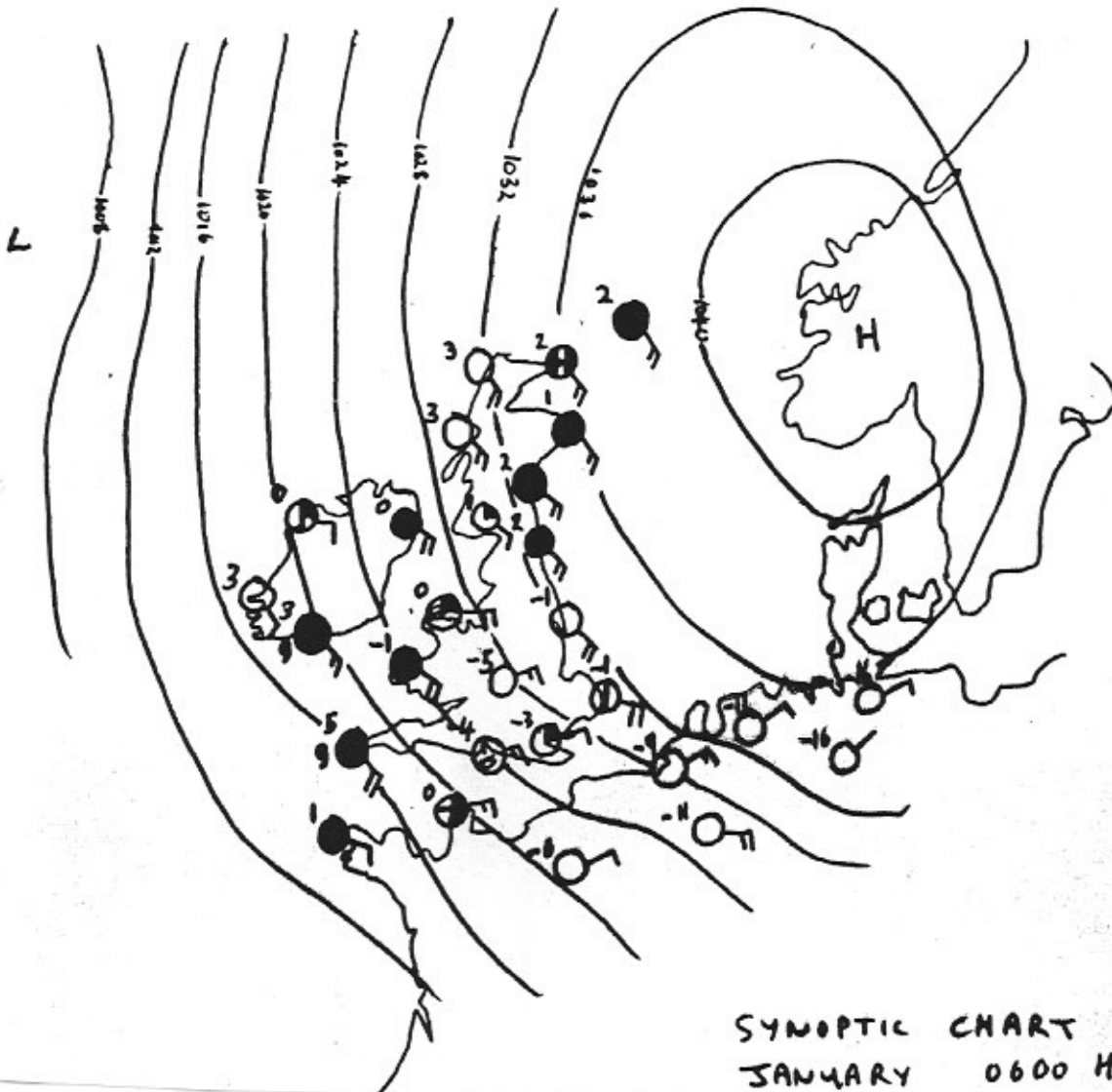
This westerly airstream brings one of the British Isles most common air masses and prevailing wind. This maritime Polar (mP) air approaches from the north west over the northern Atlantic Ocean to become a westerly airstream over the UK.

The airstream sits between a depression to the north of Scotland and an anticyclone over the Bay of Biscay. The eastern extend of the air mass is marked by an occluded front sitting over northern France, Denmark and the west of Norway.

This cool north westerly air mass is made milder by the increasingly warmer sea surfaces it crosses on its trek southwards and brings temperatures of 7 to 9 C in the north of the British Isles. A little further south over southern England, the north coast of France and the Benelux countries the temperatures reach an even milder 10 to 11 C.

Warming by the sea surface temperatures found around Britain accounts for these temperature differences. Passage over the ocean and warming by the sea surface also accounts for the high cloud cover over the British Isles, generally 6-8 Oktas. Most of this will be cumulus and cumulonimbus cloud forming in this increasingly unstable air mass, and there will be the possibility of rain showers as seen over the north west of Scotland.

THE CONTINENTAL POLAR AIR MASS



Continental Polar air mass

The synoptic chart shows an anticyclone situated over southern Scandinavia which is feeding in a very cold continental Polar (cP) air mass from the frigid winter interior of the continent to produce a south easterly airstream over the British Isles.

In northern Germany the temperatures are as low as -16 C , but as the air tracks westward over warmer and warmer surfaces, particularly sea surfaces, the temperatures rise to 2 or 3 C over Scotland.

The chart shows the influence of the so called short and long sea routes for this cP air mass. In the south of England the air crosses very little warmer sea area and temperatures only rise from -9 C on the continent to -3 to -4 C in southern England.

In Scotland, however, where this airstream has crossed a larger expanse of the relatively warm North Sea, temperatures have risen to $+2$ to $+3\text{ C}$. One of the rare circumstances when the north of Scotland can be warmer than the south of England.

In central England temperatures have fallen to -5 C . This is due to the air crossing the cold land (land masses cool down faster than sea surfaces) to reach this interior position, and the clear skies which have allowed the ground to lose heat overnight by long wave radiation.

The cloud amounts and weather are also influenced by the route taken by the air. Southern England has $0-2$ Oktas of cloud cover, whereas the east coast of Scotland has 8 Oktas since the air has picked up more moisture from the North Sea during its longer sea route. The increasing instability of the air caused by the low level warming by the relatively mild North Sea has caused cumulus cloud development and the chance of sleet or snow showers. The west of Scotland has very low cloud amounts as cooling of the lower air layers by the cold land surface increases stability.