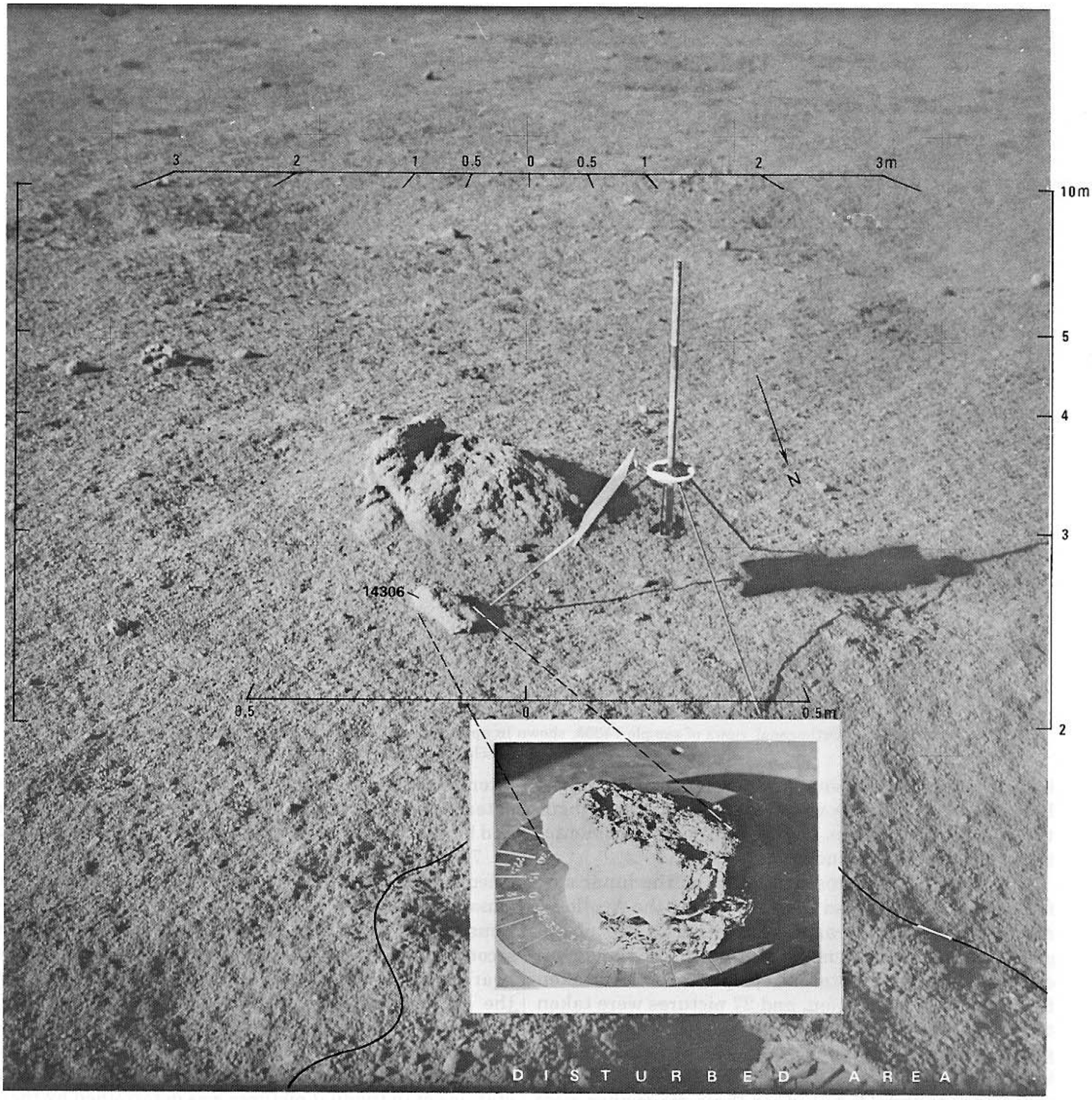

FIGURE 68.—Sample 14306 and vicinity at station G; view south. (NASA photograph AS14-68-9460.) Inset shows approximate lunar orientation reconstructed in the LRL using oblique lighting.

