STRATIGRAPHIC SECTIONS

Giorgio Buccellati

Stratification and Stratigraphy

The primary goal of field archaeology is to establish and record the stratigraphic sequence of the remains of cultural deposition. One of the main components of the stratigraphic record is the section (or profile), i. e., a graphic rendering of a plane which cuts through deposition at chosen junctures. A few words must first be said about the concept of section and the underlying presuppositions before we describe the technical procedures for its recording. A section is by definition the rendering of a plane, specifically, it must be stressed, a plane that cuts through a volume. It is easy to misconceive of a section as only a flat and'linear surface; however, it must be understood in relationship to volume and mass. A section cannot be viewed as an end in itself, graphically or conceptually; rather, it must be viewed as one of two or more axes that cut through a solid for the purpose of correlating the spatial components found within the block itself. Such a block, in the case of archaeology, is the stratified result of cultural deposition over time. Thus "stratification" refers to the concrete build-up affected by the two concurrent processes of accumulation and emplacement, and "stratigraphy" refers to the conceptualization of stratification. The recording of this conceptualization takes either an analytical or an analogical form: the former includes verbalization, digitation and diagramming, while the latter includes photography. Stratigraphic sections are a part of the analytical record.

In order to better understand the concept of section, and to answer some objections raised against its use, we may think for a moment of a simple conceptual model to represent the underlying concept of stratification. Commonly, the analogy is made between an archaeological site and a layer cake. More aptly, however, a site should be compared to a machine as shown in its assembly chart (Figure 4-1): the parts all fit together, and to remove them one must follow an order inverse to the assembly sequence. Of course, the assembly of a machine responds to a single purpose and is essentially a one-time event, whereas cultural deposition has an unbounded time depth and responds to many purposes when it is not wholly accidental. But, by referring to an assembly chart, the point may be more easily grasped that the most suitable graphic recording is the one which best represents the spatio-temporal relationships of volumes. Note the qualification "spatio-temporal": what matters is not only the reciprocal location (in space) of the parts, but also the combinatory process (in time) whereby they came to be where they are. From this pofnt of view, a section is a

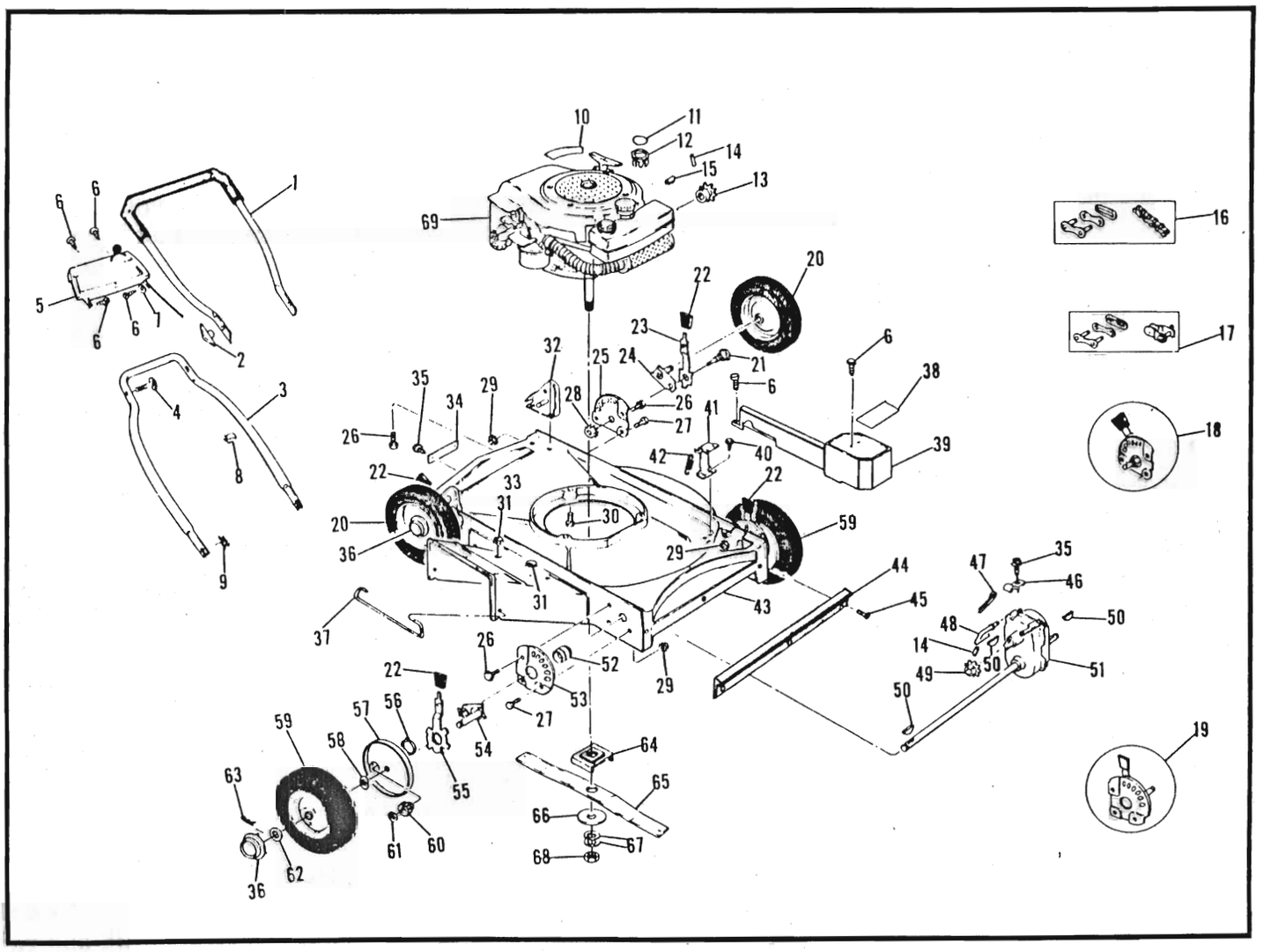
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Figure 4-1

