PLEISTOCENE FOSSIL HUMAN FOOTPRINTS IN TURKEY

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INTRODUCTION

The field work carried out by the Mineral Research and Exploration Institute of Turkey, in 1969, has resulted in an important discovery which will help to enlighten the history of mankind. This finding is the Fossil Human Footprints discovered in the Middle Pleistocene formations in Western Turkey.

These footprints, which are the fourth discovery in the long biological and geological history of the mankind, are the first somatic traces of fossil men who lived during the Middle Pleistocene. The footprints, therefore, are to be considered as very important and, in the opinion of the author, their scientific value is exceptional.

Mineral Research and Exploration Institute devotes most of its fundamental scientific studies to the solution of geological and paleobiological problems of Turkey and in the evolution of human form this new contribution to the Group of Primates is to be appreciated on behalf of the science as one of the most important finds.

This preliminary paper deals with the study of the above-mentioned footprints of Fossil Human Beings in Turkey.

Locality

Mr. M. Çelik, Prospector of the M.T.A. Institute, has found in 1969 some human fossil footprints on the surface of the middle tuff level of the basaltic zone, on the western flank of Çakallar Hill, west of the Manisa-Salihli-Demirköprü Dam (Pl. III, photo 5).

GEOLOGY

Çakallar Hill, which rises on a gneiss base, is actually a volcanic cone. The origin of this cone is basaltic lavas and it has tuffaceous intercalations (a zone where the footprints in question are encountered).

The following are the main volcanic levels encountered at the Çakallar Cone (from bottom upward):

1. Black basaltic scoria (local)
2. Black basaltic lava (local)
3. Rust-colored basaltic scoria (local).

Photo 1 - Eastern view of the Çakallar Hill.