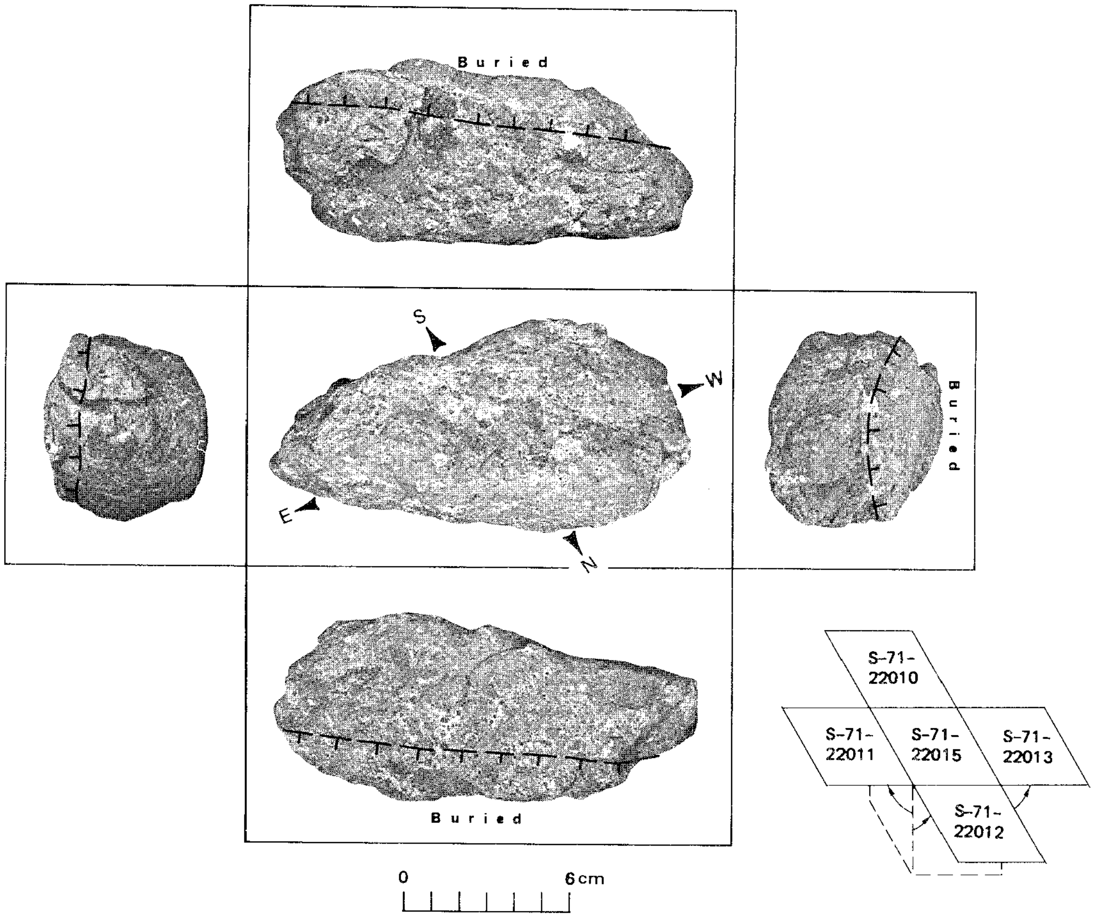

FIGURE 69.—Orthogonal views of sample 14306, shown in approximate lunar orientation. NASA photograph numbers are shown in the schematic diagram.

laneous astronaut activity, and targets of opportunity. Because these pictures were interspersed throughout the five film magazines used for geologic documentation, they are also included.

A total of 417 pictures was taken on the lunar surface with the Hasselblad cameras during the Apollo 14 mission. Fifteen panoramas, consisting of 275 photographs, were taken for major station location and general geologic documentation, 49 pictures were taken for sample documentation, and 27 pictures were taken to document ALSEP deployment. The remaining 66 pictures were taken of miscellaneous targets of opportunity. Color film was used during the first EVA in magazines II and JJ. The other three magazines were loaded with black-and-white film.

The general location on a rectified copy of Lunar Orbiter III frame H–133 of major geologic stations was determined by examining transcripts of oral reports and by talking with the crew. Gross features appearing on 70-mm lunar surface panoramas and on the rectified Orbiter picture were then identified, and the panorama station was located by resection. Final locations for the panorama stations were determined by a second stage of resection on small nearby features appearing on the panoramas, on the unrectified version of the Lunar Orbiter picture, and on the shaded relief map (pl. 2).

After the major geologic stations had been located, the approximate placement relative to the panorama stations of individual pictures was determined by their sequence within the traverse relative to the panoramic surveys, and by resection on identifiable features. Most