convenient graphic device for a concentric and layered type of deposition; it is suitable, precisely for a layer cake, but less so for a machine or--an archaeological site, Obviously, a section cut through the lawnmower represented in Figure 4-1 would be much less transparent than the corresponding assembly chart. What, then, are we to do for archaeological sites, which are all in fact, stratigraphically more complex than a layer cake? Is there a better graphic device than the section, some kind of archaeological equivalent of the machine assembly chart?

The answer is mixed. Short of utilizing complex and costly computer graphics procedures, the section will remain a useful and necessary tool for stratigraphic recording, but it should be conceived of as serving at the same time both a documentary and an indexing function, It is documentary in that it gives a true depiction of stratigraphic relationships as seen at selected junctures; but it is also an index in that it refers to volumes which are beyond the juncture plane and thus are not registered in it. The section is a window into the larger spaces through which it is cut, not a full account of the third dimension, An exhaustive recording of the data in their three-dimensional form will have to focus on the individual items in their stratigraphic context. One procedure to this effect has been suggested in a jointly authored manual (Buccellati and Kelly-Buccellati 1978): stationary units and movable items are all recorded individually and are indexed according to strata which identify a slot in the stratigraphic sequence, Similarly, Harris (1979: 73-80) has proposed a recording procedure based on a single-layer plan, indexed according to a "matrix" which embodies the stratigraphic sequence (ibid.: 86-89). Here, however, we will be concerned exclusively with the section proper, Having now outlined its theoretical import and characteristics, we may proceed with the descriptive portions of our paper,

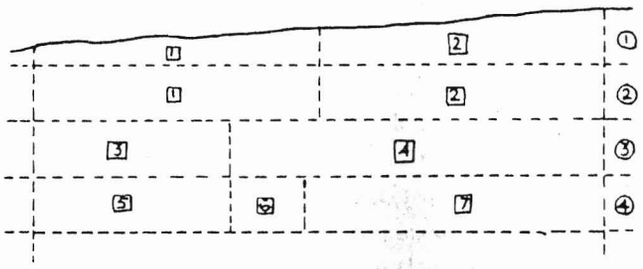
Types of section

A section may be physical or graphic: the former is one which is left standing in the ground after the excavation has cut through the deposit, the latter is the graphic rendering of the former (except in the case of a projective section, for which see below).

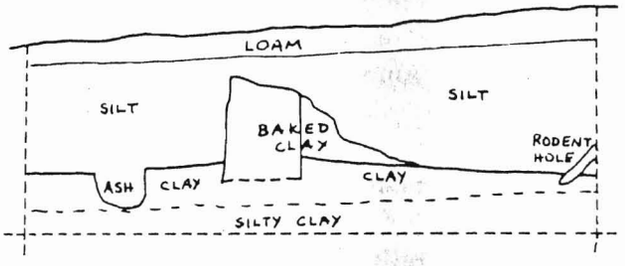
A section may further be diagnostic or documentary, The former is used as a heuristic procedure during excavation, to provide clues that may help in reading the deposit; the latter serves as a visual record of a given sequence after exposure has been attained. Note that a documentary section need not be drawn graphically simply because it has been left standing and has been used for diagnostic purposes: that decision will depend on explicit recording policies.

The orientation and geometrical configuration of the section are in principle indifferent; in practice, however, sections are only vertical or horizontal, and they are always straight, Oblique

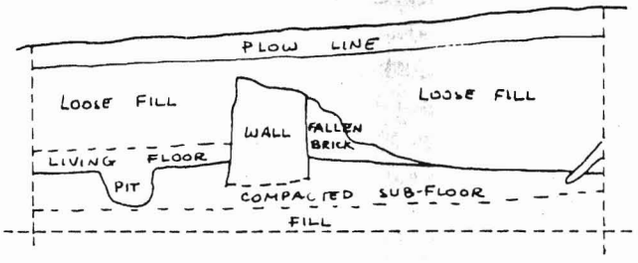
Section through stratigraphic unit showing volumetric elements.



