Chapter 5

STAROSELE: THE 1993-95 EXCAVATIONS

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(with a contribution by C. R. FERRING)

INTRODUCTION

Renewing field research at a previously excavated site has its advantages and its disadvantages; Starosele had more than its share of both. As described in detail in the previous chapter, Starosele saw extensive excavations during the mid-1950s, as well as the publication of a detailed monograph on the results (Formozov 1958). Thus, renewed excavations might not have been warranted except that absolute dates were lacking and the original work posed as many questions as it seemingly answered. When the idea of renewing work at Starosele arose, it was based essentially on our desire to obtain samples for a range of absolute dating methods which were not yet developed at the time of the original excavations and which were to be used at other Middle Paleolithic sites in the Western Crimea. Since Starosele was the type-site for one of the two lithic industries recognized in the Western Crimea (Kolosov, Stepanchuk, and Chabai 1993), its absolute dating was vital.

Once Starosele was included in the overall project, it became necessary to review Formozov's (1958) monograph in detail, in order to get some idea of how many samples might be needed. A close reading of the monograph and related publications (e.g., Formozov 1954), however, raised additional questions, discussed in the previous chapter, which could only be answered, if at all, by a full range of studies of newly acquired samples—geological, zoological, and artifactual. Only with these studies would even the technically best of absolute dates be meaningful archeologically.

While it was not expected that all the questions raised by Formozov's report could be resolved, particularly the unclear association between the Starosele child and the Mousterian occupation, it was felt that, given the significant depth of deposits, a number of new insights could be gained through careful but spatially limited excavations. (In this regard, since Starosele was universally recognized as an important site, the archeological authorities in both Kiev and Simferopol requested that we excavate as restricted an area as possible in acquiring our samples.)

Aside from our primary goal of obtaining samples from well defined stratigraphic contexts for absolute dating, our other goals, based on the unanswered questions in Formozov's work, were as follows: (1) to reconstruct the geomorphic and paleoenvironmental history of the site, through detailed description and sampling of the various lithological layers for sediment, pollen, microfauna, and mollusks, particularly to ascertain whether or not this site was a collapsed cave and, if so, under what climatic conditions it collapsed; (2) to define the history of artifact deposition throughout the sediments to establish whether or not their distribution resulted from continuous or discontinuous occupations; (3) to sample the artifacts from different lithological units to establish whether or not they belonged to the same or different techno-typological groups; and, (4) to acquire sufficient faunal samples to make possible a reconstruction of season(s) of the year of its occupation in each lithological unit, to elucidate the taphonomic patterns of bone aggradation throughout the deposits, as well as to verify

whether the reported hunting of a single species was characteristic of the deposits, as a whole, or whether it represented only a fauna-rich sub-set of the deposits.

Obviously, as we became more familiar with the site from actual excavations, our goals shifted somewhat to meet the limitations and potentials of the site itself. Yet, one of the advantages provided by the previous excavations lay in the very fact that Formozov proposed specific interpretations of his data and provided both his reasoning for these conclusions and the data he used to reach them. Thus, we knew what to look for in our work; what we should expect to find to confirm or reject Formozov's results. We did not choose Starosele as a vehicle to prove Formozov wrong; rather, it was chosen, aside from the need for absolute dates, because Formozov's conclusions indicated that Starosele was truly an interesting site and more recent work had proclaimed it the type-site of the Staroselian industry (Kolosov, Stepanchuk, and Chabai 1993).

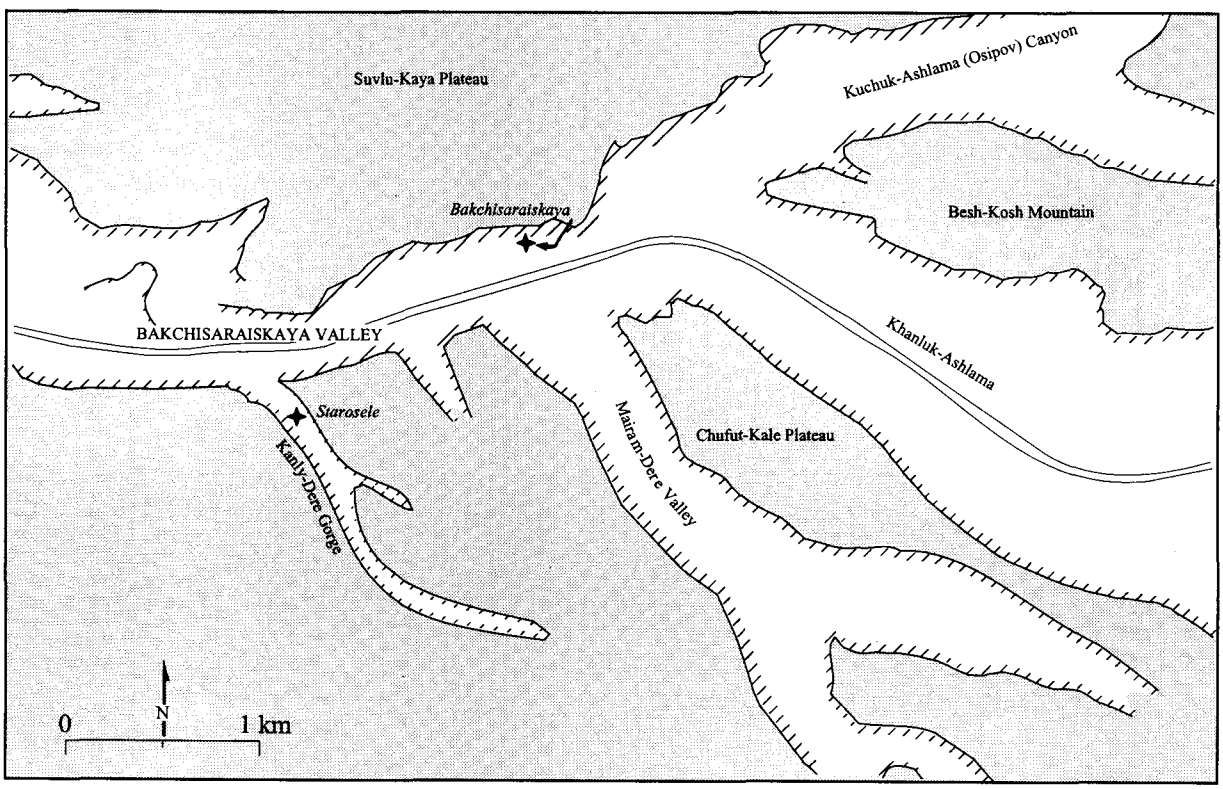


Fig. 5-1—Map of Bakchisarai and neighboring valleys (redrawn from Formozov 1958: 13, pl. 5).

Among the advantages provided us by Formozov's previous work was an established grid system and permanently fixed elevation markers on the wall of the cliff behind the site. These allowed us to adopt his grid and, in doing so, to mesh our horizontal and vertical controls with his. An additional advantage in renewing work at Starosele was that Formozov had carefully reburied his open, 4 meter-deep profiles with some 200 cubic meters of fill. While removing it took three full days (some 27 man-days) of work at the beginning of the 1993 field season, the intact profiles presented us at the very beginning of our work with a clear, intact view of the whole 4 m depth of deposits. Since part of these profiles ran along the deepest exposure of deposits excavated by Formozov, they provided us with an immediate access to all the lithological units and their stratigraphic relationships, from bedrock to the surface. This not only permitted us a picture of what was to come in our excavations but also forced us to confront, early in the excavations, the relationship between the extant sediments and

Fig. 5-2—Photo of cliff above Starosele; site is in foreground, the small cave visible to the right is the result of erosion from the fracture-controlled spillway visible just above it.

Formozov's renderings (1958: 40-41, figs. 27 and 28) and understandings of them (1958: 43), recently restated by Gvozdover et al. (1996).

Among the disadvantages of renewing excavations at Starosele was that Formozov had excavated an area of 250 m^2 to an average depth of 1 m; that is, some 250 m^3 of deposits were removed from surface to bedrock. While, according to his maps, he had left some 150 m^2 unexcavated, this was not really the case. His own map (Formozov 1958: 26, fig. 16) shows that bedrock was very close to the surface in the southernmost portion of the site, while even a quick examination of the surface showed that the western margin of the "site area" was markedly eroded. Thus, we estimated that significant intact, culture-bearing sediments covered no more than about 100 m^2, of which we excavated 38 m^2. (An additional 5 m^2 of in situ deposits outside the artifact bearing sediments were excavated to provide geological information.) Quite obviously, in order to leave as much intact as possible, we were not able to excavate sufficient areas to make possible truly meaningful analyses of the horizontal spatial patterning of either artifacts or bones.

Given the spatially different artifact distributions in different lithological units, it is unlikely that the remaining, unexcavated area will contain significant numbers of artifacts from all occupations. In fact, this variable horizontal artifact distribution was fully recognized by Formozov: one of the richest areas of artifact distribution in Formozov's excavations (1958: 51, fig. 34) had essentially stopped before the southern end of his excavations and its disappearance toward the south was one of the reasons Formozov ended his work at Starosele (Formozov 1958: 48, 52). Although we recovered a small number of artifacts from what we think was a comparable level in our excavations (Level 4), we did not get a reasonable sample.

In spite of these uncertainties and limitations, the excavations at Starosele provided us with a good range of data, both environmental and cultural. In this chapter, we will present our excavation strategies and methodologies, the geological and archeological stratigraphic sequences, and how we interpret their relationships. While mention will be made of preliminary faunal studies, the detailed reports of these studies will be presented in the next volume of reports. The absolute dates reported here are discussed in detail in Chapters 13 and 14, while Chapter 6 details our recovery of human remains and how they impact on the question of the dating and phylogenetic status of the Starosele child.

SITE SITUATION AND STRATIGRAPHY (by C. R. Ferring)

Site Situation

The site of Starosele is located on the east side of the narrow Kanly Dere Gorge which is cut into Eocene limestones by a small headwaters tributary of the Churuksu River (fig. 5-1). This gorge is one of several northwest-trending drainages that appear to be fault-controlled. The site is situated on a bedrock bench that occurs discontinuously along the gorge, 11-13 meters above the bedrock channel base. This bench formed on a resistant, chert-bearing limestone that is overlain by a softer limestone. The latter is weathered into a shelter that expands in depth north from the excavated area and which formed in recent times (Formozov 1958: 21). Above the excavation area (fig. 5-2), however, the vertical gorge wall is maintained by exfoliation of tall, thin slabs of bedrock. None of the sediments in the excavation area indicate that the deposits formed in a rockshelter.

A fracture-controlled spillway above the southern end of the excavation area (fig. 5-2), conveys surface runoff from the gorge rim to the canyon below. During site occupations, colluvium, including weathered limestone and eroded *terra rosa* soil matrix, was probably partly transported across the same spillway into the site area and partly from other spillways

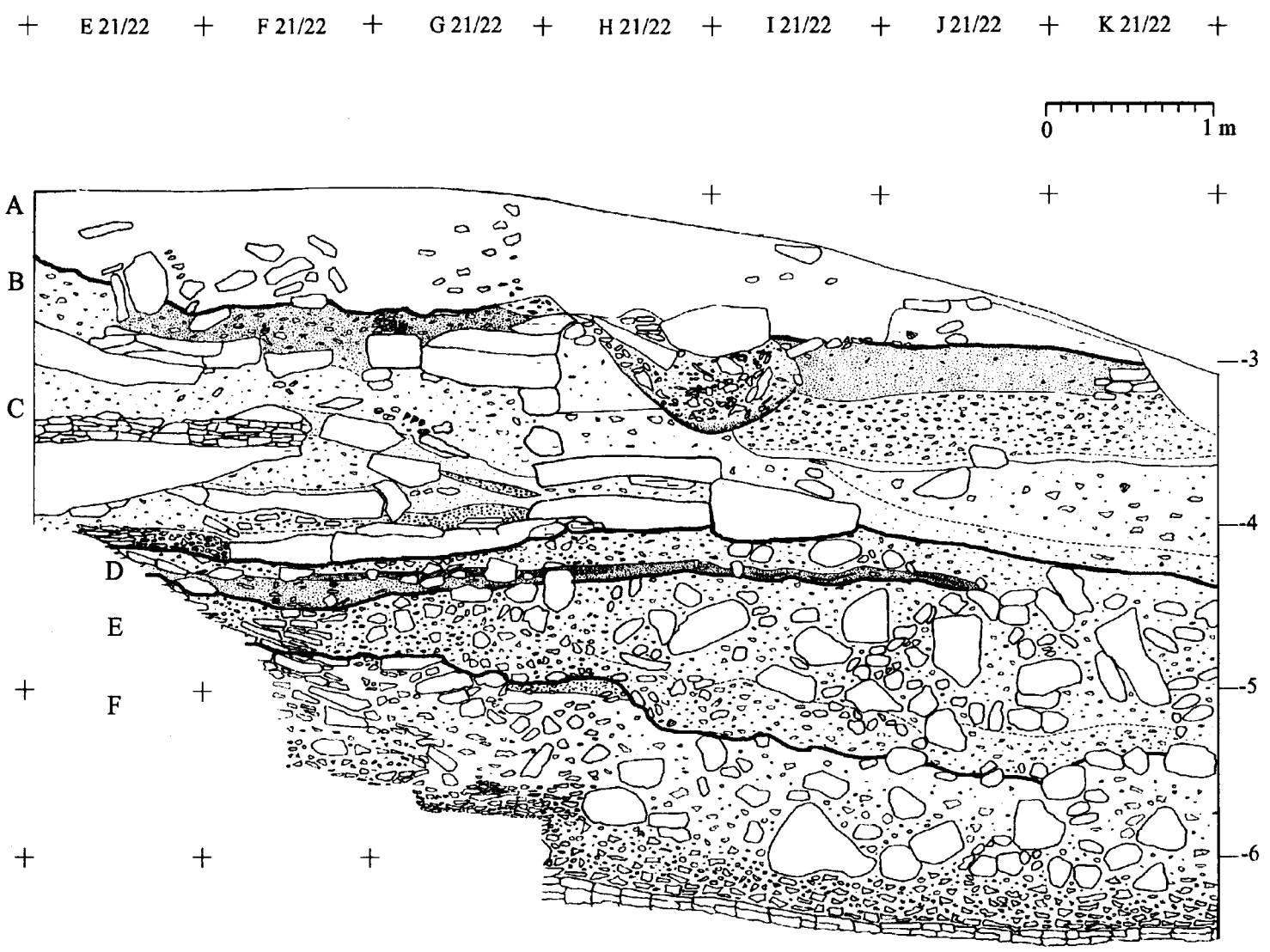


Fig. 5-3—Starosele, east-west profile of line 21/22 E-K. Erosional channel is visible in squares H/I 22/22, Stratum B.