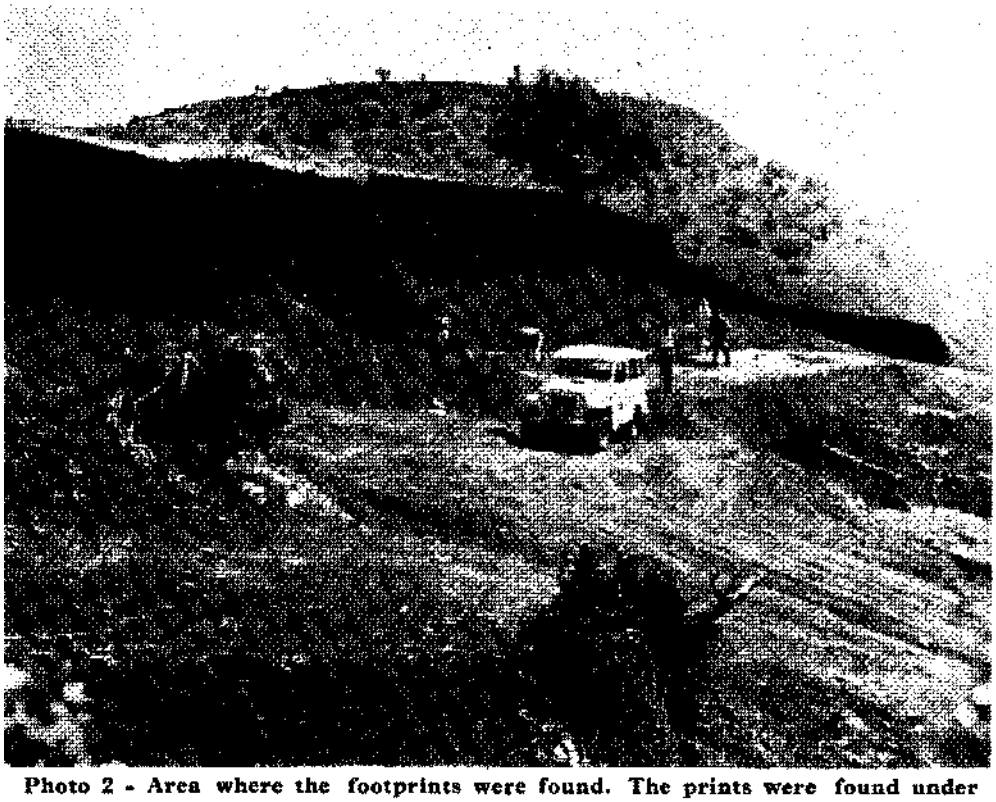

Photo 2 - Area where the footprints were found. The prints were found under the upper scoria (fifth zone) representing the western slope of Çakallar Hill. The photograph was taken after the excavations.

Photo 3 - A view of the tuff level containing the footprints (foreground) and the basaltic scoria cover (fifth zone) overlying the footprints (background).

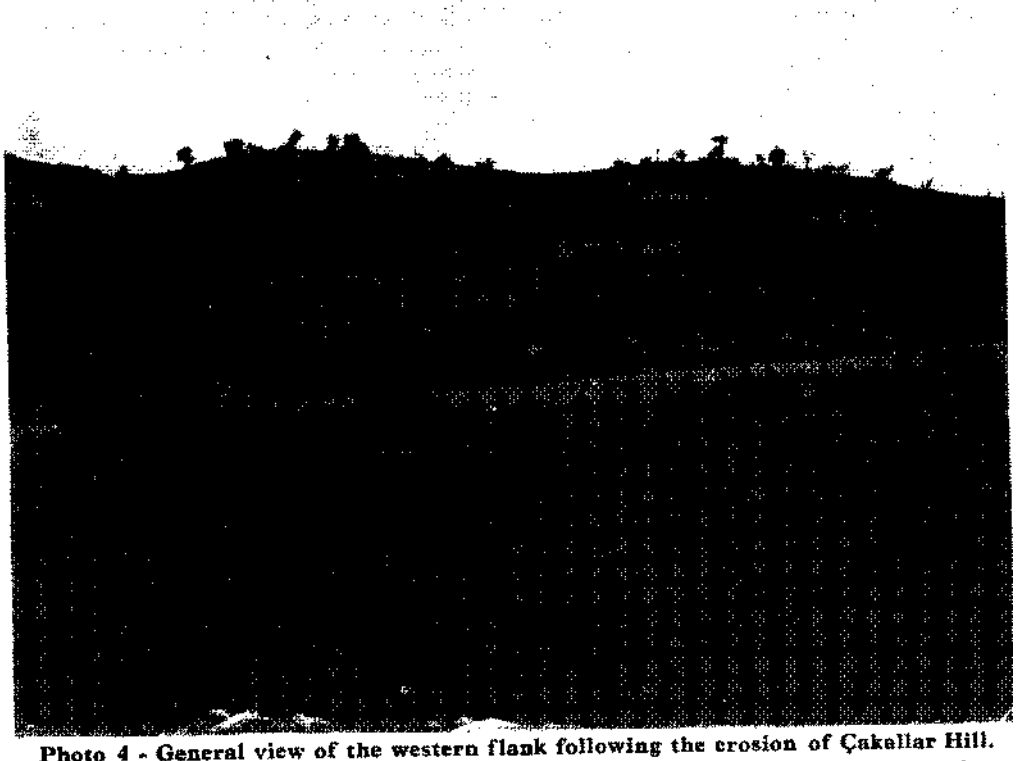

Photo 4 - General view of the western flank following the erosion of Çakallar Hill. Observe gneiss base behind the track, footprints-bearing tuff level outcropping on a level with and over the base and the vegetation cover in the scoria.

4. Dark-yellow tuff, ranging in thickness between 10-50 cm. (According to Dr. G. Elgin's determination, this zone has lithic tuff structure. The footprints are found on the surface area of this level.) (PL II, photos 3, 4).
5. Black-colored basaltic scoria, relatively coarse-grained in the internal structure of the cone, and fine-grained on its slopes.
6. Rusty-colored basaltic scoria. (This zone has the characteristics of the third zone.)
7. Coarse-grained, black basaltic scoria. (This part represents the last flow zone of the cone.) (Pl. I, photos 1, 2).