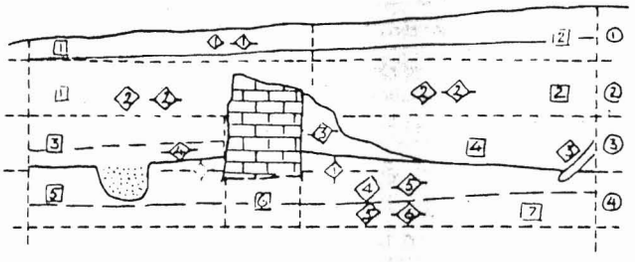
Section through stratigraphic unit showing natural elements.



Section through stratigraphic unit showing cultural elements.



Section through stratigraphic unit showing combination of volumetric, natural and cultural elements.



◊1 Materials below floor in 5 and 7 are recorded in ④

◊1 Loam
◊2 Silt
◊3 Rodent hole
◊4 Clay
◊5 Silty clay
Ash

◊1 Plow line
◊2 Loose fill
◊3 Fallen brick
◊4 Living floor
◊5 Compacted subfloor
◊6 Fill
Brick

Figure 4-2

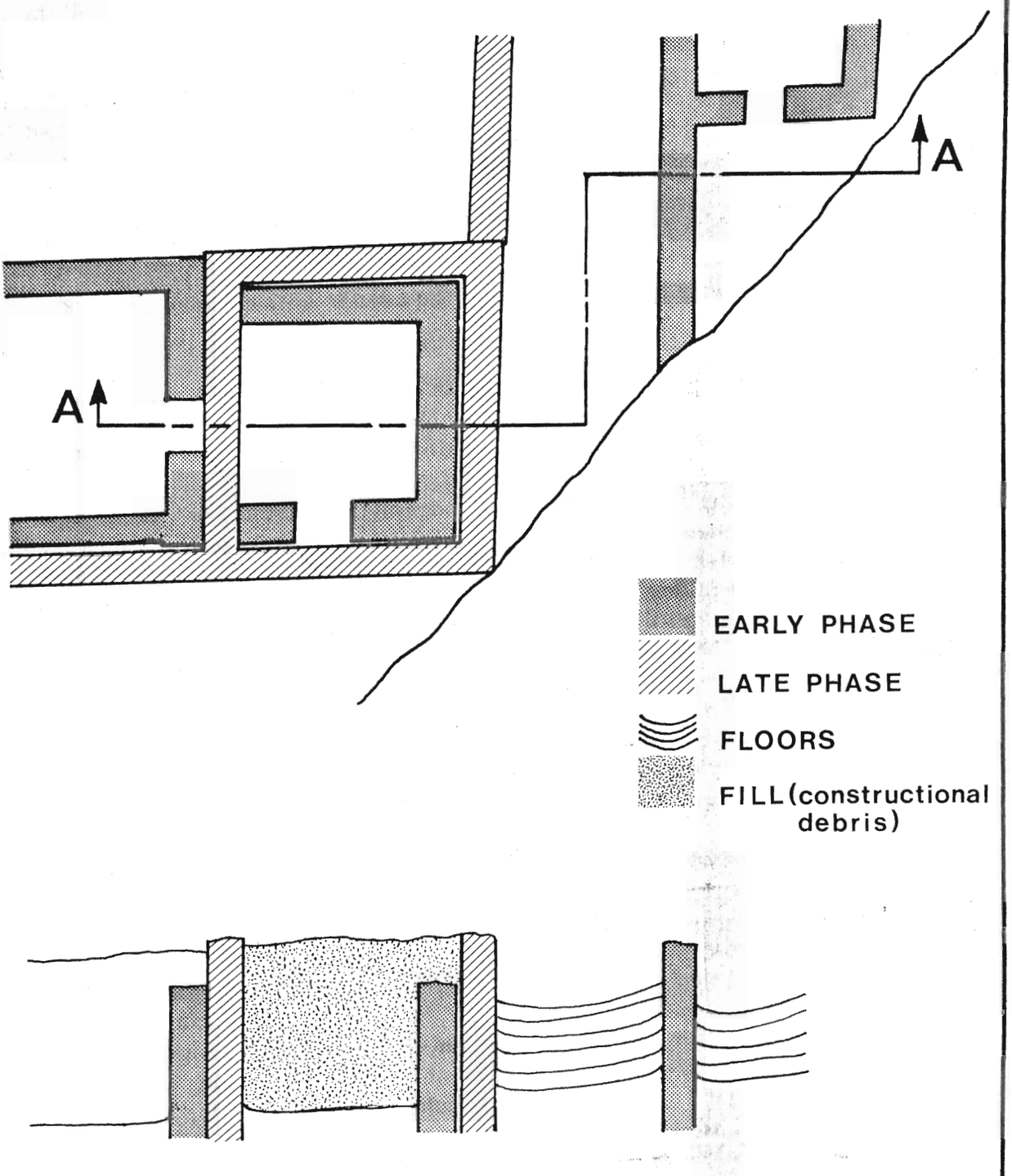

A
A
EARLY PHASE
LATE PHASE
FLOORS
FILL (constructional debris)
SECTION A–A

Figure 4-3

or curved sections would require excessive computation for easy correlation among sections and floor plans, whereas right angle and straight sections can be readily correlated through a normal triangulation system, Note that a horizontal section is different from a floor plan. A floor plan is not a geometrical plane but a rendering of cultural features disposed along a surface that is generally flat, but not necessarily straight or perfectly horizontal. A horizontal section, on the other hand, is a geometrical cut through the deposition, which ignores the solid contours of cultural features. It is used primarily for diagnostic purposes, when excavating in an area where the solid configuration of the cultural deposit is still unknown; graphic documentation of horizontal sections is not as useful because it reveals more in terms of planimetric than stratigraphic relationships, and the former are better accounted for by means of floor plans than horizontal sections.

The following three-way classification may be used to define the nature of the information conveyed in a section:

culture-free	=	volumetric elements	=	arbitrary
		physical elements		
culture-bound	=	cultural elements	=	natural

A volumetric section has the limited function of marking the "arbitrary" parameters of the triangulation system, by reference to such volumetric entities as levels (often symbolized by numbers within circles) and loci (often symbolized by numbers within squares). A physical section shows natural boundaries and describes the component parts in terms of their physical properties, especially the nature of the soil or of modified deposits such as ash or baked clay, A cultural section also shows natural boundaries, and thus it generally overlaps with a physical section; the component parts, however, are described by their cultural properties, so that a given layer of soil, for example, will be designated a floor because of compaction and association with other items such as walls. In practice, sections are normally drawn only once, combining into a composite the major items from each category. Figure 4-2 (reproduced from Buccellati and Kelly-Buccellati 1978: 12f) gives a schematic rendering of the various types of sections just described.