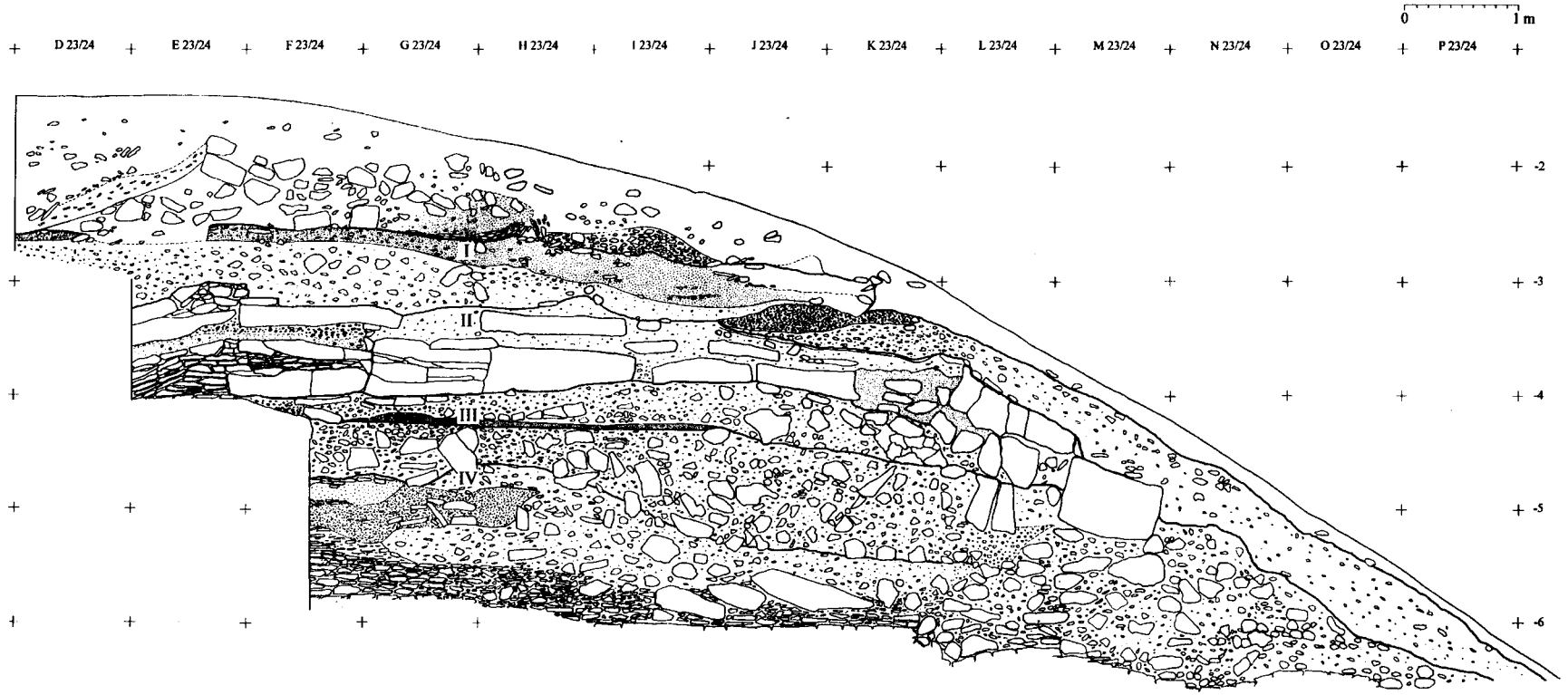


Fig. 5-4—Starosele, east-west profile of line 23/24 D-P. Roman numerals indicate cultural levels.

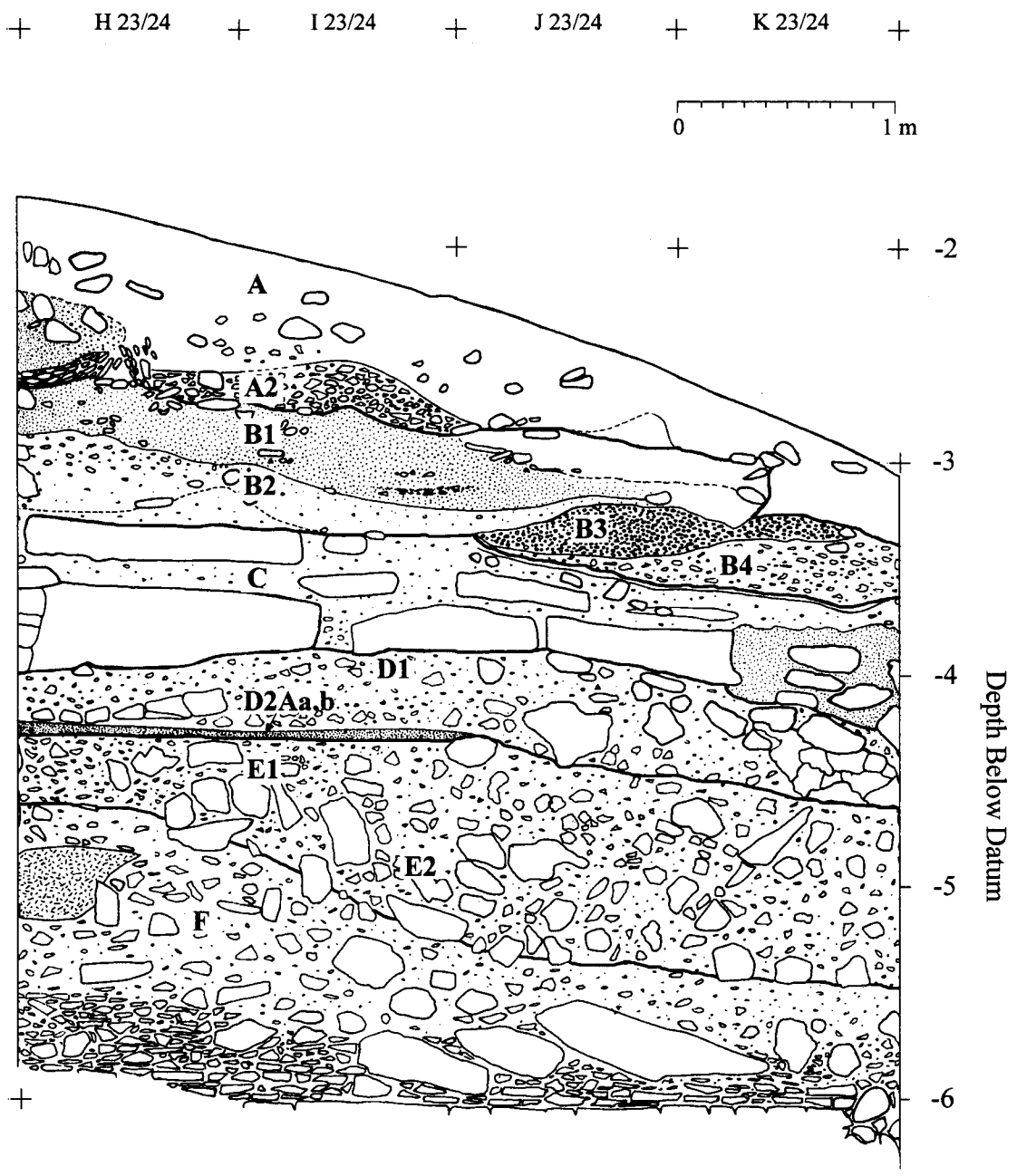


Fig. 5-5—Starosele, east-west profile of line 23/24 H-K. Letters indicate geological units.

further up the gorge. As the site is located only about one kilometer from the head of the gorge, most of the alluvium carried by the stream, including that in the site, is essentially colluvium that has washed into the gorge from above.

Stratigraphy

The sediments at the site were described and sampled along a profile from the north face of Squares E22 through G22 (fig. 5-3), and then from the north face of Squares H24 through K24 (fig. 5-4). Samples were taken from a two meter wide portion of the latter; from I23 and J23. The sediments in this section (fig. 5-5) were divided into six stratigraphic units (Table 5-1). In order to maintain a clear distinction between lithological and archeological stratigraphic units, the geological units are referred to as Strata and are named A through F, from top to bottom. The archeological deposits are named Levels, numbered from 1 through 4, from top to bottom (fig. 5-5, Table 5-1).

Sediments at the site have been eroded into a low dome that breaks sharply to the gorge floor to the west. From the highest point, near rows F-G (fig. 5-6), the surface drops toward the bedrock wall, probably as a result of historic period rock quarrying. Sediments within the Pleistocene section are horizontally bedded, east/west, to row K, at which point all but Strata F and E slope downward toward the gorge bottom. This is clearly seen in the limestone slabs at the western end of the profile (north face of Squares K24 to N24), indicating that the slope was already established prior to this period of large scale cliff wall exfoliation (fig. 5-4). It also indicates a significant downcutting of the gorge bottom prior to this major episode of exfoliation.

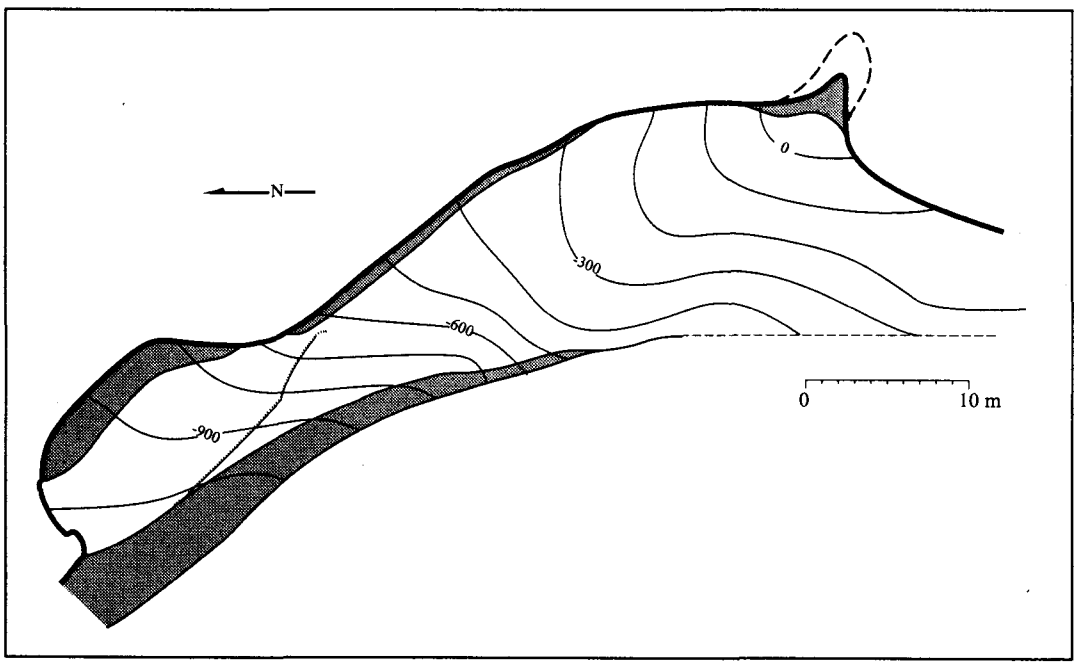


Fig. 5-6—Starosele, contour map of site (after Formozov 1958: 20, fig. 20). Hatched line indicates dripline of shelter.