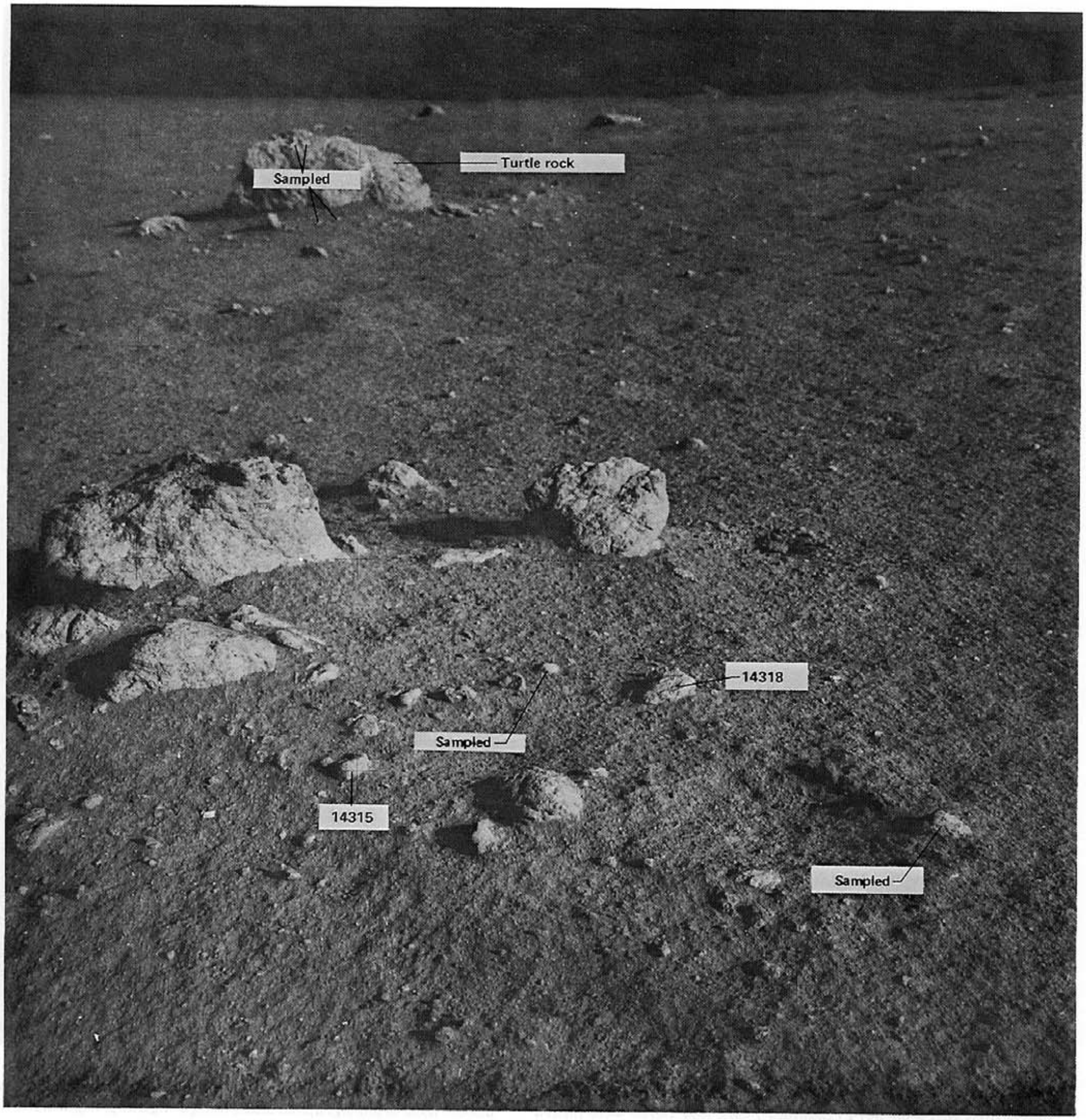

FIGURE 70.—North Boulder Field cluster (station H) sample area. View north. (NASA photograph AS14-68-9469.)

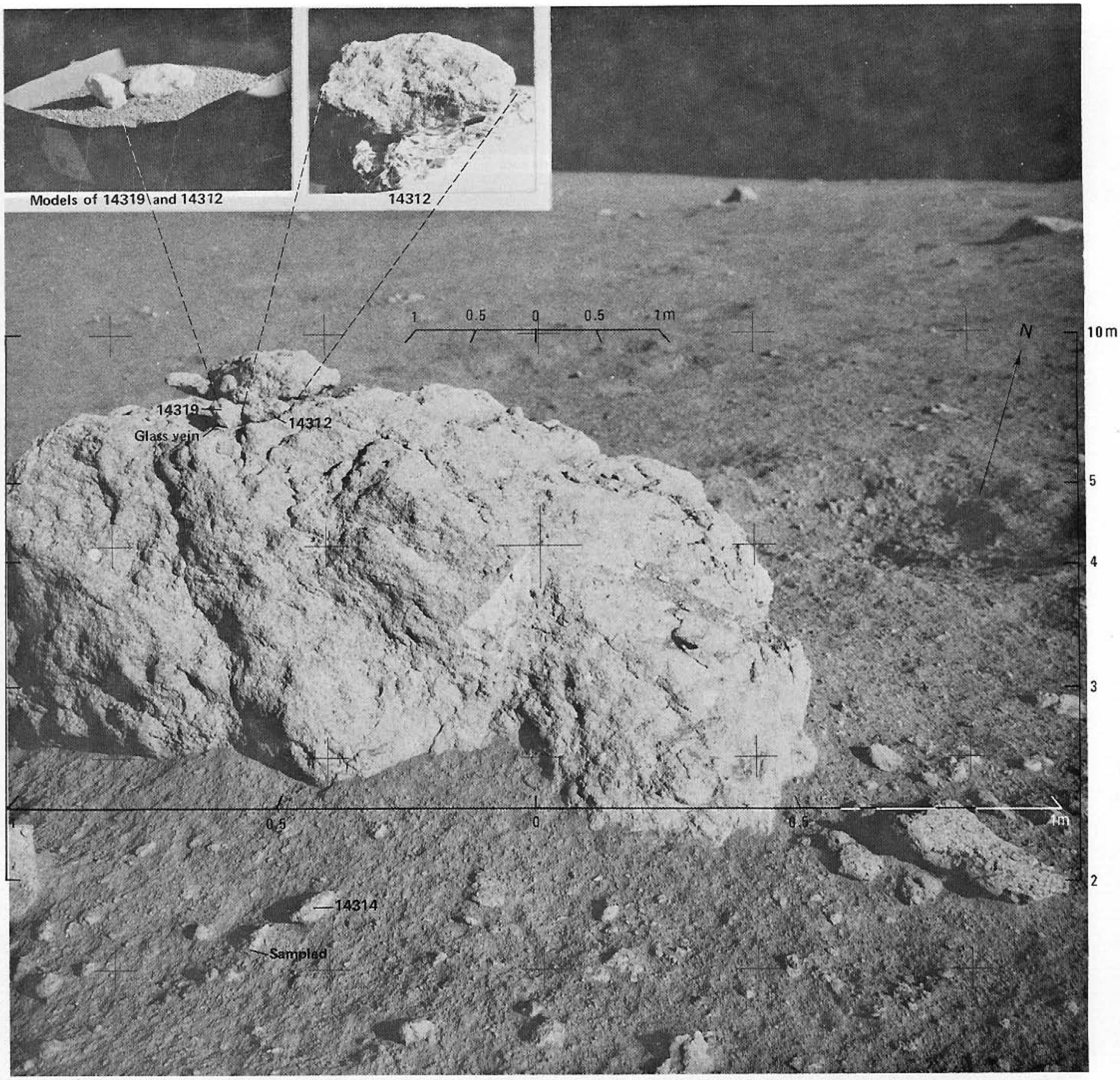

FIGURE 71.—Turtle rock samples at station H. View north. (NASA photograph AS14-68-9474.) Samples 14312 and 14319 were picked from the top of the 1.7-m boulder. Sample 14314 and one unidentified fragment were taken from the fillet at the base of Turtle rock. Left-hand inset shows approximate lunar orientations reconstructed using plaster models photographed under oblique lighting. Right-hand inset is a reconstruction using the actual sample 14312.