Finally, a section may be viewed in terms of the procedure followed in recording it. Thus we have an integral, an incremental, or a projective section (see Harris 1979: 53-55, where these three types are defined as "standing, " "cumulative" and "incidental"). An integral section is one which is recorded when all the component parts are still standing. This is the standard approach, and presupposes that baulks are physically maintained throughout the excavation. An incremental section is one recorded in increments, with the corresponding physical components being removed in the measure in which each increment is recorded, A projective section, recorded without the benefit of full visual inspection of a physical section, is extrapolated from an existent volume or mass that is left physically standing in the excavation but is not cut through. This applies, for instance, to masses of masonry when they are not physically cut through along the line of the pertinent section,

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Chapter 36, p. ____
Master p. ____

SOIL RECORD

Initials _____ Date _____ Square _____ Stratigraphy _____

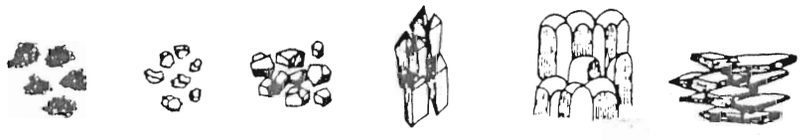
Color (Munsell): dry _____ wet _____

Texture Matrix

present
partly present
absent

	grains detectable by hand & eye	leaves color on fingers	surface can be made to shine	when moist coheres into pellets	if dry, pellets break up & fall apart	pellets dry out hard	pellets can be molded into shapes	silty feel apparent	silty feel dominant	when dry, rubs off as loose fine powder	when dry, blows away easily
clay	present	present	present	present	absent	present	partly present	present	present	absent	absent
sandy clay	present	present	partly present	present	absent	present	present	present	present	absent	absent
sandy clay loam	present	present	present	present	absent	partly present	partly present	present	present	absent	absent
sandy loam	present	partly present	partly present	partly present	absent	absent	absent	absent	absent	absent	absent
loamy sand	present	partly present	partly present	partly present	absent	absent	absent	absent	absent	absent	absent
sand	present	absent	absent	absent	absent	absent	absent	absent	absent	absent	absent
sandy silt loam	present	partly present	partly present	partly present	absent	absent	absent	absent	absent	partly present	partly present
clay loam	present	present	present	present	absent	partly present	partly present	absent	absent	absent	absent
silty clay	present	present	partly present	present	absent	present	present	present	absent	partly present	absent
silty clay loam	present	present	present	present	partly present	partly present	partly present	present	partly present	present	partly present
silt loam	present	present	present	partly present	absent	absent	absent	present	present	present	present