The thickness of Çakallar Cone

The thickness of Çakallar Cone from the gneiss base upward is 130 meters.

The thickness of the basaltic mantle overlying the tuff zone, at the cone structure, where the footprints have been discovered, is approximately 110 meters.

History of the formation of Çakallar Cone (Fig. 1)

1. According to writers (Hamilton *in* Philippson, 1913; Pamir, 1960), who previously studied this volcanic region, Çakıllar Cone is situated in a region overlain by a thick vegetation cover, which suggests that this formation can be considered as belonging to the second period of the Pleistocene volcanism. Therefore, it may be concluded that these fossil footprints belong to the late stages of Pleistocene, and this phase is of the second volcanism period of Pleistocene.

2. It may be suggested that Çakallar Cone was exposed during the first post-Pluvial (Günz glaciation) and the terminal phase of the second pluvial (Mindel glaciation), which reveal the early formation periods of Gediz Valley. This may be proved by the following observations.

In fact, the Günz parallel, in the vicinity of the Demirköprü Dam, the first Pluvial period, is represented by a terrace system 110 meters above the Gediz bed and structurally containing no basaltic material (Figs. 1 and 2). Therefore, taking into consideration the height of this terrace, as compared to the valley situated below, and the absence of basalt in its lithologic structure, it may be suggested that this cone and the surrounding volcanic area did not yet exist during the end of Lower Pleistocene.

However, rare basaltic lava gravels, corresponding to the early development of the Çakallar Cone, are found in the terminal level of the old Gediz terrace, situated some 60 meters higher above the Gediz Valley system and representing the second Pluvial period (Mindel glaciation parallel), while immediately below this terminal zone the fourth tuff level of the cone is exposed below the terminal zone. Dr. G. Elgin, who studied, the samples of tuff and gravels collected from this cone and terrace, has been able to establish this parallelism .(Pl. IV, photos 6, 7).

It may be concluded that the lithic tuff zone, bearing the fossil footprints on the surface area, is contemporary with the termination of the second Pluvial period.

As the result of the preliminary studies carried out at the Gediz Valley system, it has been observed that the terrace gravels, formed some 30 meters higher than the present level of the valley, contain abundant basaltic material.