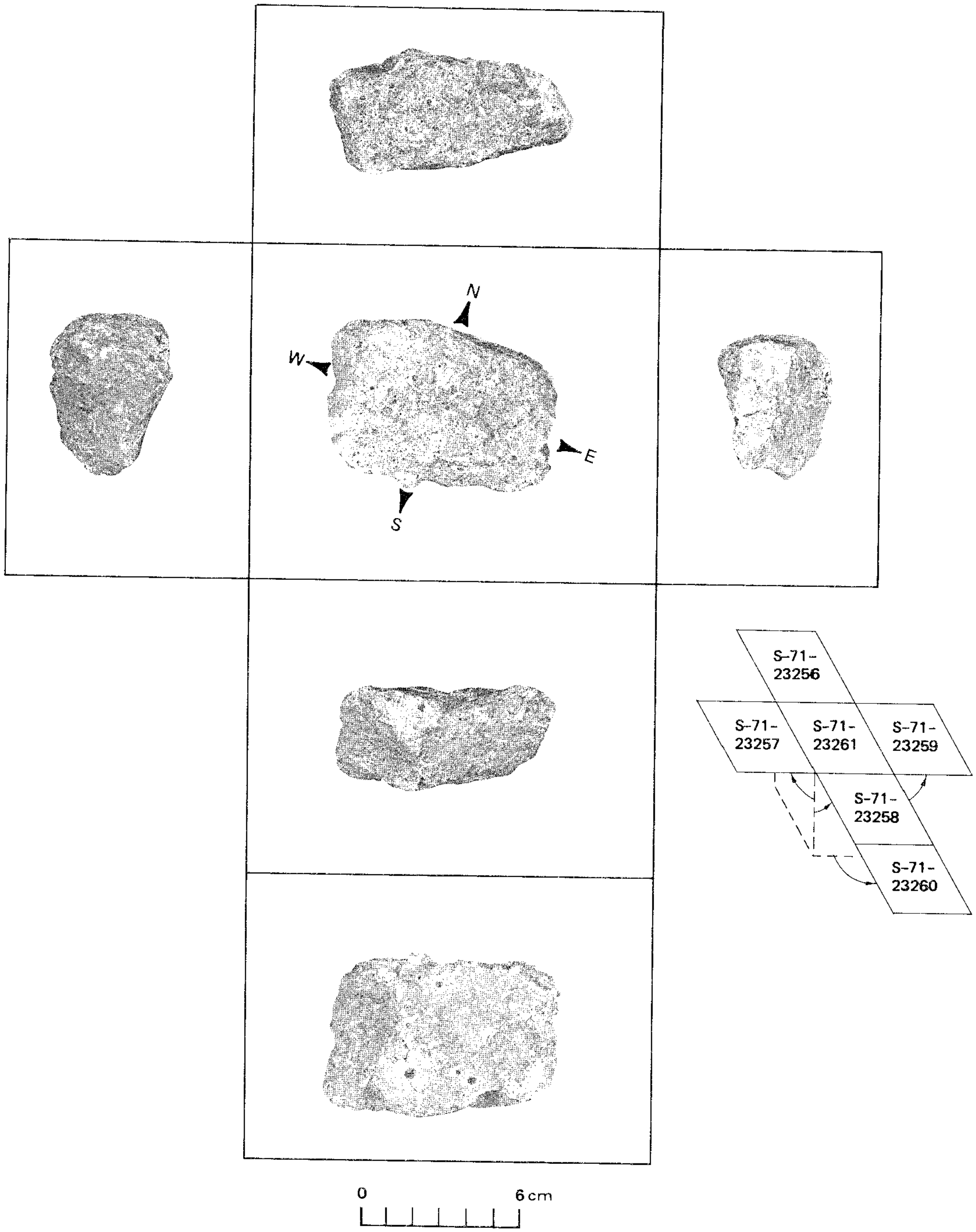

FIGURE 72.—Orthogonal views of sample 14312, shown in approximate lunar orientation. NASA photograph numbers are shown in the schematic diagram.