The large horizontal slabs of exfoliated limestone in the center of the section (Stratum C), between which is found Level 2, either changed the geomorphology of the site or they simply correspond with a change in depositional environment. Below the slabs, in Strata F through D, are large boulder gravels, with a few thin, finer-grained interbeds. The increase in red clayey to loamy matrix in the low part of the section is probably the result of infiltration and

TABLE 5-1
Starosele, Stratigraphic Description (all colors Munsell moist)

Stratum	Thickness (max. cm.)	Description
A	112	(Soil A horizon): 10YR5/2 gravelly silt-silt loam; fine moderate angular blocky structure; many rounded pebbles and cobbles, decreasing in size upward; gradual smooth boundary to (Soil Ak horizon): 10YR5.5 gravelly silt loam; common angular exfoliates increasing in frequency to east; loose; many carbonate coats on peds and clasts; several intrusive pits and disturbed areas; unit may be recent; abrupt boundary.
B1	20	(Soil Ck horizon): 10YR7/3 gravelly to sandy silt; very hard; rounded spherical and platy rock fragments; few coarse sand to granule lenses; very porous; many bone fragments; part of CL1-1; clear wavy boundary.
B2	30	(Soil Bt horizon): 8.75YR5/4 gravelly silt loam; common rounded cobble to granule clasts; moderate fine angular blocky structure; common stress clay coats around clasts; very hard and porous; abundant bone and burned bone; lower part (Soil Btk horizon): 7.5YR5/4 loam; common rounded cobbles; fine to medium subangular blocky structure; abundant carbonate filaments; part of CL-1; abrupt wavy boundary. [NB: this unit grades to east to unit with thick limestone slabs and common small exfoliates; in west it overlies Strata B2/B3; to east it overlies Stratum C.]
B3	0-35	Lenticular gravel bed of well-rounded granules with a few pebbles and cobbles; clast-supported; no bones or artifacts observed; unit has cut into unit B4; abrupt boundary.
B4	0-30	7.5YR5/4 gravelly silt loam, with pedogenic carbonate of modern soil; rounded pebbles and cobbles; part of CL-1; abrupt boundary.
C	45-75	Thick limestone exfoliation slabs, in horizontal position. Matrix is 10YR6.5/2 sand and coarse silt interbeds with common angular platy exfoliates and many rounded pebbles and cobbles. Unit is matrix supported, with matrix between slabs and above slabs to west; unit thickens to east to about 135 cm; contains CL-2; abrupt smooth boundary.
D1	55-70	Thinly bedded clast-supported rounded pebble and cobble gravel, fining up to granule and pebble gravel, with 5-10 cm boulders scattered throughout unit; few carbonate crusts on bases of cobbles; many voids between clasts; interclast matrix is 7.5YR4/6 loam; clear to abrupt boundary.
D2a	2-4	Very thin bed, 10YR7.5/3 sandy silt; very porous; common charcoal and bone; pinches out westward in square I23; abrupt smooth boundary.
D2b	3-15	8.75YR7/6 clast supported gravelly silt; abundant well rounded granules and few to many rounded pebbles; many fine pores; compact; few bones; CL-3; clear boundary.
E1	45-85	Clast supported rounded boulder gravel; poorly sorted pebble to cobble interclasts, and a few discontinuous clayey zones; clay coats on clasts; gradual boundary to F.
E2	0-25	10YR7/4 gravelly loamy sand; lenticular wedge, pinches out in square H23; cobble to small boulder exfoliate clasts; abrupt upper and lower boundaries; lower boundary contacts CL-4.
F	80	Clast supported rounded boulder gravel with thin horizontal sandy or loamy zones; more fine matrix than in E1; no secondary carbonates; clayey zone with CL-4 in upper part is 7.5YR4/6 granule loam; lies unconformably on weathered bedrock limestone.

[1] CL= cultural level

pedogenesis. The fine-grained beds (D2 and E2) appear to represent very localized filling of depressions by lower energy stream flow (fig. 5-5), contrasting with the overall high-energy environments represented by the boulders in Strata F through D. (A thin clayey zone at the top of Stratum F contains Level 4, while a gravelly silt layer near the middle of Stratum D—at the top of D2b—contains Level 3.)

Although not clearly seen in the studied profile, the profile 2 meters to the south (fig. 5-7), shows a marked cut and fill sequence between Strata E2 and F, while the distribution of artifacts and bone at the surface of F (Level 4) in the studied profile shows a hiatus when this cut took place.

Above the limestone slabs, undisturbed Pleistocene sediments in Stratum B are much finer in texture than sediments below the slabs. Along with the prior incision of the gorge which partly isolated the site from larger floods, the local effect of the slabs may have been to divert all but the most local spillway transport away from the site. The effect of the local spillway can be clearly seen in Figure 5-7 as an erosional channel which originates at the base of the spillway. In any event, the slabs are quite unweathered, except near the sloping western edge of the site, suggesting that Stratum B was deposited shortly after the fall of the slabs.

The heterogeneous alluvial facies of Stratum B were deposited in swales and small channels as cut and fill packages. They include mixtures of colluvium and angular exfoliation debris from the cliff above the site, indicating much lower energy than the gravels below the limestone slabs. The Stratum B sediments are cemented by pedogenic carbonates related to the soil that formed in these deposits after the last Middle Paleolithic occupations. Level 1 occurs in these sediments, while two of the small gravel lenses in this section are sterile. Not only is this stratum missing north of row 20, but, to the south, there are numerous pits into it from the modern sediments of Stratum A (fig. 5-8).

The uppermost sediments (Stratum A) are young anthrogenic accumulations of quarry debris and spoil from pit/hearth construction, contained in a matrix of colluvial loams derived from the gorge margin above the cliff. A number of Level 1 artifacts and bones were mixed into Stratum A, but the majority of finds in this unit are A.D. eighteenth century sherds and bones of domesticated animals. In addition, an infant burial was found in this stratum (see Chapter 6).

Weathering of the sediments below the limestone slabs, as well as their partial erosion along the western edge of the bench (fig. 5-4), suggest a depositional hiatus between those sediments and the overlying deposits of Strata C and B. After this temporal break, exfoliation of the limestone slabs was quickly followed by deposition of Stratum B sediments. Given the slope on the west of Stratum B, it is likely some portion of it was eroded prior the accumulation of the modern sediments of Stratum A. How much, however, cannot be ascertained on the basis of the available evidence.

Overall, the sedimentary environments at the site would normally appear to have been most unfavorable for site formation. Preservation of fauna and, at least, two hearths associated with the occupation horizons in Strata D and F must have been fostered by the incorporation of sufficient fine matrix to protect these materials from subsequent flood events that delivered large boulders to the site. The uniform carbonate lithology of the sediments probably buffered the deposits over their long period of weathering, accounting for the excellent bone preservation. The sequence, as seen, suggests a long period of weathering of the lower deposits, followed by rapid deposition of the limestone slabs and the Stratum B alluvium, and then another long period of post-occupational weathering.

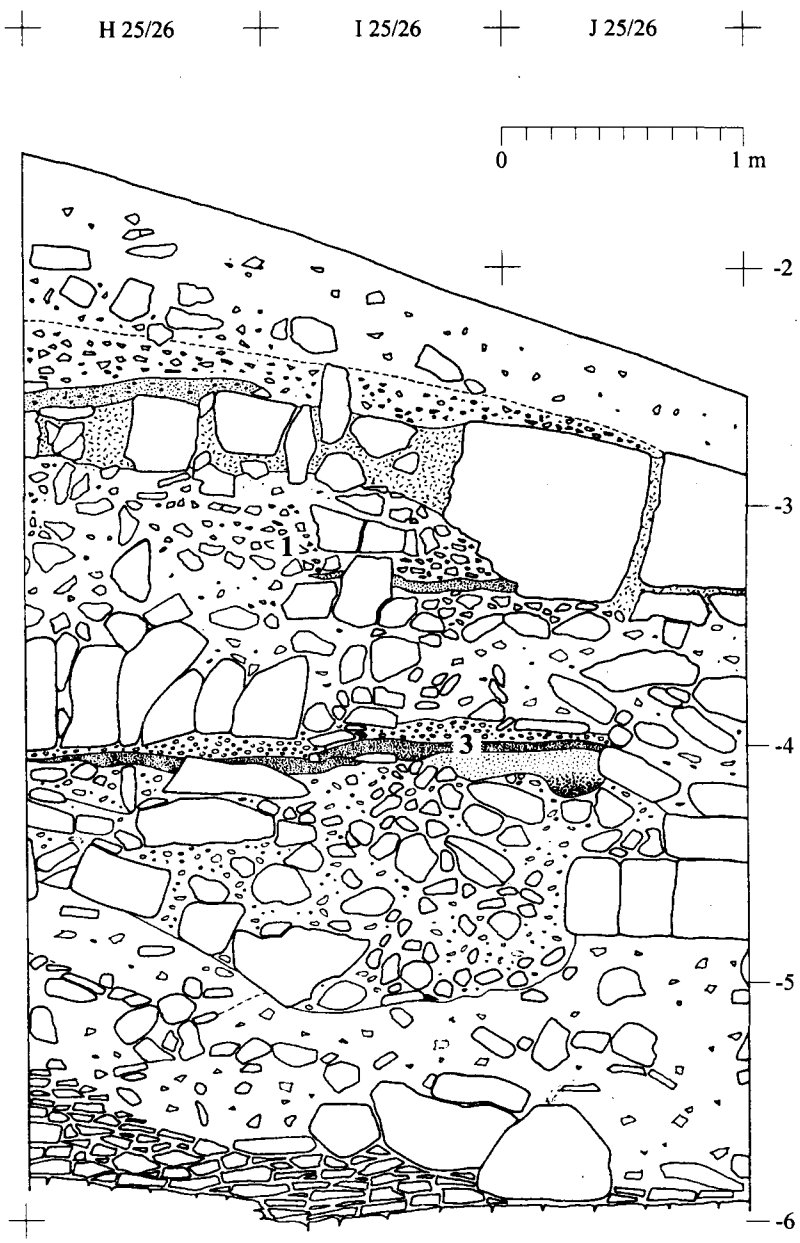


Fig. 5-7—Starosele, east-west profile of line 25/26 H-J. Cultural Level 1 pinches out towards the west at the large limestone blocks between -3 and -4 m. The erosional channel is visible between -4 and -5 m below datum.

Fig. 5-8—Starosele, north-south profile of line G/H 18-25. Roman numerals indicate cultural levels. The burial pit of the adult sepulture discovered in 1994 is visible in squares G/H 24-25, between -2 and -3 m below datum.

EXCAVATION STRATEGIES

Formozov's excavations had a major impact on how we had to approach the new excavations. Not only had he entirely removed well over half the site, but his buried profile along the southern edge of his excavations formed a necessary starting point (fig. 5-9A). These profiles established the exact position and orientation of his one-meter grid system, as well as providing a stratigraphic cross-section through the deepest part of the site. Thus, we decided to expand the original grid system, using his buried profiles as guides.

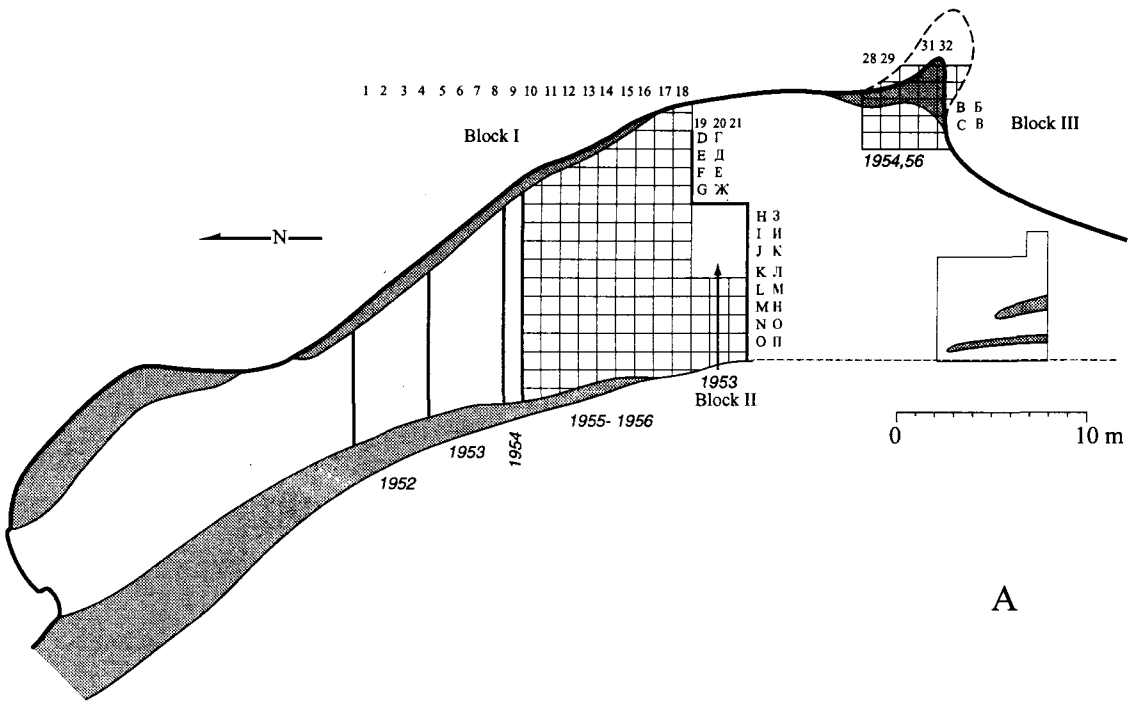
In addition, to maintain continuity, initially we used his +13 meter elevation marker as our datum. Unlike the original work, however, which used a datum at the base of the canyon and measured elevations as above that, we measured down from the +13 meter datum. Thus, our reading of -3.50 m would be equivalent to his reading of +6.50 m. By the 1995 field season, we had shifted to Formozov's +10 meter datum, in order to deal more easily with the lower sedimentary levels.

The buried profiles ran mainly on an east/west orientation. Since they consisted of two east/west sections, connected by a 3 meter north/south section, their cleaning provided standing profiles at ninety degree angles (fig. 5-9A). This configuration resulted in two potential excavation blocks, a westerly one delimited by his excavations on the north and west (Squares D19/21 through G19/21), and a larger one to the south defined by his east/west profile along row 20/21 (fig. 5-9A). Within normal limits, the extant walls toward the eastern side of the site were correctly oriented and, given the highly variable matrix sizes, quite straight. There had been a bit of erosion of Strata A and B along the northern edge of Squares D/G 19, and about 20 centimeters of the modern deposits of Stratum A had been eroded along the northern edge of the H/K 22 line. This erosion must have occurred during the period 1953 to 1956, when this profile—the southern profile of his Block II—was exposed. This exposure and the resulting erosion will be of some significance when the recently discovered human burials are discussed in the next chapter.

There was a greater problem with Formozov's westerly grid. There, he had cut too much to the south, so that most of row 22, K through P (fig. 5-9A), in fact, had been excavated by him. Since there were few in situ artifacts in that area, this caused few problems. Thus, while Figure 5-9B shows we excavated all of rows 22 and 23, most of row 22 west of K was merely back dirt.

