

A remarkable high altitude flight over the Cologne-Bonn Area

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On Sunday the 16th May 1954 a Condor IV glider conducted a flight in the Cologne-Bonn area. It reached a height of about 4,000 m (12,000 ft) in a nearly cloudless airmass.

According to the pilot, Mr. E. Loh, there was only a moderate uplift in the lowest layers, intensifying, however, with increasing height, becoming specially strong between 3,000 and 4,000 m (9,000–12,000 ft). In this height the variometer showed a constant rise of 4 m/sec for more than an hour.

Take off was at 12.00 GMT from Bonn-Hangelar Airport, landing at about 14.00 GMT on the same airfield.

The flight and the pilot's report attracted a great deal of attention in German gliding circles; for flights to this height in clear air thermal conditions have been rather rare within Germany.

From the meteorological point of view I found it rather interesting to analyse the weather situation of the 16th May, especially the upper air conditions, firstly to see whether, and how far the pilot's observations could be confirmed by the upper air ascents and secondly to take some advantage of this flight for future meteorological forecasts for glider

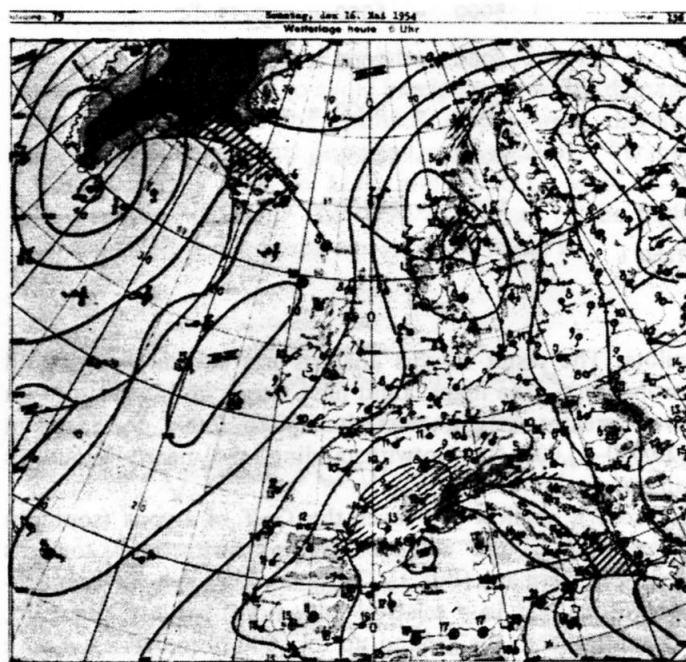


Fig. 1

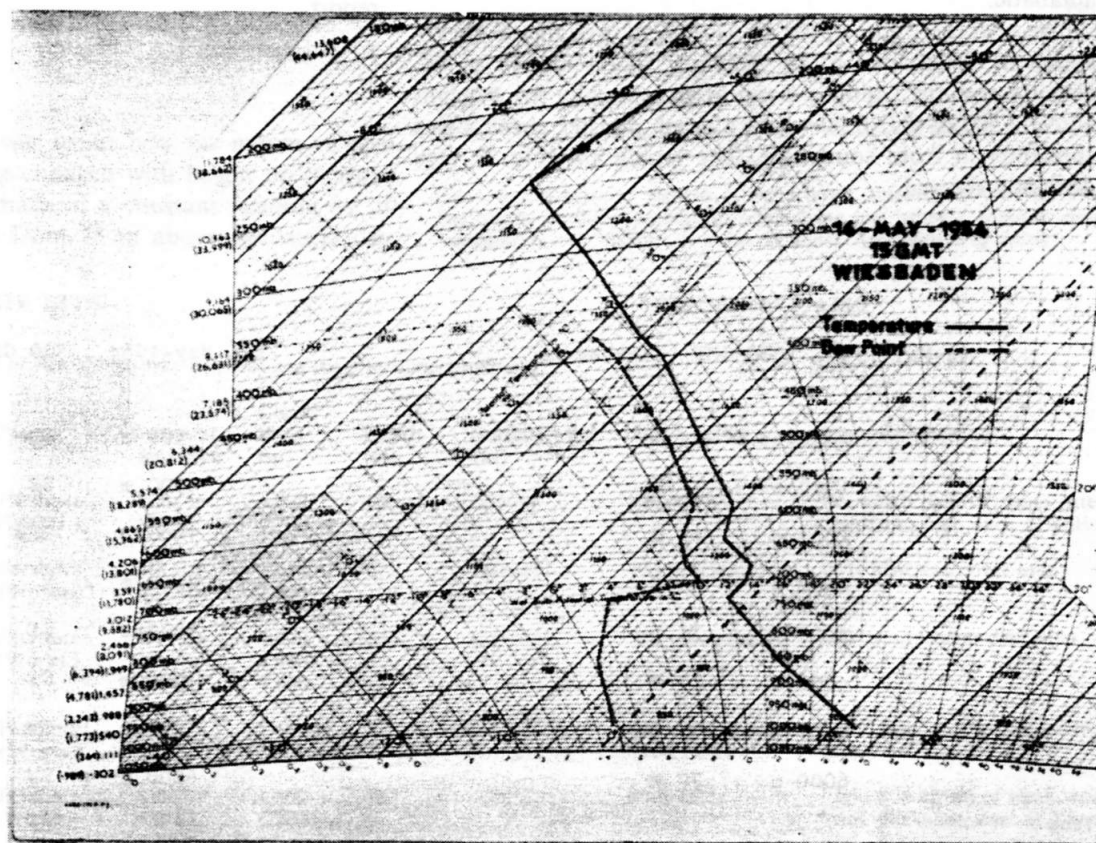


Fig. 2

TEMPERATURE LAPSE-RATE

16-May-1954, 1500 GMT (Wiesbaden)

Surface	-	1400 m	:	1,03 °C
1400	-	2700 m	:	0,86 °C
2700	-	3300 m	:	0,17 °C
3300	-	3800 m	:	1,00 °C
3800	-	5000 m	:	0,56 °C
5000	-	6000 m	:	0,77 °C
6000	-	7000 m	:	0,72 °C
7000	-	8000 m	:	0,90 °C
8000	-	9000 m	:	0,85 °C
9000	-	10000 m	:	0,85 °C

Table 1

pilots. The result of this analysis has shown that—in all probability—the flight could have been continued up to on even greater height, possibly up to 7,000 to 8,000 m (20,000–25,000 ft), notwithstanding the nearly cloudless airmass.

From a shallow low over the Gulf of Lyons (southern France) a trough extended across Switzerland towards southern Germany (Fig. 1). On its northern side the Cologne-Bonn area was in a relatively dry north-easterly airstream, extending from the ground up to 2,000 m (6,000 ft). Above this height considerably moister air was spreading in from the south (see Tables 2 and 3). The airmass in the lower layers was so dry that no or only very small amounts of flat cumulus could develop, although the lapse rate was super-adiabatic.