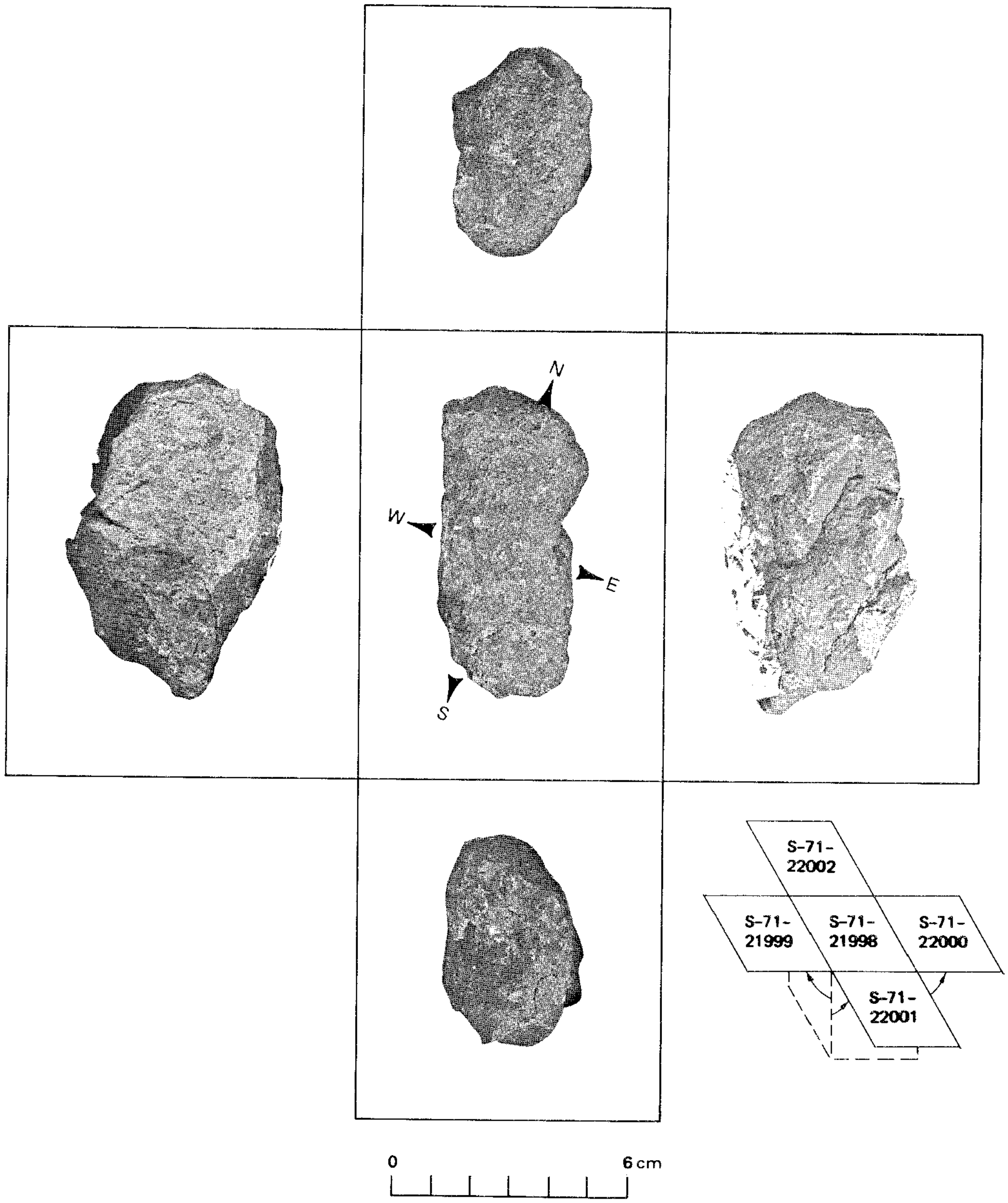

FIGURE 73.—Orthogonal views of sample 14319, shown in approximate lunar orientation. NASA photograph numbers are shown in the schematic diagram.

of the photographic station location information is shown on plate 2. The subject matter in the photographs and the approximate picture sequence were then determined by detailed examination of the pictures and transcripts of oral reports and by talking with the crew.

Several tabulations of the photographic data are shown here to facilitate topical study. Table 6 (p. 65) is a summary of film usage. Table 7 is a complete set of photographic data in chronological sequence. The picture numbers in this table are not necessarily sequential. Table 8 is a chronological listing of pictures in each magazine. Table 9 lists film usage by camera number.

The tabulations were designed to aid in the following specific tasks:

1. Given a particular location or activity within the sequence of lunar surface activity, find the pictures taken at that time, and their subject matter (table 7).
2. Given the number of a particular frame, find its location in the sequence of lunar surface activity, the station from which it was taken, and the subject matter of the picture (table 8).