Upon clearing the buried profiles, it was immediately apparent that Formozov's published renderings of them had only the most general similarities with what we saw (fig. 5-10). His profile shows a layer of large, elongated but rounded boulders, with artifacts and gravels above them and below them. The area below this line of boulders shows some large, rounded rocks along with some artifacts. In the most general sense, the profile does show artifacts above and below a line of rocks, with larger rocks at the bottom. Yet, this drawing was not even of acceptable standards when it was done. What it did was to visually justify Formozov's beliefs that there was a single, continuous occupation, except during the brief period of large rock fall which he interpreted as "roof fall." The complexity of various stream erosions of the sediments, which he discussed in the text (Formozov 1958: 43), is not visible on any of his profiles (Formozov 1958: 39-41, figs. 26-28).

What concerned us most, and seriously affected our excavation strategy, was what Formozov apparently had not seen. Most importantly, his east/west profile along the 21/22 line (fig. 5-3), as well as the exposed north/south profile on the G/H line (fig. 5-8), clearly showed a thin horizon of fine sediments, in which bones and artifacts occurred in some abundance (our Level 3). Visually, it was markedly different from the sediments above and below it, and its termination along the 21/22 line in Square J was abrupt and clearly marked.



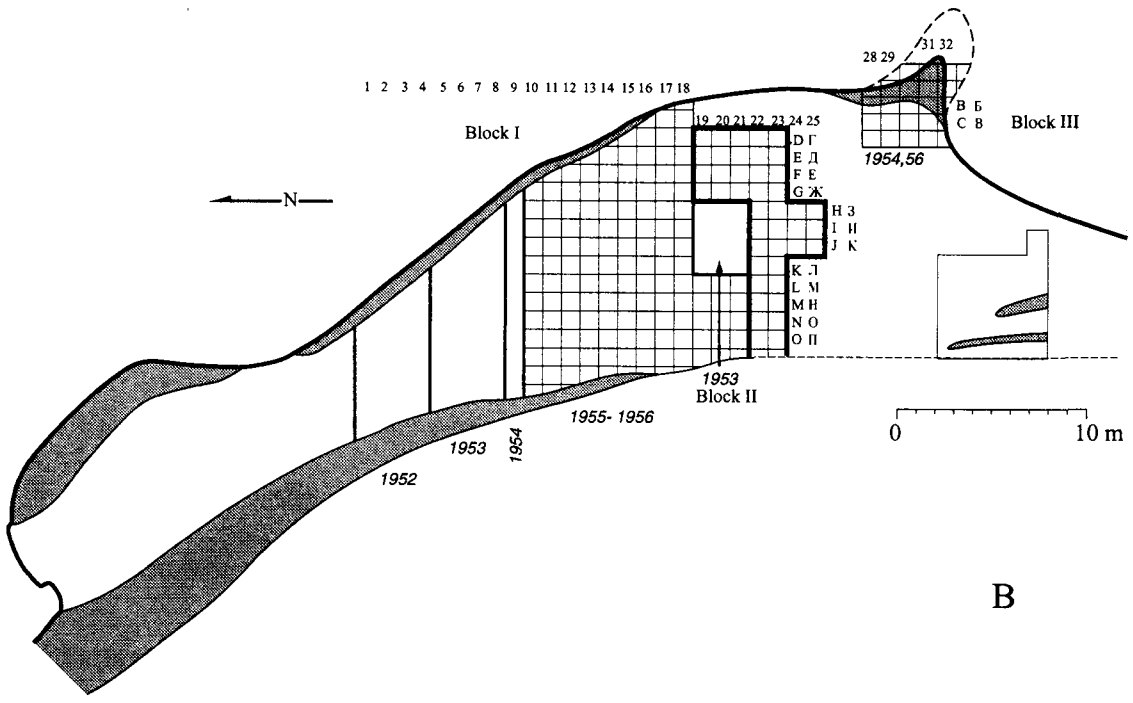


Fig. 5-9—Starosele, plan of excavated areas: *A*–plan of Formozov's excavations; grid system was not used during years 1952-53. Heavier lines indicate exposed profiles. *B*–plan of Formozov's and the recent excavations (in heavier lines) at Starosele. (Redrawn from Formozov 1958: 26, pl. 16.)

In addition, Formozov's profile along the 21/22 line (1958: 40, fig. 27) failed to indicate a massive erosional channel which had cut into the uppermost archeological level and was heading northward, directly toward the area where the Starosele child had been found. If such obvious features had gone unseen or had been judged too unimportant to draw conclusions or discuss specifically, then what about the more subtle variations in lithology and artifact distribution? It was at this point we realized that we ourselves had to firmly and completely understand the stratigraphy based upon our own observations rather than accepting those of Formozov.

Since the exposed profiles were lithologically complex, particularly the sediments above the limestone slabs (Stratum B), it was decided that excavations would proceed mainly by peeling back to the south along the 21/22 line, a meter or two at a time. Since the northwestern-most area was exposed on two sides, the north and west, it was decided to take this out first. In that way, the local stratigraphic situation could be monitored from two directions.

Beyond our concerns to fully control the stratigraphy, we had to consider that the gorge in which Starosele lies is at the edge of the town of Starosele and holds a path which leads from the town up the western cliff face to an area of new buildings. In addition, the box canyon often has hikers, groups of school children, and even shepherds passing through it. Since the excavations were planned to last for three field seasons and it was not practical to rebury the site at the end of each field season, we had to consider how to minimize the chances of "pot hunting" or even casual disturbances by those passing through. We decided that the best way to do this was by planning the excavations to leave as little surface exposed as possible at the end of each field season. That is, excavations of any given square would be stopped only when they rested either on the top of the exfoliated limestone slabs (below Levels 1 or 2) or when they rested on bedrock.

Thus, during the 1993 field season, after drawing the exposed profiles, we excavated Squares D-G/18-21 (15 m^2) to the bottom layer of exfoliated limestone slabs below Level 2. While Formozov's monograph (1958: 51, fig. 34) indicated that he had excavated the whole of line 18, in fact, in this area he had only excavated it to the top of the limestone blocks. Our excavations of this block exposed cultural materials in Stratum B (Level 1) above the limestone blocks and, also, in a thin, ca. 10 centimeter space between two layers of exfoliated slabs, where there was another layer of fine sediments with bone and a few artifacts (Level 2).

We also opened Squares H22/23 through K22/23—a 2 m by 4 m strip—to the lowest layer of exfoliated limestone slabs. These excavations confirmed the stratigraphically complex aggradation of Stratum B (including Level 1), and the continuation of Level 2 toward the southwest, into Squares H22 and H23. These excavations also indicated that the thickness of the exfoliated limestone slabs increased toward the south, making their removal more time consuming than originally planned.

At the end of the first field season, a 1 m^2 pit in Square F21 was placed through the limestone slabs to a depth of some 30 cm. This test confirmed the presence and richness of our Level 3 in that area. At the end of this small test, we refilled the test pit with limestone slabs and dirt, and piled dirt up about 1 meter high, along the opened profiles. We placed the appropriate dosimeters into the profiles, in order to get readings from all exposed cultural levels. The site at the end of the first field season, therefore, had some partly exposed profiles, but all horizontal surfaces were sealed by the exfoliated limestone slabs (fig. 5-11).

The efforts to minimize site damage proved to be rather successful. Aside from a few small holes in the profiles and the loss of two dosimeters from cultural Level 3, the site was in good condition when we returned for the 1994 field season. During that season, we removed the exposed exfoliated limestone floor and excavated the 1993 excavated areas to bedrock.

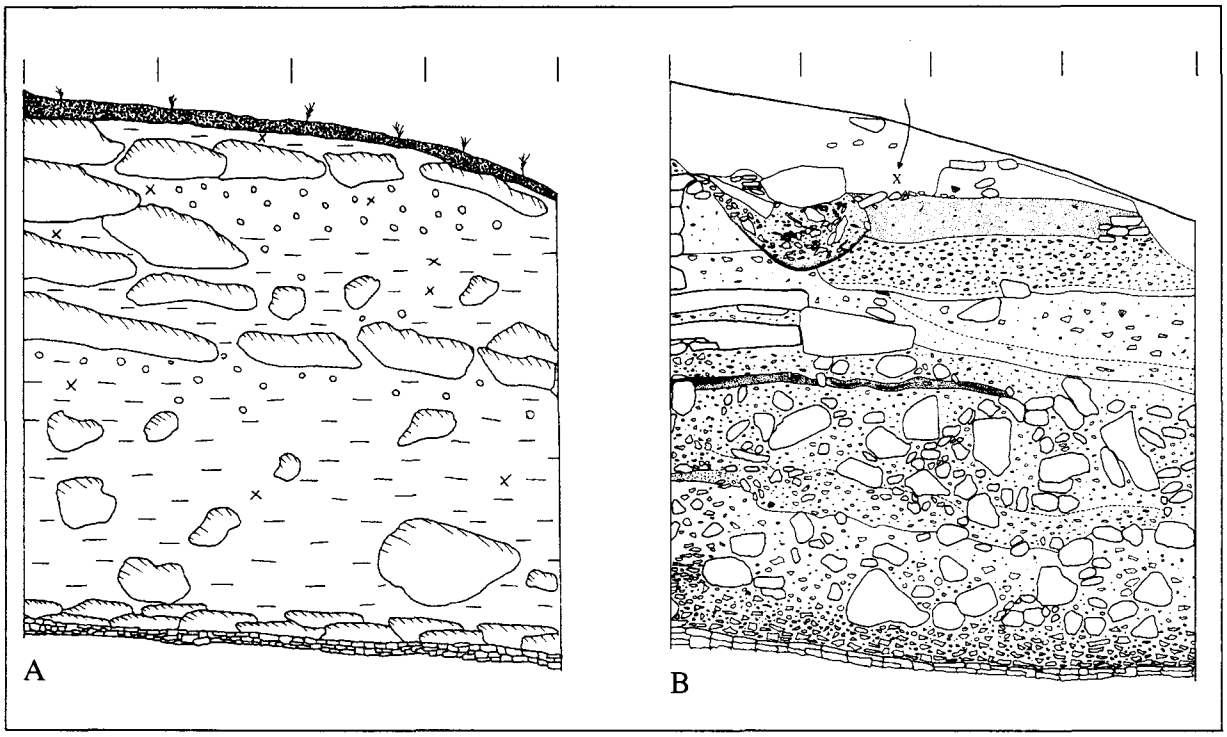


Fig. 5-10—Starosele, east-west profile of line 21/22 H-K (4 m). *A*–as illustrated by Formozov (1958: fig. 27); *B*–the same profile after removal of backfill and cleaning, as drawn in 1993.

Also, we opened Squares D through G 22 and 23 to the top of the exfoliated limestone slabs and the same was done for a 2 m by 3 m block of Squares H24/25 through K24/25.

During the final field season, in 1995, we took the H24/25 through K24/25 block and the D through G22/23 Squares down to bedrock. In addition, we opened a trench along line 23 for Squares L through P. While it was clear that most of the cultural materials from the upper levels either had been washed into that area or had been eroded away in recent times, it was felt that the lower cultural level might be present and that, in any case, the trench would complete a major profile from near to the cliff to the edge of the eroded western slope. Although Formozov's grid map indicates excavations up to the actual cliff face, during the first field season it became clear that the sediments up to 3 meters from the cliff were disturbed by recent quarrying. Since these disturbed sediments rested on bedrock at a depth of only 1 meter below the surface, that area was not excavated by us, as even part of the D line contained only remnants of Level 1 and a thin scatter of Level 2. Along the D line, the lowest of the exfoliated limestone slabs rested directly on bedrock (fig. 5-9).

Excavation Methods

The excavations themselves ran to extremes of technique. The exfoliated limestone slabs had to be broken up with sledge hammers and then taken out, in pieces, with picks. The finer sediments were excavated with trowels and knives. All artifacts larger than chips were placed onto maps within their appropriate squares, and then their elevation was shot in by farmer's level. All pieces recognized in the field as tools were given numbers sequentially for each square and each cultural level. While a few tool fragments were not recognized in the field, and therefore their exact original position within the square cannot be reconstructed, these account for less than 10% of the tools.

Fig. 5-11—Starosele, photo of excavations at beginning of 1995 season, showing the limestone slabs sealing levels 2 and 3 and their removal.

Faunal materials were treated in a similar fashion. All bones larger than about 40 millimeters were drawn onto the map of the square and their elevation shot in, as before. No attempt was made to identify specific body parts in place, but individual teeth, tooth rows, and mandible fragments were drawn in so they could be identified on the map. In the case of long bones, their easy field identification was hampered by extensive breakage during occupations. Although bone preservation was excellent, it was unusual to find a complete long bone, or even a complete articular end. When these occurred, however, a reasonable rendition of their shape was made in the drawing.

After the mapping of a square, all fine sediments were put through a 3 mm mesh and all cultural and biological residues collected. When appropriate, for instance, for Level 2 which had considerable microfauna, the sediments were passed through both 3 mm and 1 mm mesh screens. During the final field season, when we were collecting snails for analyses, all fine sediments were passed through both sized screens.

Given the stratigraphic situation, it was decided that cultural levels would be excavated without using arbitrary sub-levels. Thus, as noted above, artifacts and bones were mapped in place, including their elevations. It was possible, therefore, to separate the tools by elevation, within a level, if that seemed useful during analysis. We were concerned about the thickness of some of Level 1, but the first year's work showed us that, while some small areas had recognizable lenses, they were so limited in area to be useless for analysis. In addition, artifact and bone distributions were vertically continuous within the cultural levels and deciding just which artifacts formed a surface at any time was not possible. Therefore, Level 1 certainly represents a palimpsest of artifact and bone depositions, but ones which appear to relate to the activities of a single group.

ANALYSES

Approaches taken to the analyses of the various samples collected depended upon the nature of each sample. As already discussed in this chapter, soil samples were studied for structure and particle size, and are presently undergoing analysis for pollen content. The faunal materials, including mollusca and microfauna, are being studied following traditional identification to species and age, where possible. In the case of the macrofauna, however, additional studies involving taphonomy, age at death, evidence for butchering and carnivore modification, and the use and/or modification of bone into tools are also in progress. These studies will be presented in the second volume of these final reports.

