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14 Artifacts as indicators for activities

An examination of the artifact spectrum of Pernil Alto can provide important and deep insights into the economic system which formed the basis of subsistence, as well as the form and strength of mobility on the site. The single findings were interpreted as indicators of certain activities and then weighted to answer these questions. The artifacts were used as proxies for distinct activities. The approach followed that of Johannes Müller et al. (Müller 2010; Müller et al. 2013), who examined the spatial distribution of activities and reconstructed activity areas within an investigated site by using the spatial distribution of artifacts which were connected with certain activities. In principle, the same procedure was applied to the artifacts of Pernil Alto, but was adapted to the specific conditions of the site. The spatial distribution will become important later (Chapter 15.1). First it was important to clarify the nature of the activities and their proportions. Therefore, the entire artifact material was examined with regard to a functional assignation. It was therefore crucial to find out whether the artifact material would provide information about which economic activities were important, and the proportions by which they were interrelated. The activities connected with plant use and foraging were given priority. All other identified activities were examined, because the importance of economic activities can only be interpreted in the overall context of all activities. The proportion of the economic activities in relation to all other activities was of particular interest.

Some of those other activities were also important for the mobility analyses. Thus, a wide spectrum of activities that are not directly linked to the subsistence economy can be interpreted to indicate longer, or even permanent, stays at Pernil Alto. During such long term or continuous stays, many village activities would have been conducted that would have left remains in the archaeological record. Such a result would be interpreted as indicative of a permanent use and therefore a sedentary settlement. In contrast to this, a narrow spectrum of non-subsistence activities would be interpreted as indicative of shorter, interrupted, or discontinuous stays in the settlement. Within such shorter and interrupted stays just specialized activities would be expected, leaving less information and remains in the archaeological record. Such a result would then be interpreted as an indicator for a more distinctive mobility. Pernil Alto could then be described as a specialized site of mobile groups, which would have remained on the site only for short periods—probably within a cyclic and nomadic mobility pattern, incorporating the littoral (for the use of marine resources), the coastal river plains (as in Pernil Alto, for the use of plant resources) and the highlands (for camelid hunting).

14.1 Procedure

The procedure for answering the questions that arose in relation to the artifact remains was as follows: First, all single artifacts were rated as direct indicators for certain activities. As a result, 27 distinct activities were indicated by the artifacts. Table 58 lists the categories and subdivisions that were assigned as indicators for particular activities. All indicators were direct and primary indicators.

Activity	Category	Subdivision	n	na.
adornment	bead	angular bead	1	
		discoidal bead	2	
		discoidal bone bead	1	
		discoidal shell bead	71	
		discoidal stone bead	15	
		oval shell beads	64	
		seed beads	1	
		tube bead	1	
	feather decoration	feather decoration	1	
	necklace	large necklace	2	
		medium necklace	3	
		small necklace	1	

Activity	Category	Subdivision	n	na.
adornment	pendant	bivalve shell pendant	3	
		flat bone pendant	3	
		flat bone pendant – braiding tool	3	
		flat bone pendant – needle	1	
		malachite pendant	5	
		snail shell pendant	25	
		tooth pendant	2	
	bracelet	large bracelet	2	
		medium bracelet	3	
		small bracelet	1	
basket making	twined textile	open simple twining (basket bottom remain)	2	1
burial rites	cord	simple cord (mat fixing rope/cord)	7	1
	nd	nd (mat remain)	2	
	plant fibers	plant fibers (filling material)	1	1
		plant fibers (mat remain)	6	6
	twined textile	nd (mat remain)	8	1
		open simple twining (burial mat)	15	
		open simple twining (headgear filling)	1	
clothing	cord	simple cord (hair band)	1	
	dense laid hair with openings	dense laid hair with openings	1	1
	fur cap	fur cap	1	
	knotted textiles	close gridded (headgear, braid-belt)	3	1
		wide gridded (stretched) (braid-belt)	3	2
	looped textiles	figure-8-looping (clothing remains, braid-belt)	3	2
		nd (clothing remains, headgear)	7	5
		simple looping dense (clothing remains)	1	
		simple looping wide (clothing remains)	1	
		twisted looping dense (clothing remains)	1	
	twined textile	close diagonal twining (clothing remains)	1	1
		close simple twining (clothing remains)	1	1
		open and close diagonal twining (braid-belt)	1	
		open and close simple twining (clothing remains, braid-belt)	2	2
		open simple twining (clothing remains, headgear)	5	2
collecting/harvesting	looped textiles	figure-8-looping (bag)	3	3
		twisted looping wide (bag)	1	1
color processing	color remains	raddle remains	3	
		ocher remains	1	
construction	cord	simple cord (around two sticks)	1	1
		forked branch (worn ends) (holder)	2	2
cutting	cutting tool	cutting tool	53	14
		cutting tool borer	2	
		cutting tool notched	5	
		cutting tool pointed	11	
	blade	knife	1	
digging	digging tool	digging tool	6	3
domestic activities	twined textile	nd (mat remain)	1	1
		open and close diagonal twining (mat remain)	1	
		open diagonal twining (mat remain)	2	
		open simple twining (mat remain)	8	1
dwelling construction	cord	simple cord (wrapped wood)	1	1
	scantling	pointed scantling (peg)	2	2
	split wood	trimmed-pointed split wood (peg)	1	1
	tied up wood	wrapped wood (construction part)	5	3
	twined textile	open and close simple twining (rigid mat)	1	1
		open simple twining (rigid mat)	1	1