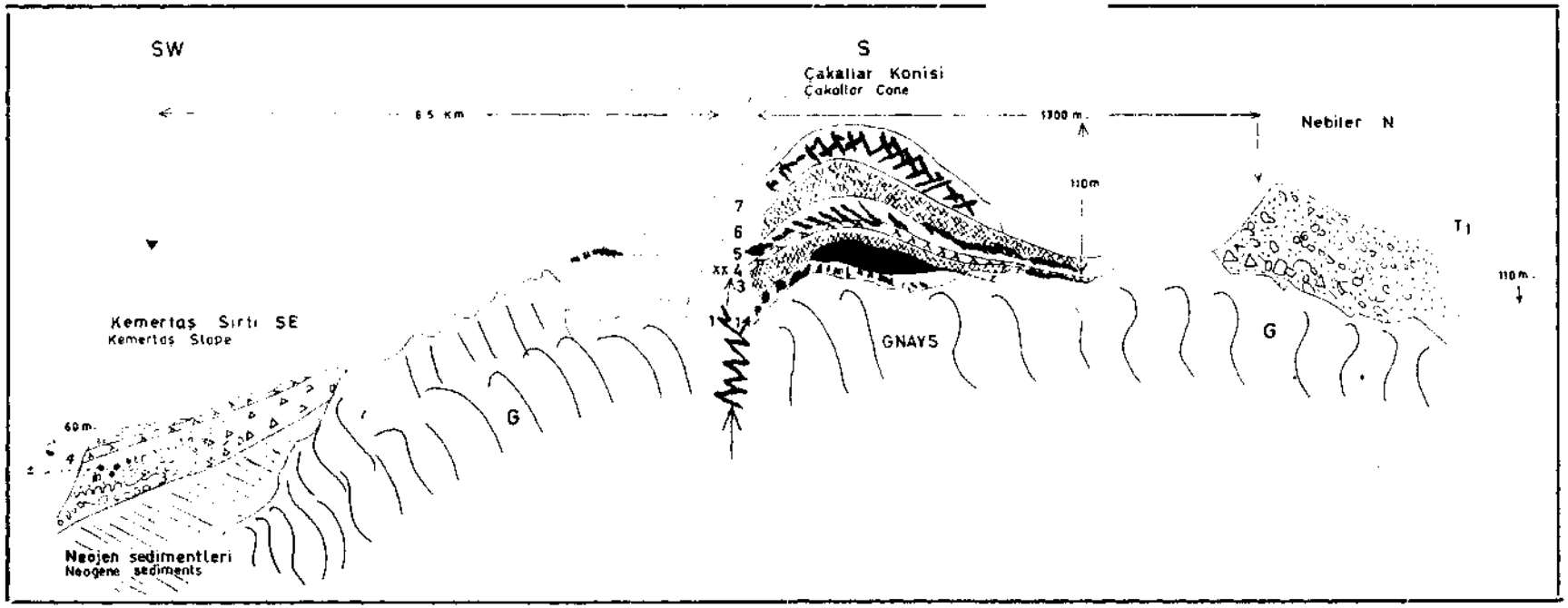

Fig. 1 - Seven-stage volcanism and its surroundings at the Çakallar Cone. The lithological and geochronological relationship with the terrace systems.

G - Gneiss basis, 1 - I. Black basaltic lava, absolutely local; 2 - II. Massive black basaltic lava absolutely local; 3 - III. Rust-colored basaltic lava, absolutely local; 4 - Basaltic tuff zone where fossil man traces were found; 5 - V. Extensive, black basaltic scoria, found with fine-grained constituents; 6 - VI. Rust-colored basaltic scoria, found rather locally; 7 - VII. Black-colored, upper basaltic scoria containing also coarse-grained constituens; XX4 - Prints-bearing tuff level; T_1 - 1. Pluvial period (Günz); T_2 - *II. Pluvial period* (Mindel).