The study of the lithic artifacts includes traditional typological classification and description, a range of technological observations, as well as considerations of horizontal distributions relative to other features. The artifact classification will follow that described in Chapter 3, with references to other systems. In addition, significant samples of the tools have been studied for use-wear and for residues. These latter studies will also be reported in detail in the second volume of final reports.

CULTURAL STRATIGRAPHY

The cultural stratigraphy consists of all the lithic artifacts and the great majority of the faunal remains. Since there was some evidence for carnivore activity at Starosele (Burke, personal communication), as well as for the washing in of animal bones during floods, it is probable that some of the bone accumulation did not result from human activity. Therefore, each will be considered separately, in relation to their disposal through the excavated deposits and in the conclusions drawn from their vertical distributions. Horizontal distributions of culturally derived materials will be considered in following chapters.

Distribution of Lithic Artifacts

By the end of the second field season, when some squares had been excavated to bedrock, it was abundantly clear that Formozov's view that artifact deposition had been more or less continuous throughout the process of sedimentation was incorrect. While Level 1 has a thickness ranging from less than 10 cm to as much as 30 cm in a few places, Levels 2 and 3 were truly surfaces, separated from each other and from Levels 1 and 4 by significant, artifactually sterile deposits (fig. 5-12). The lowest level, Level 4, was defined mainly by a surface of faunal remains and two thin clusters of wood charcoal, since very few artifacts were present. As such, if a "floor," at all, it was highly ephemeral, representing, at best, a temporary surface on which accumulated some lithics and bones. It is also possible that what we saw as Level 4 was an erosional surface, on which some artifacts had been dropped. Clearly, it was not the only surface in these lower deposits, since some chips and a larger tool or two were recovered below Level 4 (fig. 5-12), while, in places, bone distributions suggest other exposed surfaces during the process of aggradation (see below). In no other case, however, was the accumulation sufficient to recognize a stable surface but, on the other hand, it is also clear that the lower deposits were not washed into the site area during a single event.

Of all the levels, Level 1 was the most disturbed. There were various amorphous pits from the modern Stratum A intruding into the top of Level 1 (e.g., fig. 5-8) and it is likely that some of this level had been eroded prior to the modern quarrying of the cliff face (fig. 5-4). In addition, there was a major burial pit dug through Level 1 onto the upper exfoliated limestone slabs in parts of Squares H24 and most of H25 (fig. 5-8) and the sizable erosional channel seen in Figure 5-3 significantly disturbed the Level 1 sediments in Squares H22 and I22, and somewhat less so in Square H23, as well (fig. 5-8). Thick exfoliated slabs prevented a Level 1 occupation of Squares I25 and K25, by forming a natural wall some 60 cm above the Level 1 surface. In spite of these problems, the vast majority of lithic artifacts and bones were laying horizontally: only those associated with clear disturbances tended to be on edge. In addition, a distinct fireplace was uncovered in Square I22 that showed no disturbance (fig. 5-14). Associated with it was a thin spread of bone charcoal for a meter or so to the south and east, clearly indicating a surface at 2.85 m b.d. in that area.

Level 2 artifact distributions were also largely horizontally positioned. A single exception was a scraper on edge, just at the interface between the intact sediments and some modern disturbance in Square D22. This level contained no evidence for fireplaces, except for a rare, small piece of bone charcoal. Because of the paucity of artifacts, the vertical distributions tend to show only a few pieces at the eastern end of the excavations and others, at the western side of the site, which have been washed downslope (figs. 5-12, 5-13).

Level 3 artifacts, again, were almost always horizontally positioned. An amorphous fireplace in Squares F20/21 rested among some relatively small exfoliated slabs. Just to the south, in row F22, there was evidence of a shallow, temporary pond. Here, the artifacts were both under and on top of the pond sediments. The test in F21 during the first field season indicated the possibility of two distinct artifact/bone layers, separated by the thin layer of fine gravels and fragments of snail shells (fig. 5-15). It appeared that there might be two different cultural layers in that area, while only one homogeneous layer could be seen in the exposed profile for Level 3. Because of this, we recognized a Level 3 and a 3a for the materials and continued that in the following field season. It was discovered, however, that the sterile gravels represented a very small, ephemeral puddle, which was limited to less than 3 m^2 and did not affect artifact distributions even a meter north of F22 (fig. 5-16). As a result, we have grouped the Level 3 and 3a materials together for study and publication.

It is difficult to generalize about the distribution of Level 4 artifacts because there are so few. Aside from a few chips, found mainly from below Level 4 (fig. 5-12), only a handful of

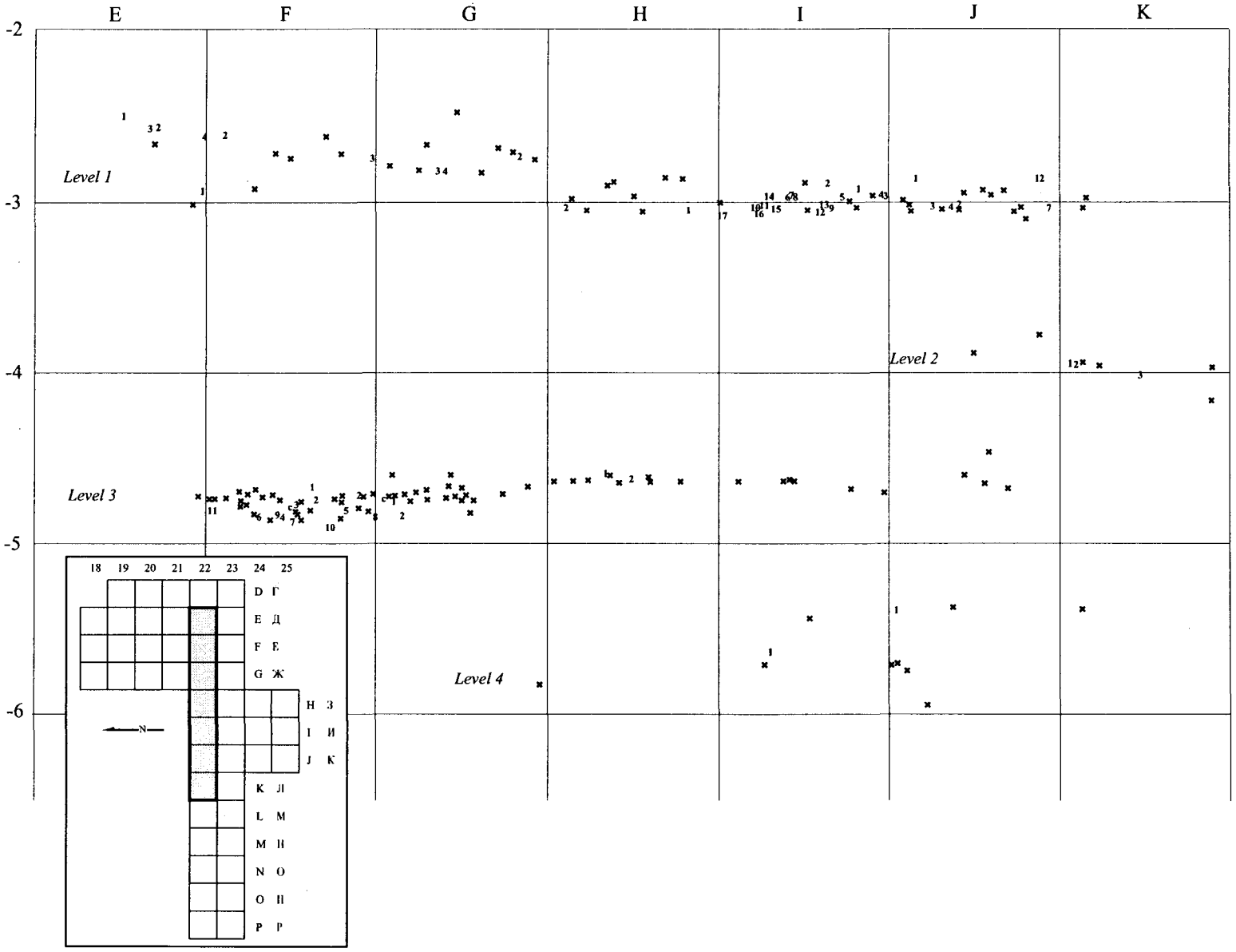


Fig. 5-12—Starosele, vertical distributions of lithic artifacts, line 22 E-K; tools indicated by Arabic numerals, debitage by "x," cores by "c." Inset is plan of recent excavations at Starosele, indicating place of profile.

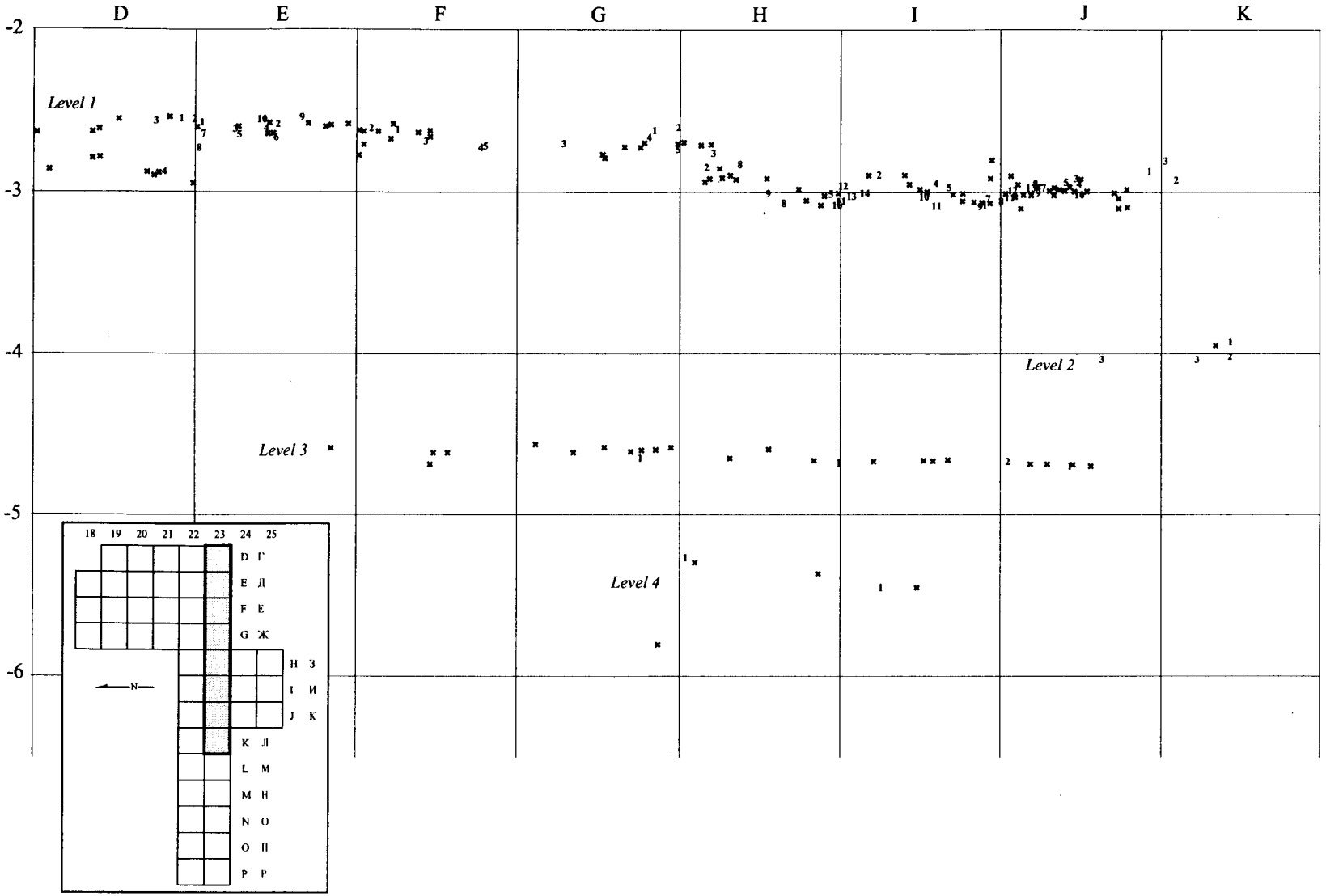


Fig. 5-13—Starosele, vertical distributions of lithic artifacts, line 23 D-K; tools indicated by Arabic numerals, debitage by "x," cores by "c." Inset is plan of recent excavations at Starosele, indicating place of profile.

larger pieces, mainly tools, were recovered. A single, very thin (ca. 1 cm thick) oval area of burned earth and small wood charcoal fragments was found at the same level, partly in Squares L23/22 (fig. 5-17). Additional small fragments of wood charcoal, however, were recovered throughout the sediments below Level 4, all the way to bedrock. They did not cluster and are probably merely part of the sediments washed in during the periodic flooding of the canyon.