Activity	Category	Subdivision	n	na.
field work	pointed wood split wood	double pointed wood (digging stick)	3	3
		pointed wood (used end) (digging stick)	1	
		trimmed-pointed wood (digging stick)	1	
		trimmed-pointed wood (worn end) (digging stick, thin digging stick)	4	1
		double pointed split wood (digging stick)	1	
		trimmed-pointed split wood (digging stick)	6	1
fire making	pointed wood	trimmed-pointed wood (fire drill, fire poker)	2	
	split wood	board (fire board)	1	
	trimmed wood	trimmed wood (fire drill, fire board)	3	
fishing	knotted textiles	wide gridded (regular) (fishnet)	2	2
food processing	cobble	cooking stone	7	
fur processing	scraper	scraper	6	1
hunting	projectile point	projectile point	2	
	spear thrower head	spear thrower head	1	
not assignable	bone artifact	flat bone artifact	1	1
	alluvial sediment remain	alluvial sediment remain	1	1
	cobble	cobble	15	15
	cord	complex cord	8	8
		complex cord connected with tressed rope	1	1
		simple cord	144	144
		tressed cord	9	9
	flake	nd	1	1
	fragment	fragment of quartz	2	2
	handstone	handstone fragment (unknown size)	15	15
	knotted textiles	nd	1	1
	knotted and twined textile	close gridded	1	1
	looped textiles	nd	4	4
		simple looping dense	2	2
		twisted looping dense	1	1
	plant fibers	plant fibers	7	7
	pointed wood	pointed cane	8	8
		pointed wood	1	1
		trimmed-pointed wood	1	1
	salt-concretion	salt-concretion	1	1
	scantling	scantling	3	3
		pointed scantling	1	1
	small piece of dried clay	small piece of dried clay	1	1
	split wood	pointed split cane	1	1
		pointed split wood	2	2
		trimmed split cane	1	1
		trimmed split wood	47	47
		trimmed-pointed split wood	5	5
	stone bowl	stone bowl	2	2
	tied up wood	tied up reed	1	1
	trimmed wood	trimmed wood	6	6
		wrapped forked branch	1	1
	twined textile	open simple twining	9	9
jewelry production	bead	oval shell bead (semi-product)	5	5
	pendant	nd (semi-product)	1	1
lithic production	blade	blade	1	1
	core	core	7	
		core-notched	2	
		core-palette	1	
	flake	flake	22	
	percussor	retouch tool	21	5
		hammerstone	16	3

Activity	Category	Subdivision	n	na.
plant processing	ground stone	ground stone (big)	10	1
		ground stone (medium)	14	2
	handstone	handstone (big)	17	1
		handstone (extreme)	4	
		handstone (medium)	25	5
		handstone (very big)	8	2
	mortar	mortar	5	
	pestle	pestle	1	
	split wood	trimmed split wood (pestle)	1	1
	trimmed wood	trimmed wood (pestle)	1	
production	borer	borer	7	3
	ground stone	ground stone (small)	20	2
	handstone	abrading tool	5	
		handstone (small)	8	
		handstone (very small)	11	1
	scantling	scantling (boring underlay)	3	3
	split wood	trimmed split wood (boring underlay)	4	
		board (boring underlay)	1	1
	trimmed wood	trimmed wood (borer)	2	1
ritual	figurine	camelid figurine	1	1
river fishing/ bird catching	knotted textiles	close gridded (net)	4	4
storage	bottle gourd epicarp	bottle gourd vessel	42	41
		bottle gourd vessel cap	2	2
textile production	awl	awl	1	
	braiding tool	braiding tool	7	
	carved wood	braiding tool	1	
	cord	complex cord (cord begin)	2	
		simple cord (production remain, cord begin)	2	
		tressed cord (cord begin, rope begin)	2	
	plant fibers	plant fibers (plant fiber bundle, plant fiber ring)	22	
	pointed wood	wrapped wood (plant fiber bundle)	1	
		trimmed-pointed wood (awl)	2	
	spatula	spatula	4	
	spindle whorl	spindle whorl	2	2
transport	twined textile	open simple twining (case)	1	1
wood processing	core	notched piece	1	
	notched piece	notched piece	2	1
	split wood	trimmed split wood (predetermined breaking point)	1	
	trimmed wood	trimmed wood (semi-product)	2	2
total	92	164	1066	468

Table 58: Activities indicated by artifacts at Pernil Alto.

The same assignment was done for activities that were of secondary or even tertiary nature, as indicated by artifacts. Secondary or tertiary indicators of artifacts were, for example, handstones, which were assigned to the activity of plant processing for their primary function but which had a secondary function probably within the activity of lithic production as indicated by the remains of distinct punch marks, particularly on the narrow ends. Table 59 and Table 60 list the activities that were determined by the secondary and tertiary functions of the artifacts.