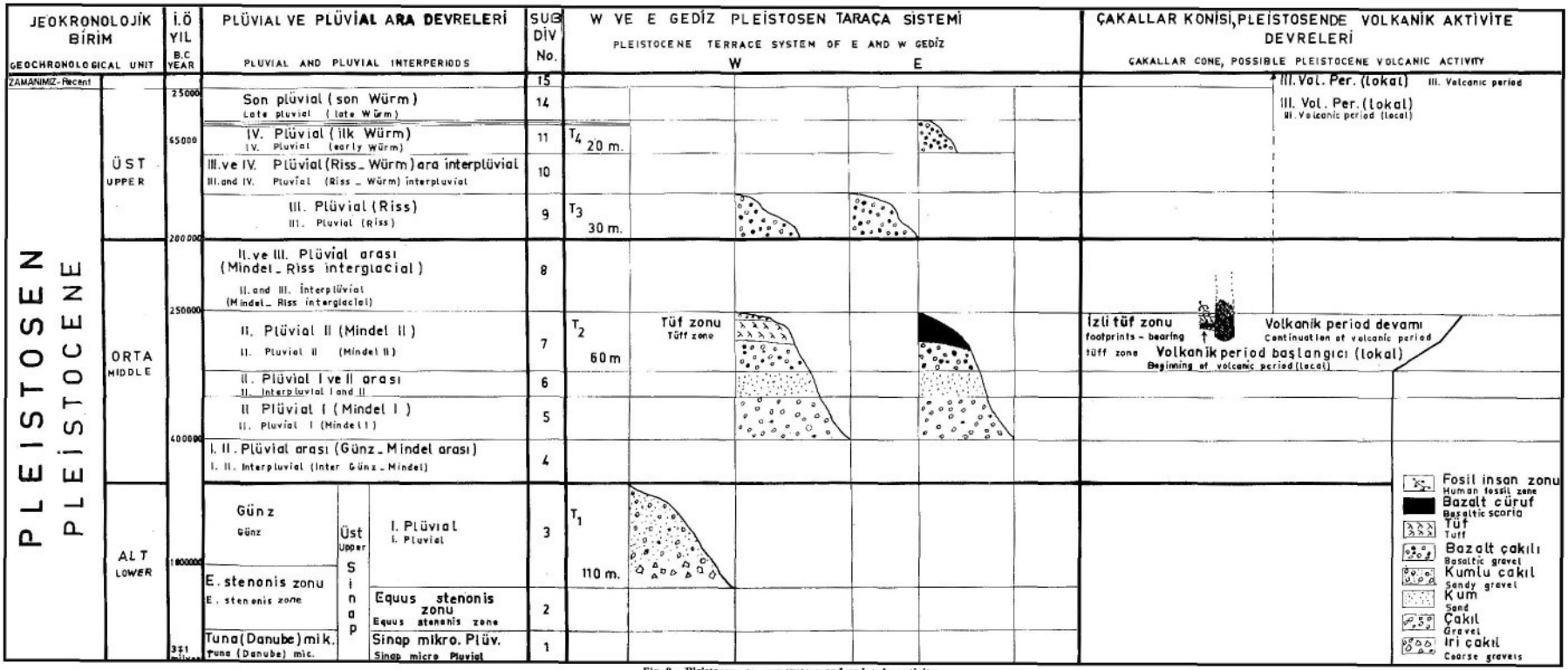

Fig. 2 - Pleistocene terrace system and volcanic activity.

There must be a close relationship between the basaltic material and the volcanic activity which shows an increased development and is of post-tuff zone of Çakallar Cone.

In conclusion, it may be assumed that in view of the characteristic height of the terrace (30 meters) it is contemporary with the third Pluvial period (Riss glaciation).

The geological age of Çakallar Cone, therefore, starts during the end of Middle Pleistocene and terminates before the third Pluvial terrace period, formed on the parallel of the Riss glaciation, which characterizes the Upper Pleistocene.

According to the absolute geochronological dating, this period occurred between 500,000 to 200,000 years ago.

Age of formation of the footprints

These footprints are found on a soft, relatively cold and wet tuff base. Around the cone, this tuff zone which follows the relief of the gneiss base surface, belongs to the end of the second Pluvial period as mentioned above. In other words, the transition period between the second and third Pluvial periods has not yet commenced. The estimated starting date for this period goes back to 250,000 years from the present era. No erosion surface is encountered between the overlying black basaltic scoria zone (fifth basaltic level) and the above-mentioned soft, wet tuff zone which bears the human footprints. Only a short period of volcanic inactivity can be considered for the area under discussion.

In fact, a second terrace level, 60 meters further to the east, in the bed of the valley, and focated on the tuff zone parallel, is overlain concordantly by a basaltic scoria body. It is, therefore, accepted that the footprints-bearing level belongs to the the termination period of the second Pluvial period. This era dates back to a little less than 250,000 years, but not any later than that.

ANTHROPOLOGY

Somatic characteristics of the footprints

Erectus bipedalism characteristics (erect, bypedally walking living beings) are certainly present in the footprints found on Çakallar Hill. It is observed that the big toe is wide apart from the following toe; i. e. there is a diastem between them (primitive characteristic). The presence of equally noticeable diastems is also observed between the second, third and fourth toes (primitive characteristics). It is also observed that in some of the footprints (negatives and positives) the metatarsus is placed rather at the back of the sole of the foot. If this is true, this indicates that erectus bipedalism phase occurred here in a level previous to the appearance of the *Homo sapiens sapiens* phase.

