

A NEW MAMMOTH-FIND FROM NORWAY AND A DETERMINATION OF THE AGE OF THE TUSK FROM TOTEN BY MEANS OF C₁₄

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In June 1964 a fragment of a mammoth-tusk was found in Gudbrandsdalen, Norway. The tusk was discovered by Mr. T. Öygarden in a large gravel pit south of the river Lågen, about 2–3 km west of Kvam railway station. The gravel pit, used by the local road authorities, lies beside the local road south of the river Lågen and is about 100–150 m long, 30–40 m deep and 15–20 m broad. It consists of distinctly stratified deposits; coarse gravel containing comparatively large stones alternates with thinner layers of fine, stratified sand. Three extensive layers of gravel and two sand layers can be seen in the pit (Fig. 1). The sediments were probably deposited in postglacial times in lakes situated between the remnants of the dead glaciers at the bottom of the valley and the more or less steep valley-sides. The tusk lay close to the bottom of the second, especially extensive gravel layer beside some large stones.

The new find is the largest fragment hitherto known from Norway. It measures 112 cm along the convex and 92 cm along the concave side. The cross-section in the thickest part is 8 × 6 cm and the maximum circumference is about 26 cm. The tusk is broken at both ends, but parts of the pulpa-cavity (about 7 cm deep) is still preserved. The tusk is only moderately worn and does not show distinct scratches or damage, indicating that it has been transported a comparatively short distance.

As mentioned, the tusk is broken at both ends and was originally considerably longer. Compared with the tusk from Siberia in the pos-



The gravel pit near Kvam where the mammoth-tusk was found. * – the place where the tusk lay. Photo: Bergdölmo.

session of the Paleontological Museum, it may be calculated that in an unbroken condition it must have measured about 150–180 cm. As the tusk is not especially strongly curved, it probably belonged to a full-grown female. The tusk from Kvam is the twelfth mammoth-fragment discovered in Norway (HEINTZ 1955, 56, 62). In 1961 a large molar from a full-grown mammoth was also found in Kvam, on the same side of the river and not far from the present locality. It is probable that it lay in deposits corresponding to those where the last tusk was discovered.

Through the courtesy of Det Rådgivende Utvalg for Radiologisk Datering, the Paleontological Museum in Oslo has been able to have the age of one of the Norwegian mammoth-teeth determined by means of C_{14} . The tusk from Toten (HEINTZ 1956) was chosen and 30 g of the inner part of the tusk used for the determination, which was carried out in 1962.

The following is an extract from a letter to me of 15 December 1962 from Laboratoriet for Radioaktiv Datering in Trondheim:

'The determination is based on tooth proteins only, and the result reached is $19,000 \pm 1,200$ years before our time (1950). It is possible that the dating of the carbonate in the tooth will give another result. If organic acids have penetrated the tooth while it lay in the earth, they may have contaminated the proteins, thus giving too high a C_{14} activity. We cannot, however, say anything about the degree of contamination, without making a determination based on carbonates in the tooth.' (Translated.)

As the Toten-tusk did not lie deep in the ground close to the level of the ground water, it is very probable that it was contaminated by humus acids.

In order to undertake a determination of the age of the tooth, based on carbonates, at least 250 g of tooth-substance are required. All the previously discovered mammoth-fragments from Norway are, however, comparatively small, and would be more or less completely destroyed if such a large part of their substance were to be removed. Owing to this, no attempt to make a control-determination on carbonates has hitherto been undertaken. Now, however, there will be no difficulty in removing 250 g from the tusk from Kvam, the weight of which is about 9 kg.

About 20,000 years before our time is in fact the most improbable age for Norwegian mammoths. As is well known, the Würm glaciation was at its highest at this time. The whole of Norway was covered by a mighty sheet of ice and no terrestrial animals could live there.

The age of 20,000 years must therefore be regarded as a *minimum* indicating that the Norwegian mammoths at least *cannot be younger* than 20,000 years. The determination of the age of Siberian mammoths undertaken in Trondheim (HEINTZ and GARRUTT 1964, 1965) shows that the oldest Siberian mammoth was more than 40,000 years old, the youngest about 12,000. The age of 20,000 years for Norwegian

animals in any case shows that the mammoth did not inhabit Norway in postglacial times, as assumed by ÖYEN (1913, 1916).

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