Activity	Category	Subdivision	n	na.
color processing	core	core-palette	1	
	ground stone	ground stone (medium)-palette	3	
	handstone	handstone (big)-palette	1	
		handstone (big)-squashing stone-palette	2	
		handstone (medium)-palette	3	
		handstone (unknown)-palette	1	
		handstone (very big)-palette	1	
food processing	ground stone	ground stone (small)-cooking stone	2	1
	handstone	handstone (medium)-cooking stone	1	
		handstone (small)-cooking stone	1	
		handstone (unknown)-cooking stone	5	
lithic production	ground stone	ground stone (medium)-percussor	3	
		ground stone (small)-percussor	12	
		ground stone (small)-percussor-anvil	1	
	handstone	handstone (big)-percussor	5	
		handstone (big)-percussor-palette	2	
		handstone (big)-percussor-palette-anvil	1	
		handstone (extreme)-percussor	1	
		handstone (medium)-percussor	11	2
		handstone (medium)-percussor-palette	2	
		handstone (medium)-percussor-palette-anvil	1	
		handstone (medium)-squashing stone-percussor	1	
		handstone (small)-percussor	4	1
		handstone (unknown)-percussor	1	1
		handstone (very big)-percussor	3	1
		handstone (very big)-percussor-palette	2	
		handstone (very small)-percussor-palette	1	
plant processing	ground stone	ground stone (small)-percussor-handstone-palette	2	
		ground stone (small)-handstone-palette	2	2
production	cutting tool	cutting tool borer	2	
textile production	pendant	flat bone pendant-needle	1	1
		flat bone pendant-braiding tool	3	
wood processing	cutting tool	cutting tool notched	5	3
	core	core-notched	2	
total	**12**	**34**	**86**	**8**

Table 59: Secondary activities indicated by artifacts at Pernil Alto.

Activity	Category	Subdivision	n	na.
color processing	ground stone	ground stone (small)-percussor-handstone-palette	1	
		ground stone (small)-handstone-palette	2	
	handstone	handstone (big)-percussor-palette	2	
		handstone (big)-percussor-palette-anvil	1	
		handstone (medium)-percussor-palette	2	
		handstone (medium)-percussor-palette	1	
		handstone (very big)-percussor-palette	2	
		handstone (very small)-percussor-palette	1	
total	**2**	**8**	**12**	**0**

Table 60: Tertiary activities indicated by artifacts at Pernil Alto.

A large portion of the artifacts could not be assigned to any definable activity. Those artifacts are listed in Table 58 and were subsumed under the category "not assignable" (abbreviated as "na." in lists and charts). The artifacts of "not assignable" activity were composed to a large extent by simple cords, which could have been part

of larger textiles, but whose exact function was undeterminable. Cobbles without any determinable use wear and a lot of wooden artifacts of unknown use were also subsumed under "not assignable" activities.

The following criteria were applied to assign the activities of the single artifacts:

- the functional activity arose from the analyses of the subdivisions (see artifact descriptions in Chapter 9)
- the manifestation of the particular use wear, such as grinding surfaces
- the context of finding; for example, mats from burials were assigned to the activity of "burial rites," whereas mats made with the same technique (usually open simple twining) but found outside of burials were assigned to "domestic activities"

The activities that were classified as "domestic activities" included lying down, sleeping, sitting etc. The assigned artifacts were interpreted as aids for such "activities". The classification of "production" included all activities that were related to production that could not be further specified. For instance, the borers or small ground stones which were certainly used to produce artifacts were subsumed under this category. These were certainly used to produce artifacts, but the specific production was—in contrast to lithic or textile production—not further determinable. The other activities given in Table 58 through Table 60 should be self-explanatory.

All activities listed in the tables were direct activities. This means that secondary indicators—as indicated by the material of the artifacts—were not included, because they would produce a distorted result. For example, the braiding tools, which were nearly all made of mammal bones, were used exclusively as direct indicators for "textile production," but not as indirect indicators for "hunting". In the same manner, all shell artifacts (mainly beads and pendants) and the seed beads served as direct indicators for "adornment," but not as indirect indicators for "shell collecting" (which was not established as activity at all) or "plant processing". The reason for this is that it was unclear how the respective materials were acquired. The bone material, for instance, could have been a result of hunting, but also acquired through the exchange or utilization of naturally perished animals. The *usage* of the braiding tools within the activity of "textile production," on the other hand, can be considered valid, due to the use wear and comparisons to similar artifacts from other sites. Therefore, the *used materials* were not interpreted as indirect indicators.