In none of the footprints the «flat-foot» phenomenon was observed.

The tarsal part shows a transverse development.

The lateral side shows a development of a convex structure (primitive).

The fifth toe is strong and massive (primitive).

From the preceeding discussion it is clearly understood that the footprints under discussion have clearly primitive characteristics.

Population represented by the footprints

Human footprints are included in Archanthropian *(Pithecanthropus* or *Homo erectus)* category, or its contemporary Preneanthropian, in other words, Presapiens evolution level.

At the present time, due to lack of precise information, it is not possible to indicate to which of these periods the footprints belong.

It is, however, clearly understood that «erectus bipedalism» dates back to earlier ages. It may be considered that this phase, showing a possibly delayed parallelism to the Oreopitkecian brachiator, started during Pliocene and acquired its main characteristics before the Paraaustralopithecian level.

Previous Fossil Human Footprints discoveries outside of Turkey

There were very few human footprint found up to date. Three major discoveries can be cited as examples:

1. In Cabrerets and Ganties (France) footprints of *Homo sapiens sapiens* or *Homo sapiens fossilis,* ranging probably over 250,000 years, were discovered in a cave.

2. Footprints of *Homo neanderthalensis* were found in Italy in the formation of probably the lower stage of Upper Pleistocene; i.e. they might belong to an era of some 50,000 years ago.

3. Some footprints were discovered in Hungary, in the Archanthropian level at the lower part of Middle Pleistocene. These footprints date back to 500,000 years ago.

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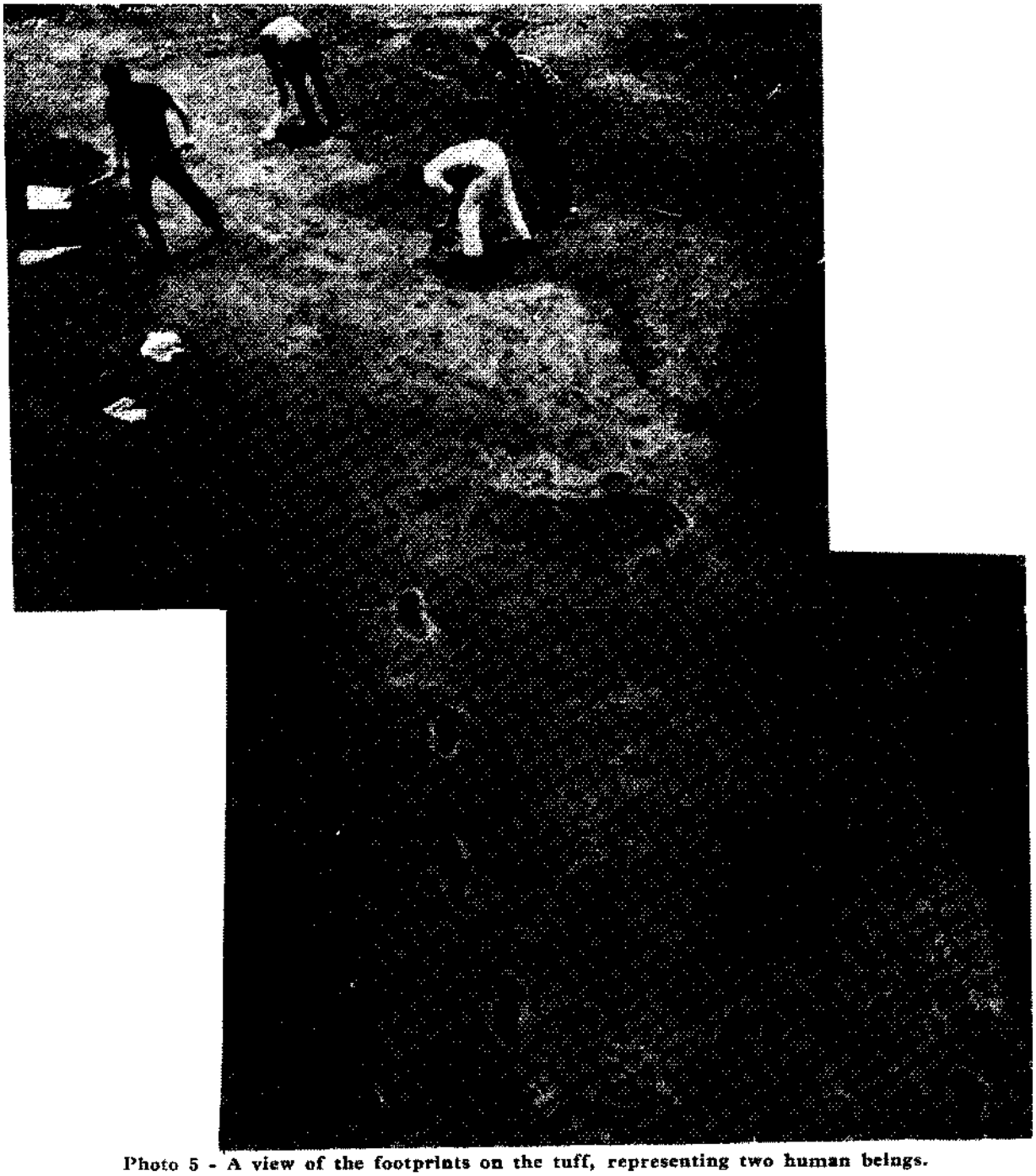

