hood of the site. The galactic latitude of the object is $b^{II} \approx -20°$, so it is consistent with the argument that a supernova remnant at high galactic latitude does not become (or cannot last) as a strong radio source.

(3) The event of AD 437: The star was visible during daylight before 3 p.m. It was orange-red in colour and was the size of an orange. The radio source *IC* 443 was considered by Shklovsky and Shajn as the remnant of a nova of AD 837, but it is also within the error circle of the event of AD 437.

(4) The event of AD 902: "The star was as big as a peach", that is, an area source of light. It was visible for more than 1 yr. Pskovskii[10] has given a detailed discussion of this object and proposed nebula *CTA*-1 as the supernova's radio remnant.

Finally, the distance to Vela *X* is about 500 pc, suggesting a brightness of $m_v < -8$ at explosion, but no suspicious event near the location of the radio source was recorded in Chinese history dating back to 206 BC (the beginning of Han dynasty), and with less certainty to 1000 BC. (According to Needham[11] the oldest Chinese record of a nova was inscribed on an oracle-bone, dating from about −1300.) The age of the remnant is therefore most likely older than the five events considered here. The period of the pulsar associated with it is 0·0892 s. This may be an indication of the expected period of historical pulsars.

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Concentration of CO_2 in the Upper Troposphere and Lower Stratosphere

During a number of flights of commercial aircraft over the polar route from Frankfurt/Main to Tokyo via Copenhagen the concentration of CO_2 in the atmosphere was continuously recorded using a non-dispersive infrared gas analyser. The flights took place between April 1967 and February 1968. The recorded concentration of CO_2 from all flights shows a remarkable change when the aircraft enters and leaves the stratosphere. A quite sudden change of about 3–5 p.p.m. CO_2 is usually observed at the transition from tropospheric into stratospheric air and vice versa. The striking difference between the CO_2 content of the upper troposphere and the stratosphere was clear enough on the record for the crew of the aircraft to use our CO_2 analyser as an indicator of the position of the aircraft relative to the tropopause. Fig. 1 shows the record obtained during the flight from Tokyo to Copenhagen on May 29–30, 1967, together with the position of the aircraft and the tropopause. Sections of the flight within the stratosphere are marked. They clearly show a drop of the CO_2 content in the stratosphere. The sudden peak at 70° N 145° W during the flight through the stratosphere may be explained by influx of tropospheric air into the stratosphere. The relative accuracy of our measurements is about ±0·3 p.p.m. CO_2, which gives confidence in the reality of the observed fluctuations. The accuracy of the absolute values of the CO_2 concentration amounts to ±1·5 p.p.m. due to difficulty in calibrating the reference gases. The marked decrease of the CO_2 concentration in the lower stratosphere compared with the upper troposphere suggests that, contrary to previous practice, it is wrong to assume a constant mixing ratio of CO_2 in the troposphere and stratosphere. Exact knowledge of the CO_2 concentration with altitude is needed for many calculations of the radiation budget of the atmosphere.

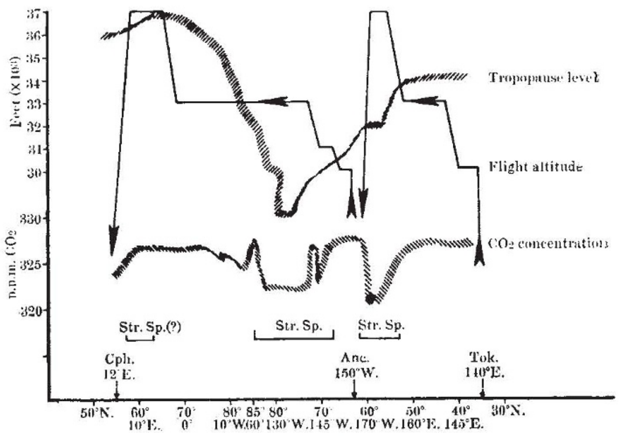

Fig. 1. Transpolar flight Tokyo–Frankfurt, May 29–30, 1967.

Even considering the annual increase in the global CO_2 concentration of 0·7 to 1 p.p.m., our values seem rather high compared with discontinuous CO_2 analyses of air samples from the upper troposphere and lower stratosphere by Bischof and Bolin[1]. Agreement is better with the results of a balloon flight by Steinberg and Rohrbough[2], who collected two air samples at an altitude of 21 km having concentrations of CO_2 of 323 p.p.m. and 338 p.p.m. These authors used an adsorption method giving an accuracy in the CO_2 values of only ±5 per cent. Further support of our findings comes from some recent (and as yet unpublished) results of Murcray (private communication by F. Möller) which show a rather sharp drop of the CO_2 concentration between 15 and 20 km. More flights with continuous records of the concentration of CO_2 are required to investigate the difference between the CO_2 content of the upper troposphere and lower stratosphere in more detail and in relation to seasonal variations of tropospheric CO_2. Nevertheless the results of the six transpolar flights carried out up to now may have further implications on many theoretical studies of the radiation and heat budget.

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