Each single artifact was counted with the factor 1 as an indicator for the activity to which it was connected. When artifacts had secondary or tertiary functions, each single function was likewise counted with the factor 1 as an indicator for the connected activity. Therefore, some artifacts were included in the counting several times. This was the case if a handstone (which was primarily counted with the factor 1 as an indicator for "plant processing") was also used as a percussor (that was secondarily counted with the factor 1 as an indicator for "lithic production") and showed distinct color remains (that were tertiary counted with the factor 1 as an indicator for "color processing"). For each of the three activities this artifact would produce a count with the factor 1. Those first counts can be found in Table 58 through Table 60 in the columns headed with "n". Some artifacts had to be categorized as being not assignable, for example if the use wear was not very distinct or if they could be assigned only with a certain probability to one activity. This was not only the case for artifacts with undetermined activities, but also for artifacts which were interpreted as indicators for determinable activities but were preserved only as fragments. Nevertheless, the indicators of these last artifacts were not absolutely certain and were therefore marked as not assignable. The number of counts of not assignable indicators within determinable activities can be found in Table 58 through Table 60 in the columns headed with "not assignable". All of those artifacts—the ones from the "not assignable" activities as well as those whose indication for a determinable activity was rather poor and therefore classified as not assignable—were multiplied by the factor 0.5. They were therefore just counted and later weighted half as much as the distinct indicators given by artifacts clearly connectable to a distinct activity. All beads were similarly multiplied with the factor of 0.3, as they obviously represented mass-produced products, which were made quickly and in large quantities for use in larger bracelets or necklaces. The beads within the bracelets and necklaces were counted and then multiplied with the factor 0.3 as well. On the other hand, some artifacts were multiplied by factors of >1. These included the big ground stones and the mortars which were multiplied by the factor 3. This higher factor was based on the assumption that the extraordinarily big and heavy artifacts were used for longer times and probably by more individuals. By comparison, clothing remains, adornment, or simple cutting tools, which—based on their simple manufacturing processes—were probably made quickly and were used for shorter times due to the lack of pronounced use wear. The projectile points were multiplied with the factor 2, as they were made of the exotic material of obsidian and were extraordinarily elaborated within the chipped tools. The factor for the figurine, which was interpreted as a distinct indicator for "ritual activities", was multiplied by the factor of 3 to mark the exceptional singularity of this artifact. The multiplication factors, therefore, were applied in order to come closer to more a realistic value of the artifacts with-

in the activity reconstruction. All factors counted and multiplied as described above were then summed for each activity.

14.2 Data analysis

The results of this factorization are listed in Table 61 in the column headed "n/fct. (= factored) of total". The first value indicates the amount of simple weighted and not factored indicators for activities, including the secondary and tertiary ones. The total value is 1164, which is higher than the number of 1066 artifacts; 98 activities were indicated secondarily or tertiary on some artifacts. The second value in the same column indicates the result of the factorization described above, totaling 854.8. The assignment of activities and their factorization made it possible to estimate the proportions of the activities (as indicated by artifacts), and to compare the proportions. Of particular interest were the activities which give information about economy and mobility.

Activity	n/factored of						
	total	Ph 0	Ph 1	Ph 2	Ph 3	Ph 4	Ph 5
ritual	**69/66.5**	**4/6**	**11/11**	**5/3.5**	**23/22.5**	**17/16**	**9/8.5**
burial rites	40/35.5	1/1	10/10	5/3.5	13/11.5	5/4	6/5.5
color processing	28/28	2/2	1/1	0/0	10/10	12/12	3/3
ritual	1/3	1/3	0/0	0/0	0/0	0/0	0/0
plant use	**156/150**	**12/8**	**6/7**	**26/26**	**37/40**	**63/56.5**	**11/12.5**
basket making	2/1.5	1/1	0/0	1/0.5	0/0	0/0	0/0
collecting/ harvesting	4/2	0/0	0/0	2/1	1/0.5	1/0.5	0/0
field work	16/12.5	2/2	0/0	2/1	1/1	7/6.5	4/2.5
plant processing	90/111.5	3/2	4/6	13/19.5	26/34	39/41	5/9
storage	44/22.5	6/3	2/1	8/4	9/4.5	16/8.5	2/1
village activities	**52/43.5**	**5/4**	**1/0.5**	**9/9**	**7/5.5**	**32/26.5**	**0/0**
construction	3/1.5	0/0	0/0	0/0	1/0.5	2/1	0/0
digging	6/4.5	0/0	0/0	0/0	4/3	2/1.5	0/0
domestic activities	10/9	1/1	0/0	3/3	1/1	7/6	0/0
dwelling construction	11/6.5	4/3	1/0.5	0/0	0/0	6/3	0/0
fire making	6/6	0/0	0/0	0/0	1/1	5/5	0/0
food processing	16/16	0/0	0/0	6/6	0/0	10/10	0/0
handcraft	**324/303**	**18/16.5**	**18/16.5**	**37/34.5**	**61/57.5**	**181/166.5**	**9/8**
cutting	72/65	2/1.5	4/4	2/1.5	24/22.5	38/34	2/1.5
jewelry production	6/6	3/3	1/1	0/0	0/0	2/2	0/0
lithic production	121/117.5	5/4.5	7/6	20/19	18/17	69/65.5	2/2
production	63/57.5	1/0.5	3/2.5	10/9	10/9.5	36/33	3/3
textile production	49/47	7/7	3/3	4/4	7/7	27/25	1/1
wood processing	13/10	0/0	0/0	1/1	2/1.5	9/7	1/0.5
foraging	**15/13.5**	**4/4**	**0/0**	**3/2**	**0/0**	**6/5.5**	**2/2**
fishing	2/1	0/0	0/0	1/0.5	0/0	1/0.5	0/0
fur processing	6/5.5	0/0	0/0	1/1	0/0	3/2.5	2/2
hunting	3/5	2/3	0/0	0/0	0/0	1/2	0/0
river fishing/bird catching	4/2	2/1	0/0	1/0.5	0/0	1/0.5	0/0
personal items	**243/125.3**	**98/43.1**	**28/19**	**17/10.9**	**32/18.6**	**55/25.6**	**13/8.3**
adornment	211/101.8	95/41.1	21/13.3	13/7.4	27/15.1	46/20.1	9/4.8
clothing	32/23.5	3/2	7/5.5	4/3.5	5/3.5	9/5.5	4/3.5
not assignable	**305/153**	**28/14**	**7/3.5**	**55/27**	**23/11.5**	**181/90.5**	**11/5.5**
not assignable	304/152	28/14	7/3.5	54/27	23/11.5	181/90.5	11/5.5
transport	1/1	0/0	0/0	1/1	0/0	0/0	0/0
total	**1164/854.8**	**169/95.6**	**71/57.3**	**152/113.9**	**183/154.6**	**535/387.1**	**55/44.8**