Photo 5 - A view of the footprints on the tuff, representing two human beings. Note that there are also other smaller footprints (probably dog's footprints).

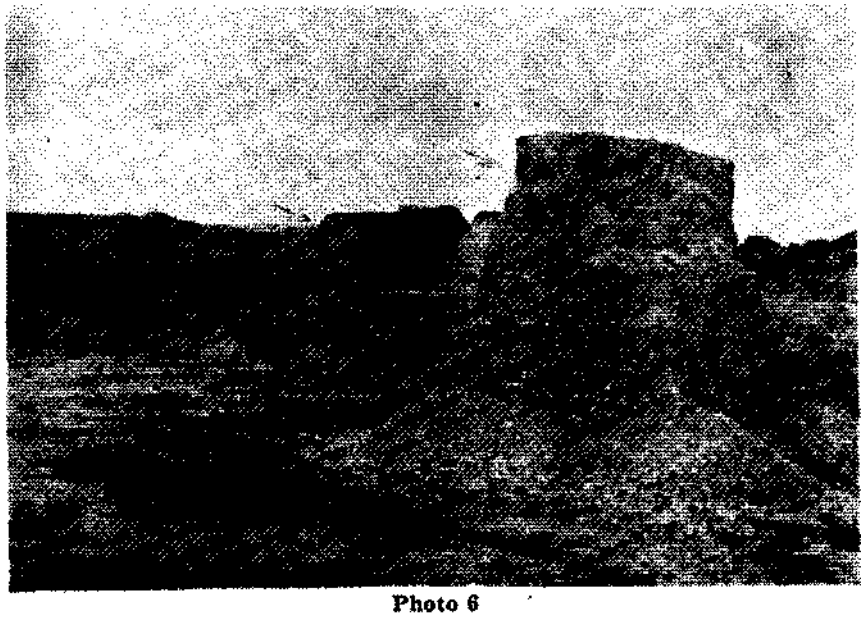

Photo 6

Photo 7

Photos 6 and 7 - T_3 Terrace corresponding to the second Pluvial period on the Mindel glaciation parallel, east of Salihli-Adala. The fossil human footprints found on Çakallar Hill are contemporary with the end of this period. «⟶» marks show the fourth tuff zone of Çakallar Cone in this terrace system.