The analysis of the upper air ascents showed the 15-GMT-ascent of Wiesbaden to be the most representative of the airmass over the Cologne-Bonn area, especially for a height above 2,500 m (8,000 ft) where a much moister airmass was spreading in from south-east. The tephigram (Fig. 2) very distinctly showed

1. The super-heating in the lower layers.
2. The sudden increase of moisture above 730 MB = 2,700 m (9,000 ft), shown by the curve of the dew point.
3. The very unstable layer between 675 and 635 MB, about between 3,350 and 4,000 m (11,000–13,000 ft).

In my opinion the latter is the layer in which the pilot must have observed the strongest uplift. The rather stable layer between 730 and 675 MB (9,000 and 11,000 ft) is remarkable, as no uplift is to be expected at all. Either the uplift in the lowest layers must have been sufficiently strong as to have pushed the glider through this stable layer or, at the time of the flight (deviating from the 1500 hrs upper air ascent) the airmass was unstable throughout.

The fact that the flight could have probably been continued up to more than 7,000 m (22,000 ft) has been largely verified by the curves of temperature and dew point (Fig. 2) and the calculated lapse rate (see Table 1). In the heights above 580 MB = 4,000 m (13,000 ft) the airmass is unstable throughout and an uplift up to above 380 MB, about 7,500 m (25,000 ft) is quite possible.

It may be asked, to what height is soaring possible in a cloudless airmass? The question can perhaps be answered, that in theory soaring can take place up to the tropopause. This must be a natural limit, as above this height, there is no convection. In practice, however, it appears to be somewhat different.

Firstly: weather conditions with such an unstable structure of the atmosphere and without formation of any convection clouds are very rare, and secondly: unstable layers only prevail for a short period.

A large amount of luck seems necessary to soar up to a height of 8,000 or 10,000 m (about 25,000 to 33,000 ft) in a clear sky. However it is not impossible, as shown in this report.

(Swiss Aero-Revue 7.1966)

RELATIVE HUMIDITY

16-May-1954, 1500 GMT (Wiesbaden)

Surface	:	23 %
1000 m	:	27 %
2000 m	:	23 %
2500 m	:	40 %
3000 m	:	75 %
4000 m	:	77 %
5000 m	:	75 %
6000 m	:	79 %

Table 2

UPPER WINDS

16-May-1954, 1500 GMT (Wiesbaden)

500 m	:	NE	8-10 m/sec
1000 m	:	NE	6- 8 m/sec
1500 m	:	ENE	6- 8 m/sec
2000 m	:	E	6- 8 m/sec
3000 m	:	SE	4- 6 m/sec
4000 m	:	SE	4- 6 m/sec
5000 m	:	SW	2- 4 m/sec
6000 m	:	SW	2- 4 m/sec

Table 3