Table 61: Absolute and factored (fct.) activities in total and by phase (Ph). Bold lines mark the activity cycles.

The single activities identified before were summarized in seven superordinate activity cycles. The bold marked lines in Table 61 indicate the activity cycles. The activities listed below those activity cycles were included. The activity cycles can be defined as following:

- *ritual:* includes all activities related to rituals which were important in everyday life as well as in burial activities, yet their specific nature stays, nevertheless, unknown.
- *plant use:* includes all activities related to the usage of plants, including preparing cultivation areas, harvesting, collecting wild plants, processing plants, and storing plant foods.
- *village activities:* include all activities related to the formation and the usage of the settlement, such as the construction or erection of dwellings, ignition of fires, and the preparation of food.
- *handcraft:* includes, in contrast to the village activities, all activities which were carried out in the settlement with the aim of processing materials and making specific products. Accordingly, all tools used in the production of these products, as well as semi-products, were summarized in this activities cycle.
- *foraging:* includes all activities related to bringing down or catching game. Given that this includes hunting, fishing, and bird catching, this cycle has been termed "foraging" instead of "hunting". Not included in this activity cycle were activities related to the collection of possibly wild plants. Those were included in "plant use".
- *personal items:* includes all artifacts used individually by the inhabitants, such as pieces of jewelry and clothing.
- *not assignable:* includes all activities, which were not determinable.

The majority of the assignments of activities in the superordinate activity cycles are self-explanatory. However, some of the assignments need some further explanation.

The assignment of color processing to the ritual activity cycle was based on the assumption that the usage of colors for body painting played an important role within certain rituals in ethnographically described groups. For example, color painting played for example an important role in rituals of the extinct Selk'nam or Ona on Terra del Fuego, in which a system of certain body paintings was used within different rituals (see for details Gusinde 1931–1939). The only direct evidence for the usage of colors at Pernil Alto is represented in the colored wraps of one textile. Nevertheless, the most reasonable assignment of color processing—actually indicating the use of colors—appears to be the rituals activity cycle, even though other usages also took place.

The assignment of basket making to the activity cycle of plant use was based on the assumption that not completely preserved baskets were—like the bottle gourd vessels—used for storage. Therefore, basket making was rated as an indicator for the importance of plant use rather than an indicator for handcraft.

The assignment of collecting/harvesting to the activity cycle of plant use is explained by the artifacts that were summarized within this group. Those are the probable remains of bags. The assumption was that these bags were used to collect plants, which appears to be probable, even though other usages could of course be conceivable.

The assignment of the activity of digging to the activity cycle village activities can be explained by the artifacts summarized within this group. These include lithic digging tools, which were—based on the use wear—used for coarse excavation works. The assumption was that these were used in digging out pits, such as those of the dwellings, and that they therefore do not indicate field work.

The assignment of cutting into the activity cycle of handcraft was based on the artifacts of this group which were mainly cutting tools. Those cutting tools were most probably multifunctional and a specialized use was not determinable. They could have been used as tools for harvesting plants, but such an assignment appeared questionable. Therefore, it was assumed that these artifacts were used within the production in handcraft activities, even though a more specific function could not be determined.

The assignment of fur processing to the activity cycle of foraging and not to the activity cycle of handcraft was due to the fact that fur processing is clearly a result of foraging in the sense of hunting. Given that the subsistence economy is of particular interest, fur processing was interpreted as an important indicator for foraging, even though it was of indirect nature in this case.

Transport was assigned to the not assignable activity cycle because the only artifact within this group was a case for two other artifacts, and it was unclear to which activity cycle it could have been assigned.