Structure



For individual peds:

	crumb	granular	blocky	prismatic	columnar	platy
fine	☐ < 2mm	☐ < 2mm	☐ < 1cm	☐ < 2cm	☐ < 2cm	☐ < 2mm (thin)
medium	☐ 2-5mm	☐ 2-5mm	☐ 1-2cm	☐ 2-5cm	☐ 2-5cm	☐ 2-5mm
coarse	☐ > 5mm	☐ > 5mm	☐ > 2cm	☐ > 5cm	☐ > 5cm	☐ > 5mm (thick)

For cluster of peds, when peds cannot be identified:
☐ massive: holds together as a coherent mass
☐ single grain: is incoherent and disintegrates into separate particles when disturbed

Consistence

dry: ☐ hard (difficult to crush) ☐ soft (easy to crush)
wet: ☐ sticky (sticks to fingers if pressed) ☐ plastic (can be rolled into "worms")

Boundaries

	merging/sharp		smooth/wavy/irregular		
upper	☐	☐	☐	☐	☐
lower	☐	☐	☐	☐	☐

Figure 4-4

Sections are especially common in two circumstancest either along the sides of an excavation unit that corresponds to a site grid, or along the axes of structures or features. The first, or grid section, is independent of the contours of cultural deposition and responds only to a volumetric design imposed a priori over the site. The second, or structural section, presupposes recognition of patterns of cultural deposition and aims at documenting the deposition itself from the best available vantage points. In this type, especially, it is often counterproductive to leave the baulks standing as in an integral section, since within a structure or feature it is more desirable to expose floors and other features to their full extent, Thus it is that structural sections are best recorded following an incremental procedure.

The physical record

Just as artifacts are cleaned before being drawn and photographed, so a section too must be prepared before a graphic recording is possible. While a section refers to volume and mass, as emphasized above, it is in fact, in and of itself, a plane: hence the record shows only lines and surfaces. It may be said that the first task in an excavation is to identify cleavage lines. These lines may be the result of compaction, cutting, juxtaposition, and so on, but they are in any case visible to the eye as the alignment of homogeneous elements; as such, they stand out because of such factors as discolorations or texture variations on either side of the line. The lines, in other words, are not so much separate items as they are boundaries between heterogeneous bands, i.e., they represent the interface between discrete features (on this see the excellent remarks by Harris 1979: 43–18). From this derives the principle that section lines ought to be scored with a sharp point drawn through the face of the section, This procedure has given rise to objections, primarily on two grounds: first, that scoring may obliterate the record itself, and second, that it introduces an undesirable degree of subjective interpretation, One may, however, respond to the first objection that since the line is a boundary between features rather than a feature itself, nothing is in fact obliterated; and to the second that if sufficient attention is paid to measurable criteria such as color and texture, there is an adequate control on objectivity.

Since cleavage lines are boundaries between volumes, and since volumes are concrete masses which do not disappear into thin air at one end, it follows that section lines cannot stop suddenly without some degree of resolution. This means that either they meet another line, or else they exhibit a progressive loss of markedness. In the first instance, the juncture of two lines corresponds to the juxtaposition of two discrete volumes, while in the second the disappearance of a line corresponds to the gradual merging of two volumes which are discrete at one end and fused into a homogeneous whole at the other, Such a merging boundary must be carefully assessed in terms not so much of the line itself but of the bands (i.e., volumes) that surround it.

Reading a physical section is difficult if one pays attention to minute details and not only to the broad outline. It is important, therefore, to correlate it as closely and as often as possible

NATURAL STRATIGRAPHY

DEPOSIT

Homogeneous

GRAPHIC REGISTER	ALPHA-NUMERIC REGISTER (Alpha-Numeric codes are cumulative)
Texture and Dominant Color: (Deviations are noted by Alpha-Numeric Register)	**Color:** (Sequence according to Munsell chart)

Within Cultural Deposition:

- clay (reddish brown)
- silty clay (light gray)
- silt (gray)
- sandy clay (light brown)
- sand (light brown)
- rocks (limestone; light brown)
- gravel

Capped by Cultural Deposition:

- virgin soil (clay; reddish brown)

◊D dark ◊L light

◊R red
◊G gray
◊N black ("noir")
◊W white
◊P pink
◊B brown
◊Y yellow
◊O orange
◊V green ("vert")

Heterogeneous

Inclusion and Matrix as Separate Entities: (Graphic or Alpha-Numeric)

Primarily Inclusion:

- wall rubble
- heavy trash (metal, plastic, rubber, etc.)
- sherd and/or bone dump
- midden
- sewage
- = ◊A ash or charcoal streaks
- charcoal

Primarily Matrix:

- = ◊C clay
- = ◊Y silty clay
- = ◊S silt
- = ◊Z sand
- = ◊M mixed

Inclusion and Matrix as a Single Whole:

- topsoil
- isolated bricks

Bricks in walls (various types of linear patterns which refer to texture, color, temper, boundaries, i.e. brick sizes, and mortar).