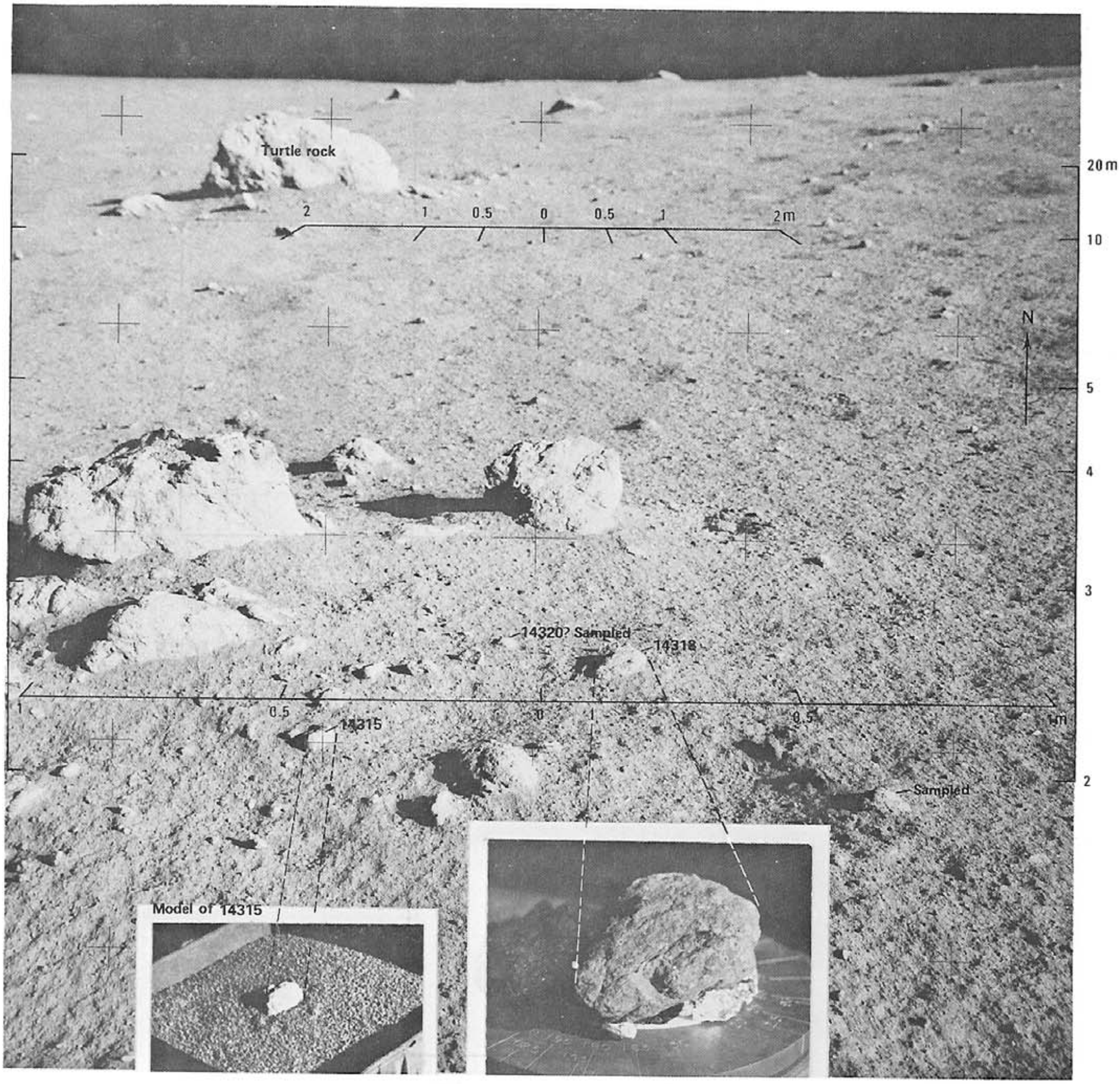

FIGURE 74.—Samples 14315, 14318, 14320?, and one unidentified sample from the North Boulder Field cluster, station H. View north. (NASA photograph AS14–68–9469.) Left-hand inset shows approximate lunar orientation of sample 14315 reconstructed using a plaster model under oblique lighting. Right-hand inset is a reconstruction using the actual sample 14318.

3. Given a specific frame number, find the serial number of the camera with which it was taken (table 9).

THE APOLLO 14 BASE MAP

Part of Lunar Orbiter III frame H–133 was used to map the Apollo 14 landing site. This frame had the highest resolution of any photographic coverage of the area, resolving craters as small as 2 m, and boulders as small as 1 m. The camera, however, was tilted approximately 33° when the picture was taken. This, plus the fact that there is nearly 100 m vertical relief at the