The grouping of the different activities into the seven activity cycles was done based on the following considerations:

First, it helped to better understand the proven activities for Pernil Alto. This was important for the interpretation of the economic basis of the site. Moreover, the activity cycles reflect fields of activities which are important for interpretation of the settlement and its function. Thus, not all single activities which were grouped within the activity cycles could be traced throughout all phases of the settlement. Most likely the settlement was not excavated completely, especially in

those areas which were covered by wall remains of the Initial Period. This problem was resolved with the help of the activity cycles, which were traceable throughout the entire sequence (compare Table 61). The activity cycles coarsen the interpretation of the activities to a certain extent, but are constantly traceable and build representative results applicable to the interpretation of the entire settlement throughout the complete sequence. The conditions of preservation were problematic in the textile remains. However, given that one can assume that the conditions of preservation were basically the same for all textiles on different parts of the settlement, they were still included.

The calculated factored results were then converted into percentages in order to produce a better understanding and visualization (see Table 62). The value of 7.78 in the line "ritual" in the column "% of total" in Table 62 gives, for example, the percentage of all factored artifacts connected with the activity cycle "ritual" in relation to all other factored artifacts of the same column. All artifacts, their factored value and their percentages, as well as the percentages of the superordinate activity cycles were determined for all phases and in their total values. All data can be found in Table 62. The percentages reflect their proportion of the factored artifacts within one phase, and the first column contains the total artifacts.

Activity	% of						
	total	Ph 0	Ph 1	Ph 2	Ph 3	Ph 4	Ph 5
ritual	**7.78**	**6.28**	**19.20**	**3.07**	**13.91**	**4.13**	**18.97**
burial rites	4.15	1.05	17.45	3.07	7.44	1.03	12.28
color processing	3.28	2.09	1.75	0.00	6.47	3.10	6.70
ritual (undetermined)	0.35	3.14	0.00	0.00	0.00	0.00	0.00
plant use	**17.55**	**8.37**	**12.22**	**22.83**	**25.87**	**14.60**	**27.90**
basket making	0.18	1.05	0.00	0.44	0.00	0.00	0.00
collecting/harvesting	0.23	0.00	0.00	0.88	0.32	0.13	0.00
field work	1.46	2.09	0.00	0.88	0.65	1.68	5.58
plant processing	13.04	2.09	10.47	17.12	21.99	10.59	20.09
storage	2.63	3.14	1.75	3.51	2.91	2.20	2.23
village activities	**5.09**	**4.18**	**0.87**	**7.90**	**3.56**	**6.85**	**0.00**
construction	0.18	0.00	0.00	0.00	0.32	0.26	0.00
digging	0.53	0.00	0.00	0.00	1.94	0.39	0.00
domestic activities	1.05	1.05	0.00	2.63	0.65	1.55	0.00
dwelling construction	0.76	3.14	0.87	0.00	0.00	0.77	0.00
fire making	0.70	0.00	0.00	0.00	0.65	1.29	0.00
food processing	1.87	0.00	0.00	5.27	0.00	2.58	0.00
handcraft	**35.45**	**17.26**	**28.80**	**30.29**	**37.19**	**43.01**	**17.86**
cutting	7.60	1.57	6.98	1.32	14.55	8.78	3.35
jewelry production	0.70	3.14	1.75	0.00	0.00	0.52	0.00
lithic production	13.75	4.71	10.47	16.68	11.00	16.92	4.46
production	6.73	0.52	4.36	7.90	6.14	8.52	6.70
textile production	5.50	7.32	5.24	3.51	4.53	6.46	2.23
wood processing	1.17	0.00	0.00	0.88	0.97	1.81	1.12
foraging	**1.58**	**4.18**	**0.00**	**1.76**	**0.00**	**1.42**	**4.46**
fishing	0.12	0.00	0.00	0.44	0.00	0.13	0.00
fur processing	0.64	0.00	0.00	0.88	0.00	0.65	4.46
hunting	0.58	3.14	0.00	0.00	0.00	0.52	0.00
river fishing/bird catching	0.23	1.05	0.00	0.44	0.00	0.13	0.00
personal items	**14.66**	**45.08**	**32.81**	**9.57**	**12.03**	**6.61**	**18.53**
adornment	11.91	42.99	23.21	6.50	9.77	5.19	10.71
clothing	2.75	2.09	9.60	3.07	2.26	1.42	7.81
not assignable	**17.90**	**14.64**	**6.11**	**24.58**	**7.44**	**23.38**	**12.28**
not assignable	17.78	14.64	6.11	23.71	7.44	23.38	12.28
transport	0.12	0.00	0.00	0.88	0.00	0.00	0.00
total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table 62: Absolute and factored activities in total and by phase (Ph). Bold lines mark the activity cycles.

14.3 Results

The proportions of the activity cycles are depicted in Figure 116. In total, the activities of the activity cycle "plant use" made up 17.5 %, whereas the activities of the activity cycle "foraging" just made up 1.58 %. Thus, plant use was at least ten times more important for the inhabitants than foraging for the inhabitants, as reflected by the artifacts. This is an important result for the interpretation of the economy. The use of plants for subsistence played an important role, whereas foraging (hunting, fishing, bird catching/river fishing) was rather unimportant.