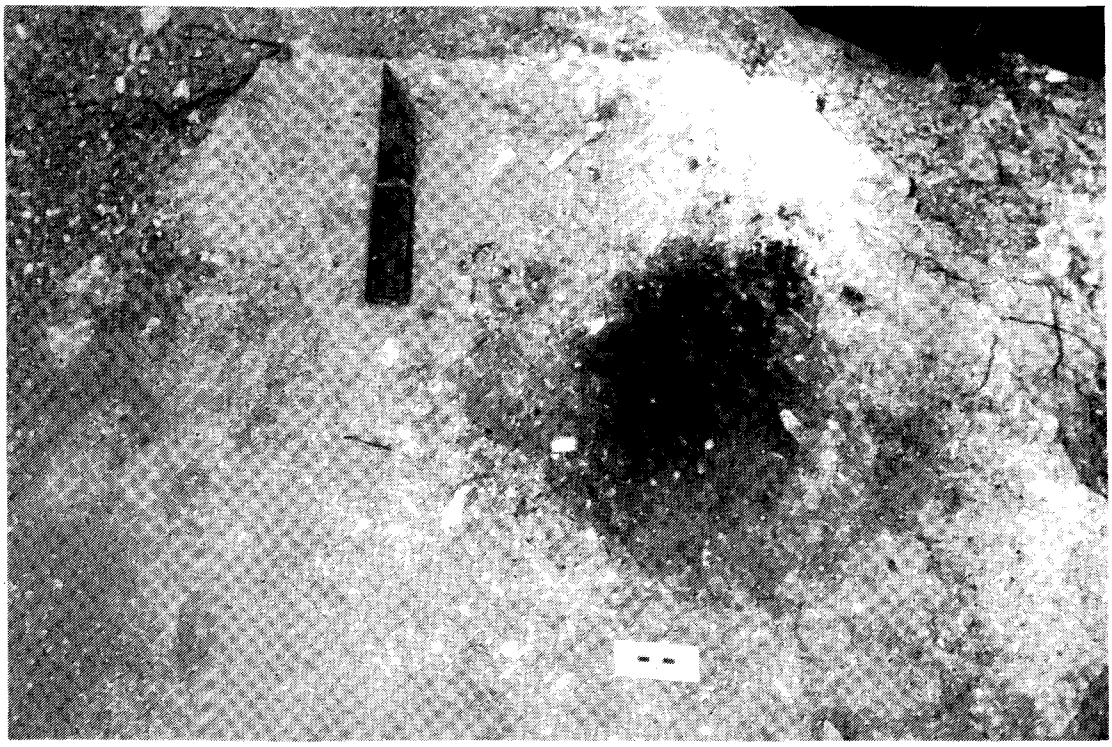


Fig. 5-14—Starosele, Level 1 fireplace.

As noted by Formozov (1958: 41-43), there is a slope downward along the north/south axis of the site, seen most clearly in the bone distributions discussed below. There is also a slight downward trend to the artifacts from east to west, across the main portion of the site, which becomes very marked for Levels 1 and 2 along the western edge (fig. 5-12), but is not present east of K, in rows 24 and 25 (fig. 5-18). This, along with similar bone distributions, clearly document the steep western slope down which artifacts and bones washed toward the canyon bottom.

Distribution of Faunal Remains

In spite of the possibility of carnivore activity, the vertical distribution of the faunal materials strongly paralleled that of the lithic artifacts, although, given their much larger number, their vertical spread in each archeological level is somewhat greater than that of the artifacts (figs. 5-19 through 5-22). While there are very few bones in stratigraphic positions unrelated to the archeological material (e.g., fig. 5-21), it appears that most possible carnivore activity took place on the abandoned surfaces of archeological occupations.

In Level 1, bone accumulation was strongly associated with lithic clusters, both horizontally and vertically. As noted above, these clusters are too small to provide analytically useful samples and, therefore, are combined for analyses. The bone distribution

Fig. 5-15—Starosele, profile of test pit in Square F20-21, 1993 excavations. At the base of the profile, cultural Level 3 and the pond sediments of Level 3a are visible.

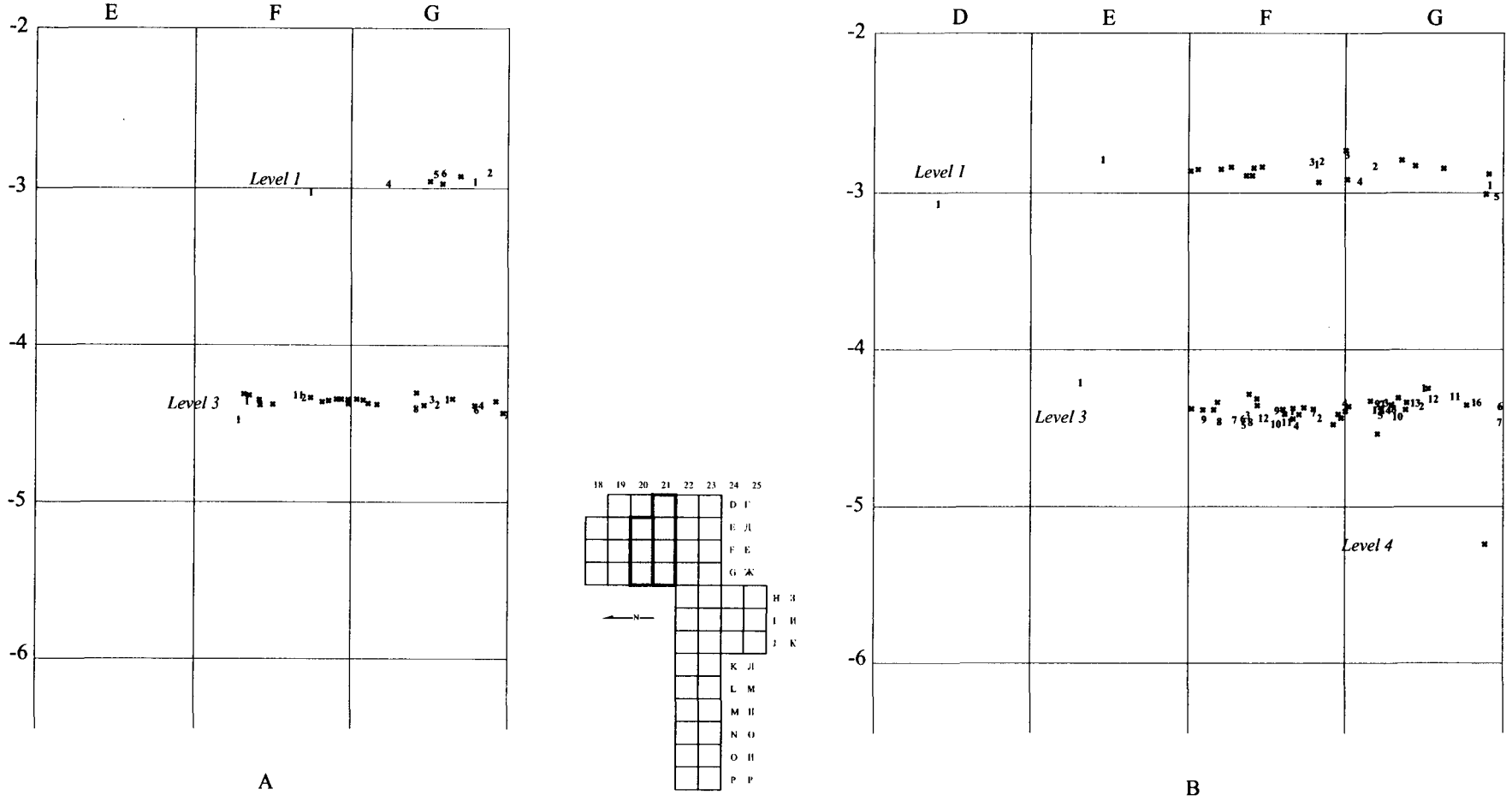


Fig. 5-16—Starosele, vertical distributions of lithic artifacts: *A*–line 20 E-G; *B*–line 21 D-G; tools indicated by Arabic numerals, debitage by "x," cores by "c." Inset is plan of recent excavations at Starosele, indicating place of profile.

of Level 2 was the same as that of the artifacts but vastly outnumbered them. In Level 2, the bones were less fragmented than in the other levels which might indicate a very brief period of surface stability between the two rockfalls which sealed this level.

In the cases of both Levels 1 and 2, the bone distribution, as that of the lithic artifacts, was largely horizontal as far west as row K (fig. 5-20). At this point, however, both show evidence of having been washed down toward the canyon bottom, following the slope of the surface. For both levels, there was a marked accumulation of faunal materials around the westernmost limestone blocks in Squares M22 and N22 (fig. 5-19). It is likely that this was typical all along the western edge of the site, but the 23 row was the only one to expose that markedly sloping area. Levels 1 and 2 do show a downward slope toward the north, but this is not the case for Levels 3 and 4 south of row 20 (figs. 5-21 and 5-22).

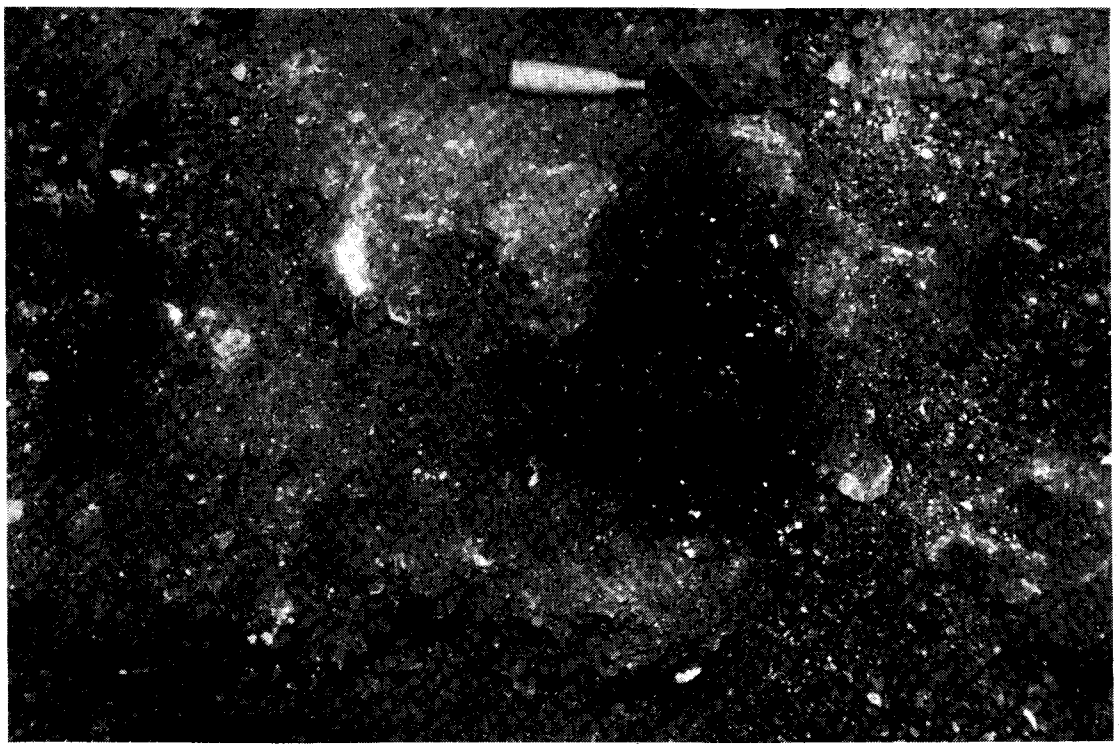


Fig. 5-17—Starosele, Level 4 fireplace.

Again, Level 3 faunal remains clustered with the artifact distributions. In this level, bone condition was similar to that in Level 1—excellent surfaces but a high degree of splintering and breakage from cultural processing (Burke, personal communication). The largest bone concentration was around a single, amorphous fire area in Squares F20 and F21. The absence of "out-of-place" Level 3 bones at the western edge of the excavations clearly shows that the erosional slope which affected Levels 1 and 2 was not yet formed during the Level 3 occupation (fig. 5-19).

The bones from Level 4 were quite different. Again, they outnumbered the artifacts by a large margin but, unlike in the other levels, these bones showed weathering cracks and mainly consisted of tooth/mandible sections and large pieces of long bones (Burke, personal communication). Very few small fragments were recovered. The vertical distribution of the bones continued below Level 4, although density dropped (figs. 5-19 through 5-22). Given the extremely small number of lithic artifacts, it is the bones which provide the best clue to the relationship between them, the artifacts, and the sediments. The sediments, as described