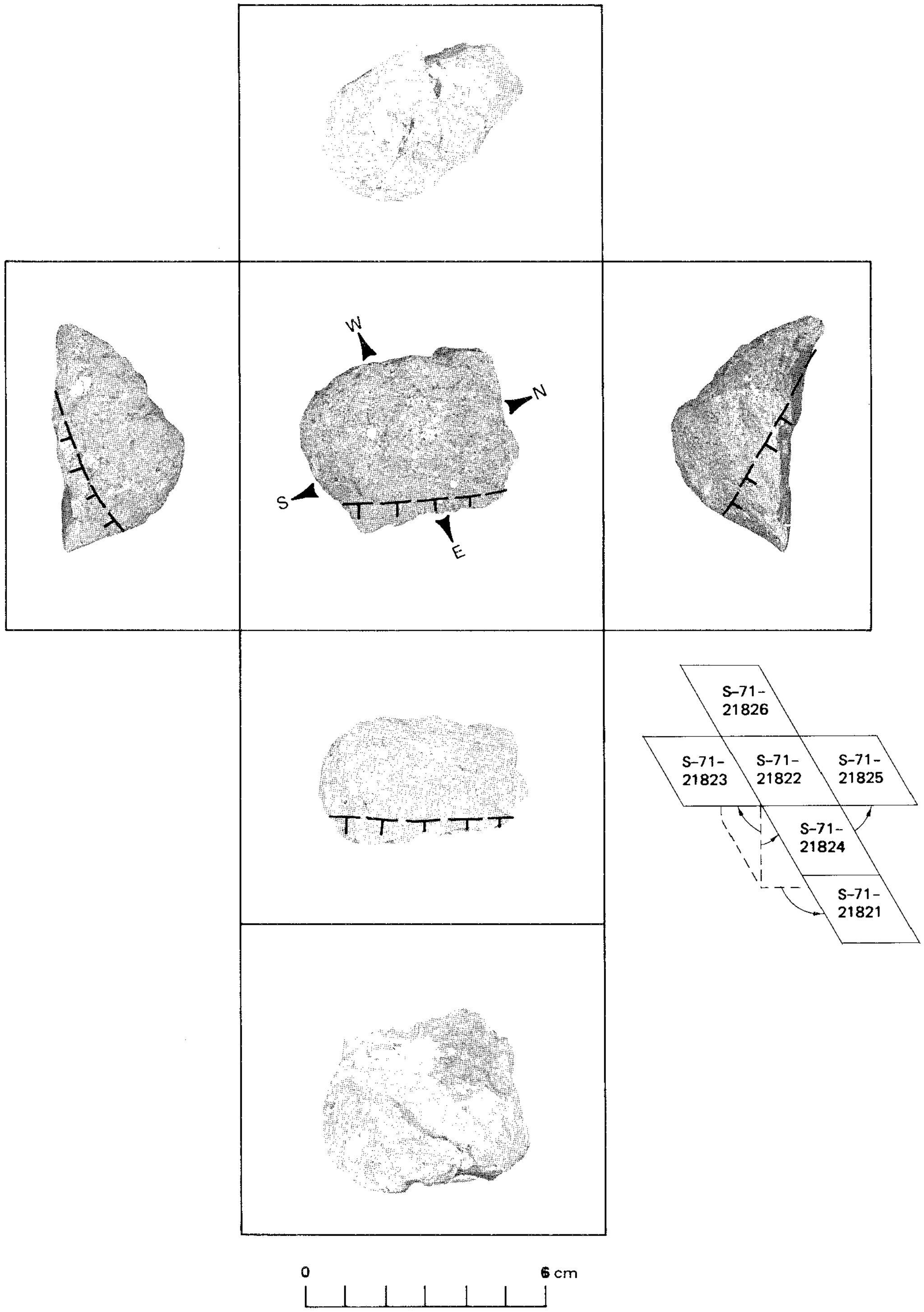

FIGURE 75.—Orthogonal views of sample 14315, shown in approximate lunar orientation. NASA photograph numbers are shown in the schematic diagram.

landing site, produced variable distortion in the picture that could not be removed by optical rectification. The geometry of this condition is illustrated in figure 79. Feature P appears at point P_p on the untransformed picture. If the picture is projected onto a plane differing from that of the original image by angle t, P appears at point P_r. This point is displaced from the correct map location by distance ΔG_n because of the effect of topographic relief h_n.

Even if the geometric distortion is neglected, all at-

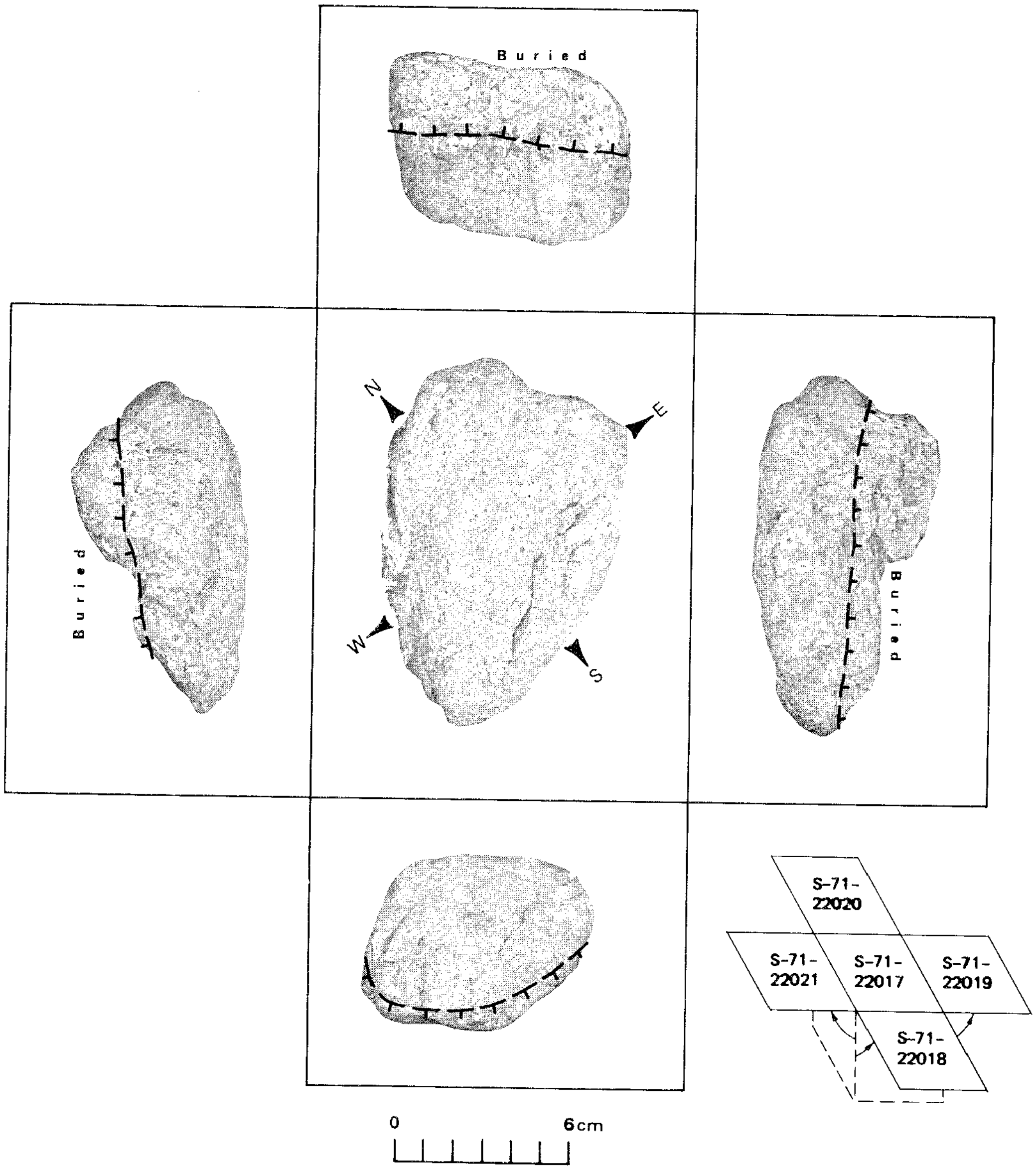

FIGURE 76.—Orthogonal views of sample 14318, shown in approximate lunar orientation. NASA photograph numbers are shown in the schematic diagram.

tempts to rectify the picture have degraded its resolution by at least a factor of two. This degradation obliterated many of the blocks and craters on the rectified photograph, severely reducing its usefulness for scientific evaluation and measurement of traverse data.