However, the most important and best preserved activities were those of "handcraft" which made up 35.4 % of the activities. This notable value indicates that Pernil Alto was generally settled quite continuously and does not represent a specialized site, such as a hunting camp. The accumulation of handcraft is a distinct indicator for a permanent stay on the site, where inhabitants conducted all necessary handcrafts to produce items. Mobile groups would have left a section of the overall artifact assemblage resulting in specialized sites. Therefore, the high prevalence of the highly varied field of handcraft is interpreted as an indicators for sedentariness.

Personal items made up 14.7 % of the activities. It seems that individual representation was important at Pernil Alto. Yet the percentage can be interpreted further: beyond a representative function it also indicates the amount of personal property. While the property situation of all other artifacts is not really clear, and even problematic in the case of the grave goods, the percentage of this activity cycle represents personal property. From this perspective, the individual property made up 14.7 % of the artifacts in proportion to the communal ownership.

Ritual activities, on the other hand, played a less important role and made up just 7.78 % of the activities. If it is assumed that personal property divides a community, but rituals strengthen it by binding the individual to the community, then it seems that the individual was more important than the community at Pernil Alto.

Village activities were calculated with just 5.09 % and formed the smallest activity cycle. The erection and maintenance of building seems to have been of minor importance. This corresponds to the rather simple, tent-like construction of the dwellings, which probably did not need a high amount of work.

The remaining 17.9 % accounted for not assignable activities. Nothing can be said about the economic basis, the mobility, or the social conditions based on this value.

14.4 Activities by phase

Phase 0

8.37 % of plant use is opposed by 4.18 % of foraging in Phase 0. The plant use is only about twice as important as foraging in this phase. In contrast, plant use is approximately 10 times more important than foraging in the overall spectrum. Therefore, foraging seems to have been of particular importance at the beginning of the settlement activities in Phase 0.

At 17.3 %, handcraft activities were not very pronounced. This is about half as important as the total average of 35.4 %. Of special importance within the handcraft was jewelry production, which accounted for 3.14 %, and was almost 4.5 times more prevalent than in the average of the settlement (0.7 %). Textile production was also somewhat more important than in the overall average of the settlement, where it accounted for 5.5 %. All other handcrafts were less pronounced in Phase 0 than in the total of the settlement. This is especially remarkable in the general production, which, with 0.52 % is nearly 13 times lower than the settlement average. Cutting, lithic production and wood processing (which was not determined at all) played an unimportant role in comparison to the overall average. Following the interpretation that a high value of handcraft represents a higher settledness, it seems that sedentariness was not as strongly developed in Phase 0 than in the following phases and in the settlement average.

The personal items in Phase 0 were determined to be 45.1 %. This is the highest value within all phases, and about three times higher than the settlement average. The activities connected with rituals are 6.28 %, corresponding more or less with the average value of 7.78 %. If personal items are understood as an indicator for more strongly pronounced individuality and—in contrast to that—ritual activities as an indicator for a more pronounced communality, then the proportion of individuality to communality in Phase 0 was a little bit more than 7 to 1. Following from these findings, individuality in contrast to the group was most pronounced in Phase 0, which means that the individual was very important and the group was relatively less important in this phase.

Village activities make up 4.18 % of the activities in Phase 0. This corresponds to the erection of four dwellings.

In total, the findings from the activities show that the economy in Phase 0 was not oriented around the use of plants. In comparison, foraging activities were still relatively important. Furthermore, sedentariness was not yet very pronounced. Therefore, Pernil Alto can be interpreted during Phase 0—based on the information of the artifact composition—as a seasonal campsite of