- CW1, CW1A, CW2
- CW2A, CW3, CW3A
- CW3B, CW3C, CW4, CW4A
- medieval other walls

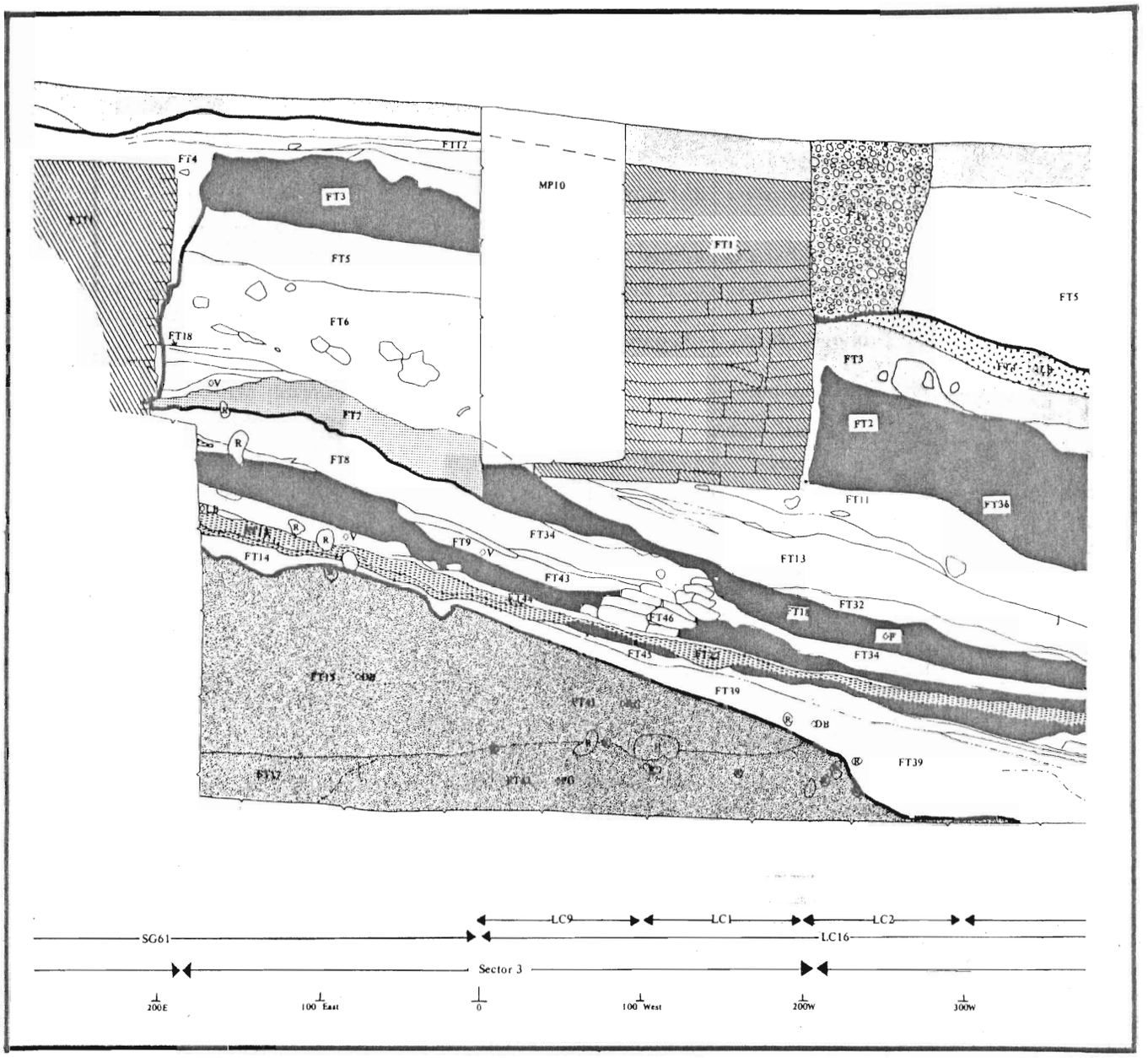
BOUNDARIES

- more / less — excavation line
- sharp slope
- merging or uncertain
- reconstructed
- • 1245 — elevation (cms. above 0 datum; see Fig. 2)

CULTURAL STRATI-GRAPHY

Demarcation among various horizons is shown by heavier lines on profile of natural stratigraphy. Also, each major horizon is represented by a separate profile which identifies (1) wall remnants in solid black, (2) reconstructed walls each with its pertinent linear pattern, (3) the deposition associated with any given wall by means of a uniform dot pattern.