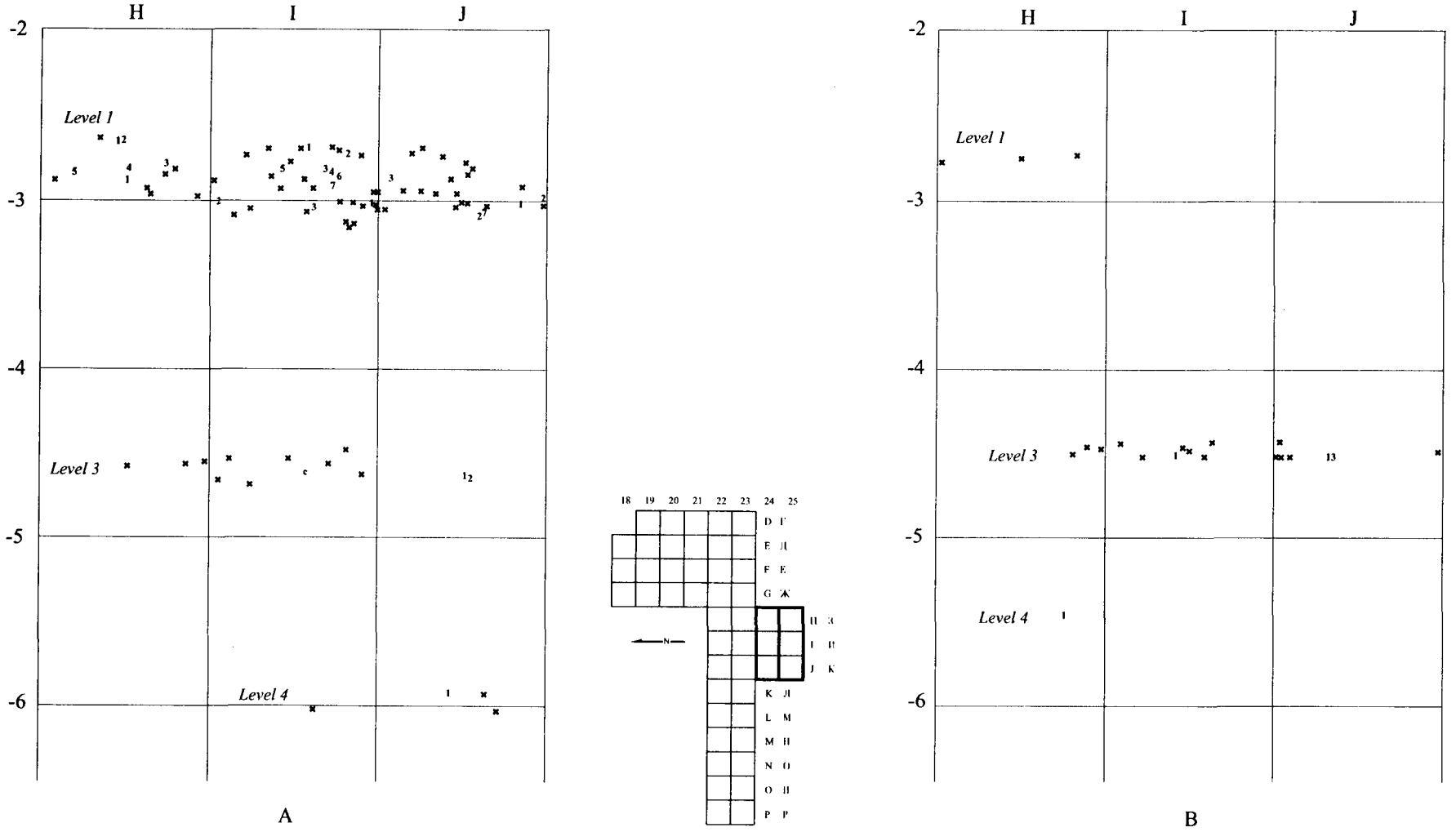


Fig. 5-18—Starosele, vertical distributions of lithic artifacts: *A*–line 24 H-J; *B*–line 25 H-J; tools indicated by Arabic numerals, debitage by "x," cores by "c." Inset is plan of recent excavations at Starosele, indicating place of profile.

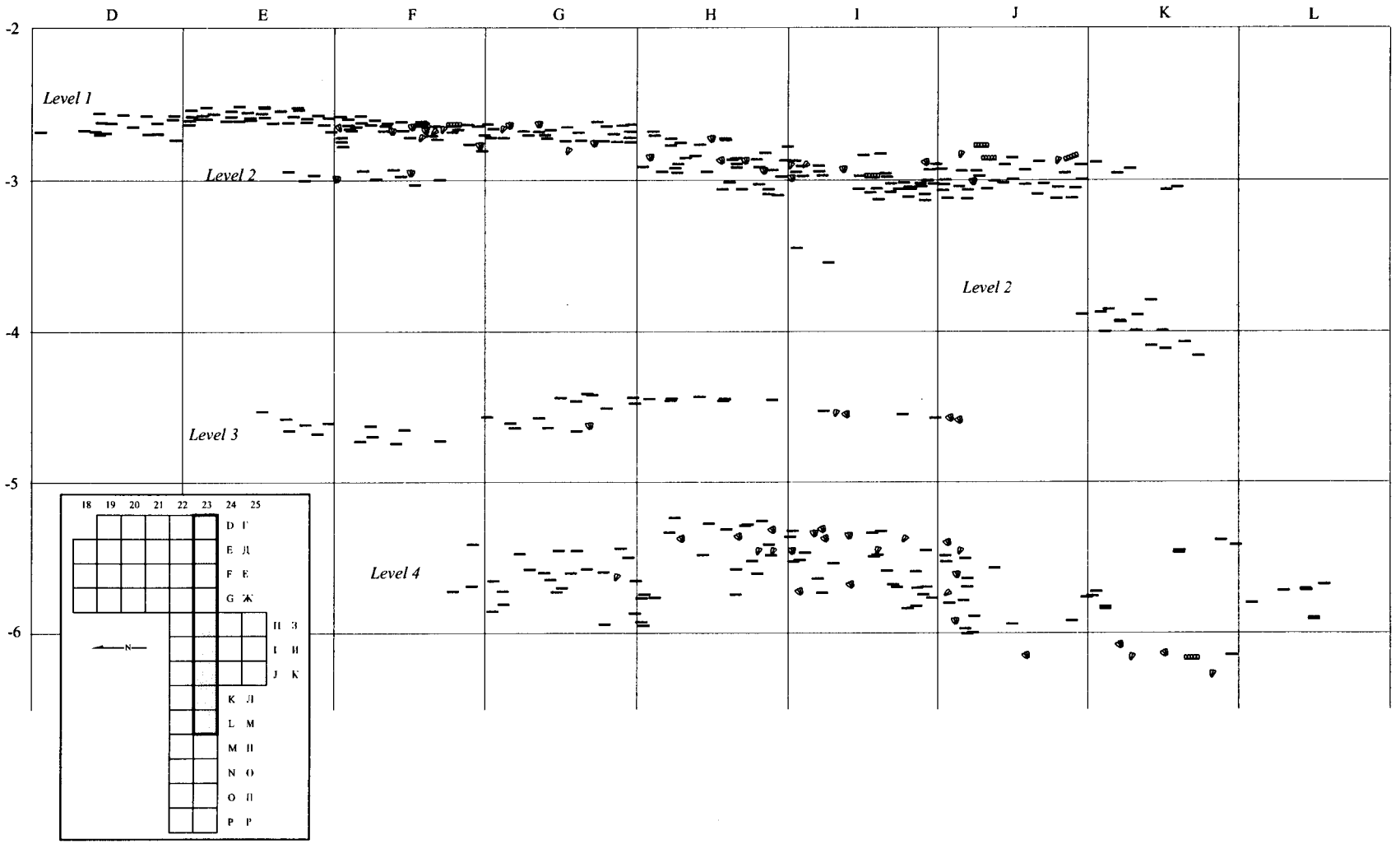


Fig. 5-19—Starosele, vertical distributions of faunal remains, line 23; ▬–bones; ▸–individual teeth; ▬▬–tooth rows. Inset is plan of recent excavations at Starosele, indicating place of profile.

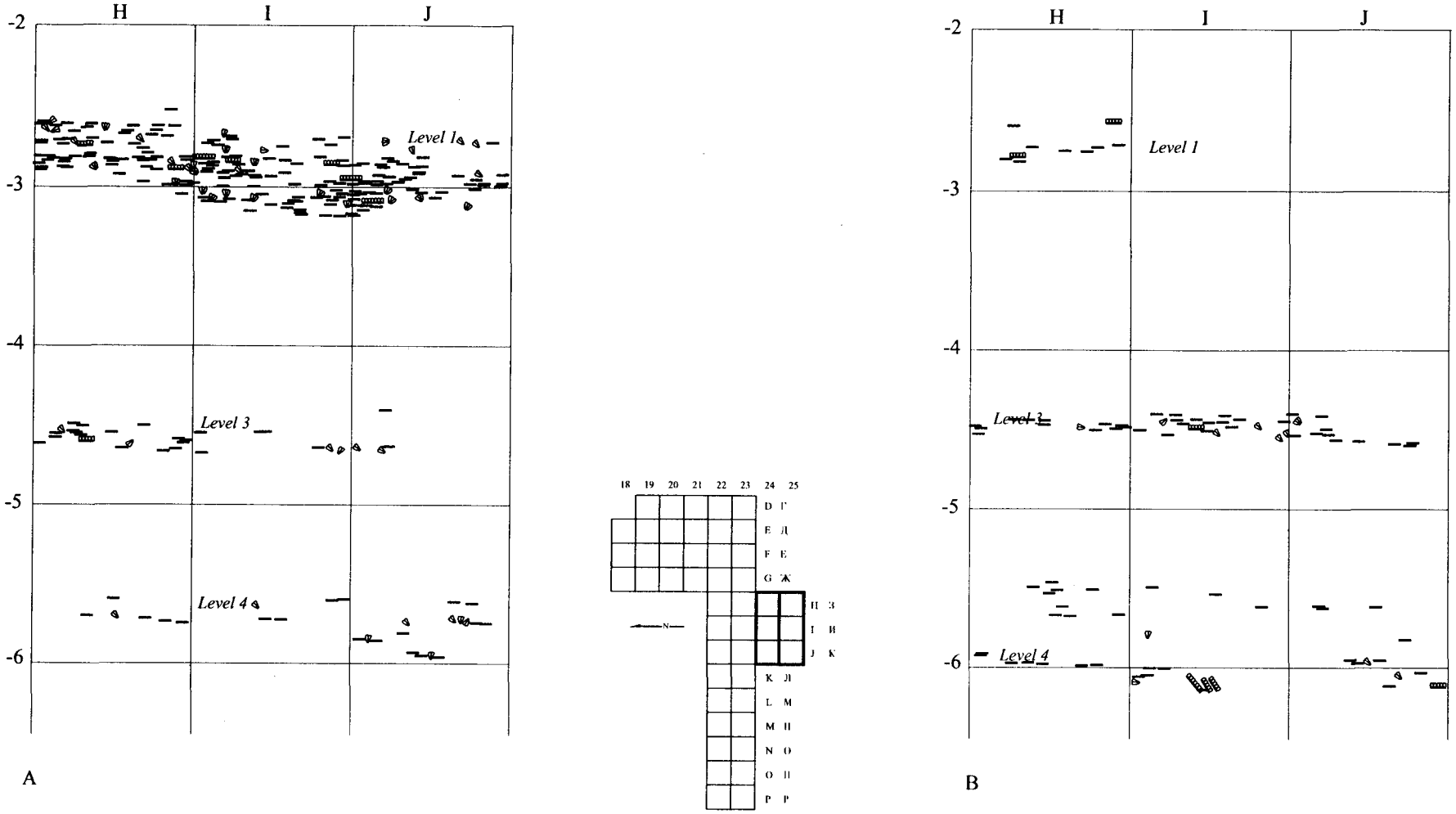


Fig. 5-20—Starosele, vertical distributions of faunal remains: *A*–line 24 H-J; *B*–line 25 H-J; –bones; –individual teeth; –tooth rows. Inset is plan of recent excavations at Starosele, indicating place of profile.

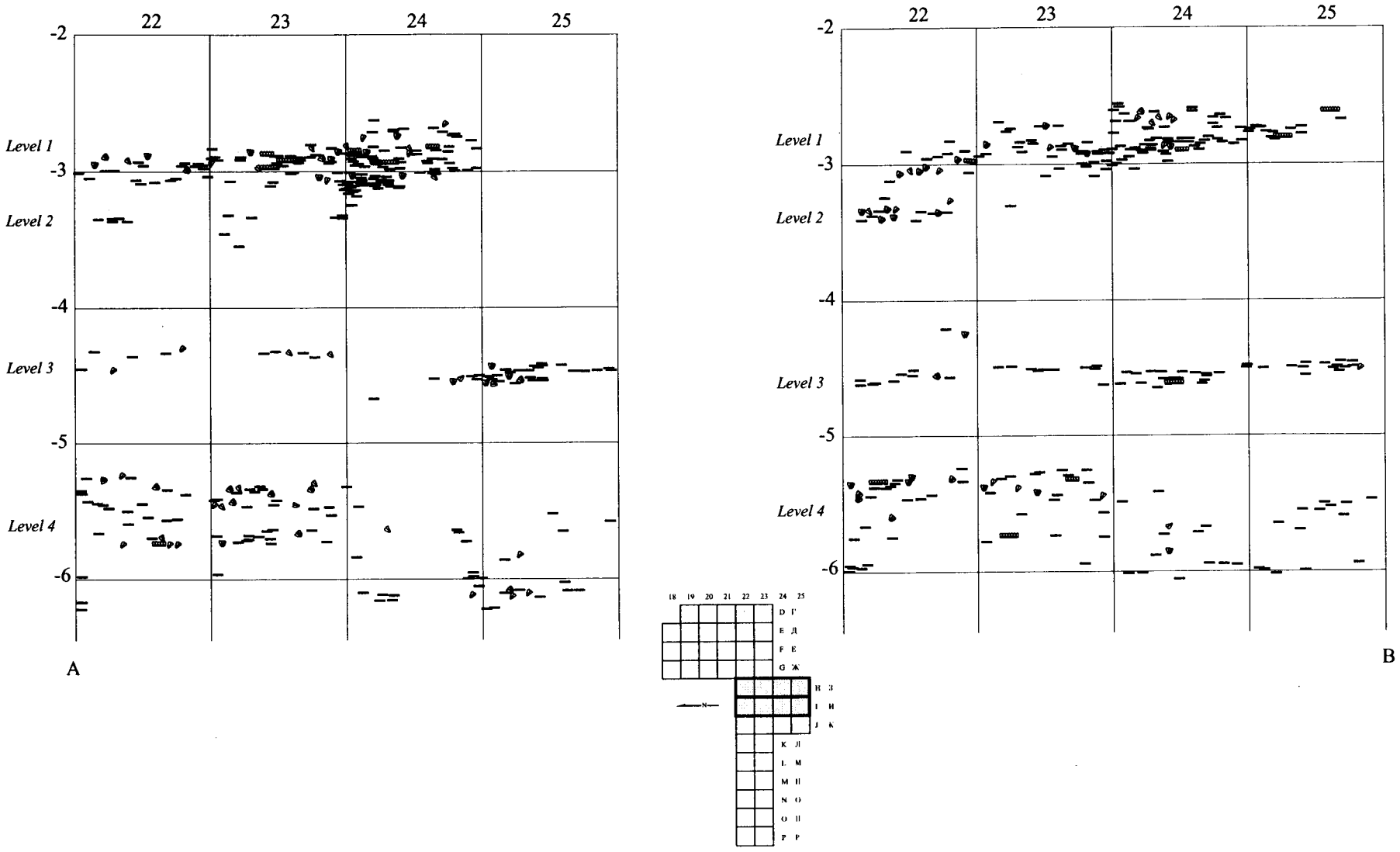


Fig. 5-21—Starosele, vertical distributions of faunal remains: *A*–line H 22-25; *B*–line I 22-25; – –bones; • –individual teeth; ▬ –tooth rows. Inset is plan of recent excavations at Starosele, indicating place of profile.