A shaded relief map was therefore compiled with an airbrush. The map has as much resolution as the original Lunar Orbiter photograph and is differentially rectified to remove, insofar as practical, the effects of tilt and relief. This was done by superimposing a grid of 50 m squares, deformed to match the distortions in the Lunar Orbiter photograph, on that photograph. Details were then transferred manually from the deformed grid to an undeformed one, and enhanced with the airbrush to produce the finished map. Because the angle subtended by the landing site was only about 2°, for simplicity the lines of sight from the camera are considered to be parallel (fig. 79). The deformed grid overlay for the unrectified Lunar Orbiter photograph was constructed by solving for X_n at even intervals of G along evenly spaced lines parallel to the direction of tilt:

$$\Delta G_n = h_n \tan t$$
$$X_n = (\Delta G_n + nG) \cos t$$
$$X_n = h_n \sin t + G_n \cos t, \qquad (1)$$

where G is the grid interval, h is the relative topographic elevation, t is the camera tilt with respect to the

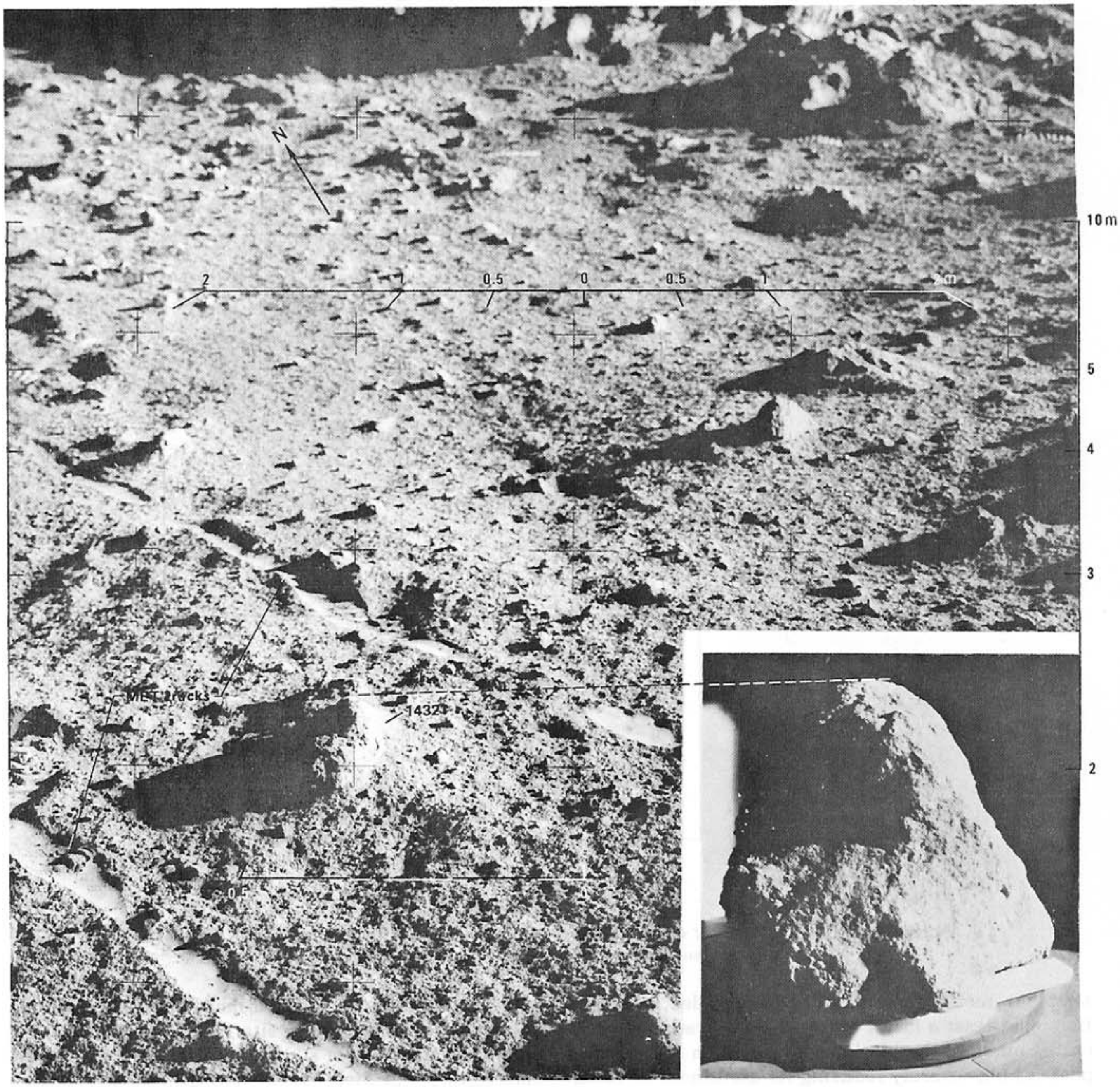

FIGURE 77.—Sample 14321 and vicinity at station C1. View northeast toward the blocky rim of Cone crater. (NASA photograph AS14-64-9128.) Inset shows approximate lunar orientation reconstructed in the LRL using oblique lighting.