Figure 4-5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FT46
FT32
FT45
FT39
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LC9
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LC16
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200E
100 East
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100 West
200W
300W

Figure 4-6

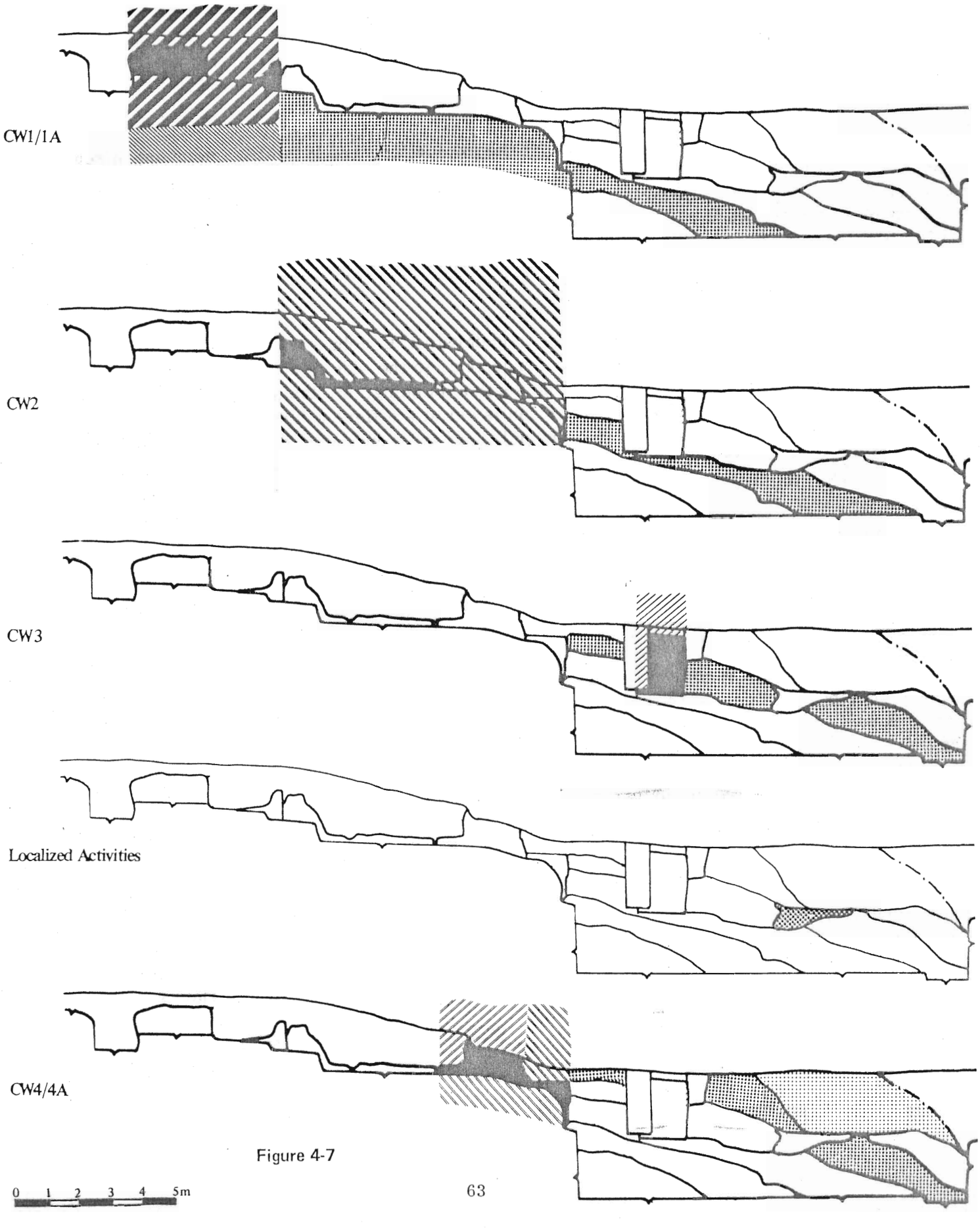

Figure 4-7

to the corresponding known volumes exposed by the excavation, and it is also important to read the section while it is stfll fresh, Protracted exposure to air, sun and dust obscures the face of a section, As partial remedies, one can shave back the face and spray it with water, but the beat solution remains that of reading the section, scoring it, and, ideally, drawing it while it is still fresh.

The graphic record

As stressed above, a section can only be understood in relation to a floor plan, In the case of a grid section, i.e., a baulk which corresponds to the side of a volumetric excavation unit (a "square"), it is sufficient to qualify the section as being, for instance, the western baulk of the unit, facing west. But whenever a section is cut at a different juncture, i. e., in what we have called structural sections, the trajectory will have to be indicated on the floor plan, where it is marked by a solid line with arrows pointing in the direction toward which one looks in drawing the section. The line may be segmented, in order to accommodate given peculiarities of a given floor plan; for example, in Figure 4-3 the section as drawn shows the stratigraphic relationship of three rooms, part of which has been eroded away.