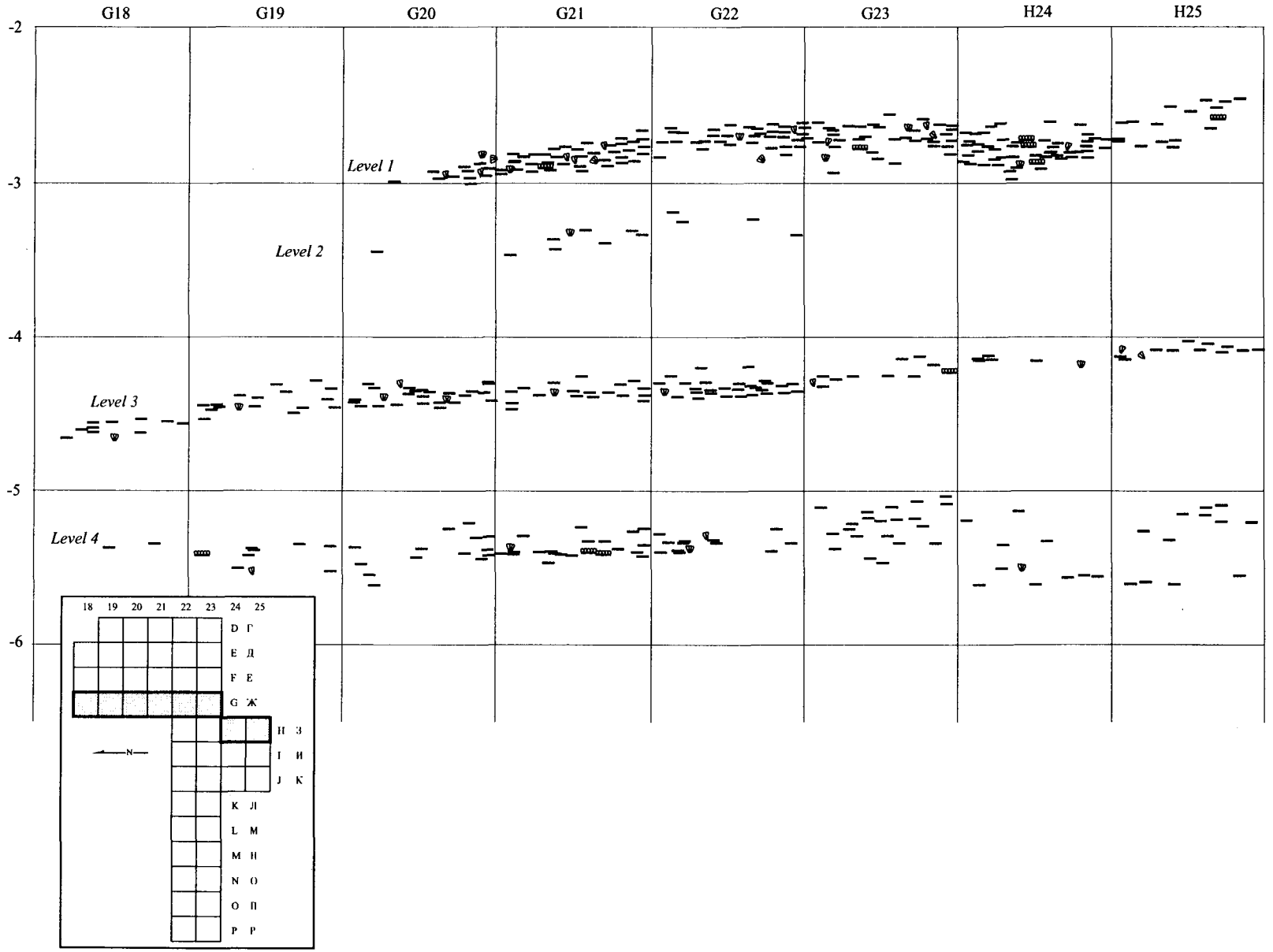


Fig. 5-22—Starosele, vertical distributions of faunal remains, line G 18-23/H 24-25; – –bones; • –individual teeth; ▬ –tooth rows. Inset is plan of recent excavations at Starosele, indicating place of profile.

above, were brought to the site by strong water action. Aside from the surface of Stratum F, which we called Level 4, it is likely that the bones below Level 4 were mainly brought to the site by water action from above the canyon. The "below Level 4" bones were also often on edge or markedly slanting through the deposits. The very few artifacts in similar stratigraphic position, however, show no evidence of rolling or edge damage. Therefore, it is suggested that they were dropped on surfaces during dry periods between the floods and were sufficiently incorporated into the sediments that the next flood did not move them significantly.

Considering the sediments, the fauna, and the artifacts, as a whole, there is not the slightest evidence for a continuous occupation over the 3 meter depth of Pleistocene deposits. Only Levels 1 and 4 (if Level 4 and "below 4" are grouped together) suggest any temporal depth; it is only minor for Level 1 and is mostly due to natural causes in Level 4 and below.

THE DATING OF STAROSELE

Although it became clear early in the excavations that artifacts and bones did not accumulate continuously during sediment aggradation, the actual dates of periods of occupation were unknown. Formozov's belief that all of the Starosele materials came from a single event led him to date it as late Middle Paleolithic, and to justify it by seeing "evolved" elements in the lithic materials, as discussed in detail in Chapter 4. Since the occupations clearly were separate events, it was possible that, overall, they spanned a long period or, conversely, that even though they were separate events, they may have all taken place over a relatively short period.

As noted above, the lower sedimentary units (Strata D through F) mainly were deposited by strong fluvial action, although certainly not by a single flood episode, since at least one major cut and fill episode can be seen in the profiles. The weathered nature of those sediments, as well as their eroded western edge, suggest some time in place before the period of large scale exfoliation of the limestone cliff. The absence of weathering of the exfoliated slabs, except at the break in slope toward the west where the slabs are closest to the surface, indicates that Stratum B accumulated soon after the exfoliation. Given the various minor alluvial/colluvial lateral facies in Stratum B, it was probably a period of rapid accumulation. Thus, it would seem that the sediments below the exfoliated limestone were in place some significant duration prior to the exfoliation and that the sediments above the exfoliation may have accumulated over a brief period.

In relation to the archeological occupations, this would mean that Levels 1 and 2 should be quite close in time and the various visits to Starosele during the Stratum B accumulations would cover only an insignificant time. The temporal relationship of Levels 1 and 2 with Level 3 is less clear. While Level 3 is in the older, pre-exfoliation sediments, it is close to the top of these. Thus, it is possible that all these levels are close in time, since the period of exfoliation was very brief. The stratigraphic positions of Levels 3 and 4, within the older sediments, might suggest they are somewhat similar in age, but their very different positions within those sediments could mean a considerable temporal gap. Only absolute dates could solve these problems because, at best, these observations refer to relative, rather than absolute, time.

Providing absolute dates for accumulations of sediments, natural and/or cultural, becomes difficult when their ages exceed 30,000 BP. Given the Middle Paleolithic character of the materials (excluding the Starosele child itself), absolute dates in excess of 30,000 BP, if not even 40,000 BP, are justifiably expected. While the majority of absolute dates for Starosele do exceed 30,000 BP (see Chapters 13 and 14 for detailed discussions), as usual, multiple dating systems have provided multiple results. While these are often in statistical agreement,

the range of standard errors tends to be so wide as to be less than satisfying. As the absolute dating now stands, the various archeological occupations must be dated in somewhat general terms.

Level 1 has dates from three different dating techniques, AMS on bone collagen (Hedges et al. 1996: 189), ESR on tooth enamel (Chapter 13) and U-Series on tooth enamel and dentine (Chapters 13 and 14). Although samples were taken from Level 1 for TL dating, none of the flint was sufficiently burned to be datable (J. Rink, personal communication).

The AMS dates produced two clusters, both of which are apparently technically good and both received the same exact pre-treatments. One cluster consists of two dates taken from bones excavated by Formozov from above the exfoliated limestone and the other comes from two bones excavated by us from Level 1, also above the exfoliated limestone. Both sets came from near each other; the Formozov samples from Squares H21 and L18 (our lettering system) and ours from Square H22, at depths of 2.83 and 2.91 below datum (see figure 6-1). The higher bone comes from the top of Level 1, while the lower bone came from within a concentration of Level 1 materials. The dates are as follows:

Formozov sample	Square H21	36,160 ± 1,250	(OxA-4133)
Formozov sample	Square L18	35,510 ± 1,170	(OxA-4134)
Recent sample	Square H23 (2.83 bd)	41,200 ± 1,800	(OxA-4775)
Recent sample	Square H23 (2.91 bd)	42,500 ± 3,600	(OxA-4887)

As pointed out (Hedges et al. 1996: 189), each set is internally consistent and it is not apparent why the "second is so much older than the first." The difference between the pairs, by averaging within each pair, is 6,015 years; that is, the first averaged date is 35, 835 BP and the second is 41,850 BP. At one standard deviation, neither the averaged date nor the paired dates overlap. At two standard deviations, however, all dates do overlap and so, at a 97% confidence level, all dates are statistically the same. This provides a rather wide window for the occupation.

Regardless of how inexact the absolute AMS dating may be, it is clear that using AMS dating exclusively, Level 1 was occupied some time around 40,000 years ago and more probably somewhat before 40,000 BP than after it. This, by itself, certainly supports Formozov's belief in a late Middle Paleolithic date, at least for Level 1. Level 2 was undated, but its stratigraphic position is clearly temporally close to Level 1 and these dates should be equally valid for Level 2.

The coupled ESR/U-Series dates on tooth enamel for Level 1 are generally consistent with the AMS dates, but tend to match more closely with the older set, rather than the younger (see Chapter 13 for detailed discussion). As of now, a date of 41,200 ± 3600 BP should be considered a minimum.

When both the AMS dates and the coupled ESR/U-Series dates are considered together, a date of ca. 40,000 BP would seem reasonable. As pointed out in Chapter 13, however, the ESR/U-Series dates are affected by beta levels, so a date in the late 40,000s is probable, correlating better with the second set of AMS dates. While we may never get tighter temporal controls on the Level 1 occupation, it is clearly a late Middle Paleolithic. Yet, it is certainly not the youngest Middle Paleolithic in the Crimea, which at the moment appears to be the Western Crimean Mousterian at Kabazi II, Unit II, or possibly, the Kiik Koba occupation of Level B/B1 at Buran-Kaya III, in eastern Crimea (Pettitt 1997).

Level 3 has both coupled ESR/U-series dates (Chapter 13) and a sequence of U-series dates on tooth enamel (Chapter 14).[1] The former produced a range of 37,800 BP to 46,000 BP, with

[1] The manuscript of Chapter 14 was received too late to be considered in this discussion.

a mean date of 41,900 ± 4,100 BP, only slightly older than the Level 1 average. The latter gave a date of 45,800 ± 5,100 BP. While this date is absolutely older, the mean date and it are statistically identical. Again, however, the coupled ESR/U-Series dates must be adjusted for beta effect and, as explained in Chapter 13, this discrepancy would affect the Level 3 dates more than the Level 1 dates, making them closer to 50,000 BP than to 40,000 BP.

Given the stratigraphic position of Level 3 near the top of the older sediments and close to the exfoliated limestone slabs, it is not surprising that it appears to be only somewhat older than the Level 1 occupation directly on the limestone slabs. How much time difference is involved? It could be very minimal or, equally, it could be in the order of 8,000 years or somewhat more (see Chapter 13).

A single U-Series date for Level 4 of 104,000 ± 8,500 has been published, noting that was preliminary and might undergo significant change (Marks et al. 1997). It turns out that this original reported date was incorrect, as discussed by C. McKinney in Chapter 14. Although combined ESR/U-Series samples are currently being processed (J. Rink, personal communication), they will not be available for some time. Thus, the absolute age of Level 4 remains highly tentative. On the other hand, the geological deposits consisting of transported *terra rosa* soils, without significant weathering, suggest that these deposits only somewhat post-date the Last Interglacial. Given the combination of assemblage types, geological deposits, and absolute dates from Kabazi II and GABO, a date around 70-80,000 BP would not be surprising. In fact, it would make a good deal of sense both archeologically and geologically. Only time will tell, however.

DISCUSSION

As documented above, the vertical distributions of both lithic artifacts and bones clearly show that their accumulations were episodic, not continuous. The absolute dates also indicate a significant period between Level 4 and Level 1. These facts have a profound effect on the *a priori* acceptance of previous descriptions and interpretations of the Starosele lithic "industry." Since it is obvious that Formozov's justification for lumping all materials into a single analytic unit was without validity, it is also possible that the works of Gladilin, Chabai, and Yevtushenko, as they relate to Starosele, also need revision. Even though they kept separate the samples of Formozov's "cultural level 1" and "cultural level 2" from his 1955/56 excavations (see Chapter 4 for a detailed discussion of this), they could not have separated the materials from below the "roof fall" into their two clearly distinct stratigraphic units (our Levels 3 and 4). Although Formozov noted that there were two levels below his "roof fall," he decided they were not significantly different and put them together as "cultural level 2" (Formozov 1958: 48). Only the new excavations at Starosele can resolve whether this grouping was justified. As will be shown in detail, unfortunately, it cannot be justified, since the Levels 3 and 4 assemblages are very distinct, as are the Levels 1 and 3 assemblages. Thus, new descriptions of the Starosele assemblages are necessary, as are judgments as to how they relate to assemblages from other sites in the area.