The detafls of the physical and cultural components of a section must be indicated as fully and objectively as possible, This implies the use of standards-that either are in common use (such as the Munsell color chart) or are made explicit for a given excavation (e.g., the soil record chart form given here as Figure 4-4, adapted from Buccellati and Kelly-Buccellati 1978: 44). There are no uniform conventions used in the coding of such details in sections. A somewhat complex, but flexible and transparent, system has been proposed by the writer in the context of a site report, and is reproduced here in Figure 4-5 (adapted from Buccellati 1979: Fig. 10). Here there is an alternation between two coding registers, one graphic and the other alpha-numeric. The alpha-numeric register is characterized by notes, signaled by a rhomboid. The notes indicated here in Figure 4-5 are of the recurrent type, and are marked by letters; additional non-recurrent remarks may be similarly signalled by a rhomboid followed by a number? The various categories are kept rigorously discrete according to the standards noted above.

The interplay between physical and cultural elements may become too complex to be chown effectively in the same drawing. In this case, two different and complementary renderings may be given, as illustrated here in Figures 4-6 and 4-7 (adapted from Buccellati 1979: Fig. 12). These are sections cut through a city-wall and its moat, with four major phases represented for the construction of the city wall. Figure 4-6 gives a detailed rendering of a physical section. according to the codes just described; the heavier lines refer to major cultural boundaries between the various phases in the construction of the wall. Figure 4-7 gives a schematized rendering of the various phases, with each phase corresponding to the one shown in bold in the detailed physical section.

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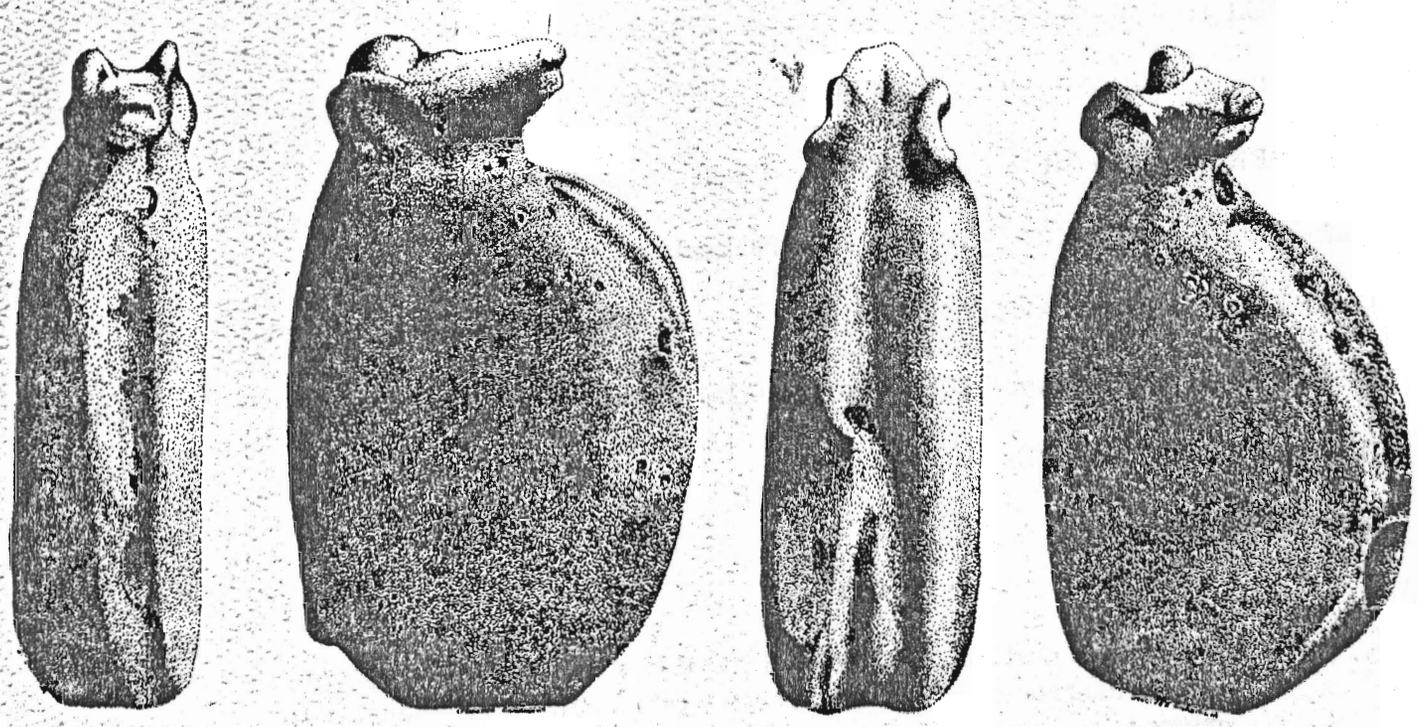
BRIAN D. DILLON, Editor



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CHAPTER 4:

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