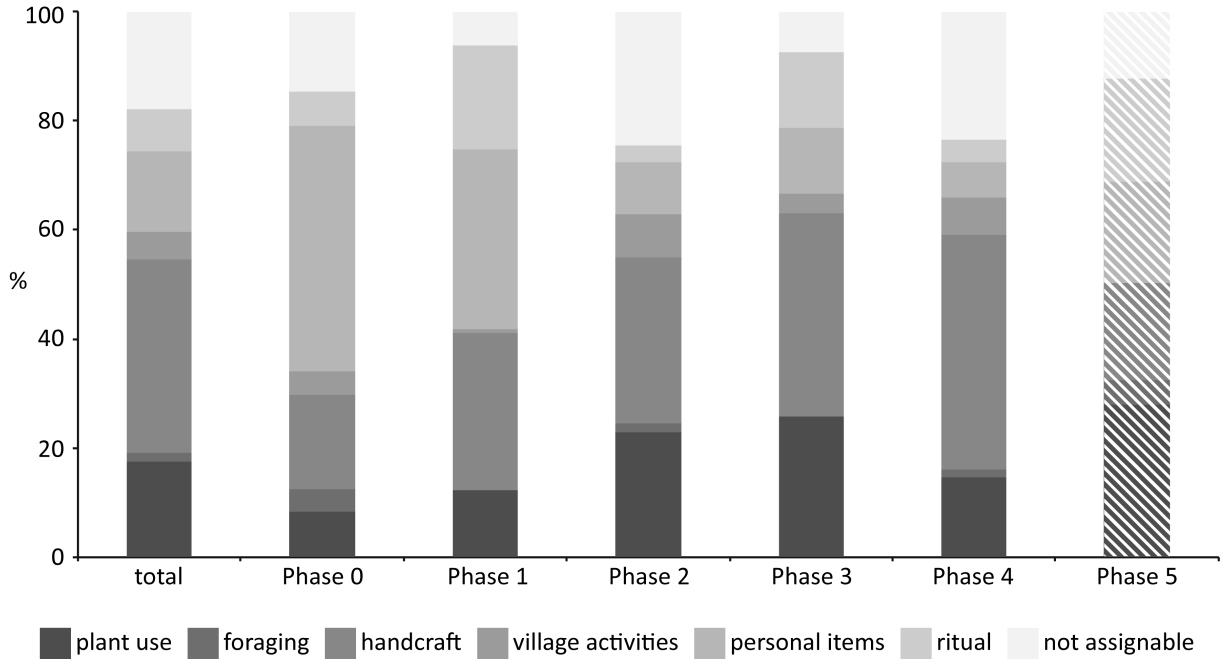

Figure 116: Bar diagram of the determined activity cycles in their diachronic distribution. Phase 5 is shaded because the indicators are not representative.

semi-sedentary or semi-mobile forager groups, which spent only parts of the year on the site, possibly using then available plant resources and plant cultivation but still relying on foraging modes to a high degree. It is interesting that the individual seems to have been more important than the community, in comparison to later phases. Phase 0, therefore, appears to represent a founding period in comparison to the activities conducted in the following phases.

Phase 1

During Phase 1 plant use was determined to be 12.2 %. In contrast to that, foraging activities could not be determined at all. This does not necessarily mean that no foraging was conducted in Phase 1, as different processes—like preservation, erosion and artifact movement—influence the assemblage of the artifacts and the entire assumed settlement area could not be excavated. However, as these circumstantial influences effect the indicators for plant use as well, foraging had become insignificant in comparison to plant use.

Handcraft already made up 28.8 % of the activities. Moreover, all activities included here were distinctly pronounced, except wood processing, which could not be determined by the tools during this phase. Jewelry production was very high and accounted for 1.75 %, which is 2.5 times higher than in the settlement average. Following the interpretation that handcraft is an indicator for more permanent stays on the site, the sedentariness had increased distinctly in comparison to the previous Phase 0.

Personal items accounted for 32.8 %, which, in comparison to the average value of 14.7 %, is almost double. If personal items represent individuality, then—at first view—the individual appears to have had a very high importance in relation to the community. However, on the other hand, ritual activities are interpreted as an indicator for instituting communality. These account for 19.2 % in Phase 1, which is the highest value of all phases and about 2.5 times as high as the average of the settlement. If personal items (understood as linked to individual activities) are put in relation to ritual activities (understood as community-building activities), a relation of 1.7 to 1 results. This compares to a relation of 1.9 to 1 in the total average. Accordingly, individuality was slightly less pronounced than in the average. Of particular importance is a comparison to Phase 0. In Phase 0, the relation was 7.2 to 1, indicating a pronounced emphasis on the individual in relation to the group. However, 32.8 % of personal items are a relatively high amount, as are 19.2 % of ritual activities. These high values, which nevertheless result in a relatively low proportion of individuality, can be interpreted to the effect that individual expression was still important and not essentially less developed than in Phase 0. However, in Phase 1 it had become necessary to conduct community-building activities in the form of rituals, in order to counteract this pronounced individuality and therefore to strengthen the community in relation to the individual. A stronger

community spirit seems to have been important in Phase 1, but had to be expressed by more community-incorporating activities as individuality was still pronounced.

The village activities made up just 0.87 % in Phase 1, as indicated by the artifacts. These correspond to one erected dwelling.

In total, plant use had become distinctly more important, whereas foraging had become effectively unimportant. At the same time, permanence on the site distinctly increased while mobility distinctly decreased. Most probably, Pernil Alto was already a fully sedentary settlement. Of special interest in this context is a social change that may have taken place against a background of changes in economy and mobility. In this social change, the individual was still pronounced, but this individuality was counteracted with more community-integrating activities. Therefore, in Phase 1 community becomes especially important, whereas the individual decreases in importance.

Phase 2

In Phase 2, the proportion of plant use further increased to 22.8 %. This is the second highest value for plant use on the site, and is distinctly above the average value of 17.5 %. However, in Phase 2, artifacts indicating foraging activities occur again and compromise of 1.76 % of the activities. However, these amounts for plant use as compared to foraging were in a proportion of 13 to 1. Therefore, foraging—like in Phase 1—seems to have been unimportant during Phase 2. In contrast, plant use was of highest importance for subsistence.

Handcraft amounts to 30.3 % in Phase 2 and reflects roughly the value of the previous Phase 1. Thus, no distinct changes seem to have appeared in the economy and mode of mobility from Phase 1 to Phase 2.

However, the low amount of 9.57 % of personal items is interesting. This is the second lowest amount in the settlement. It is distinctly below the settlement average. Even rituals apparently played a secondary role in Phase 2, as they amount to just 3.07 %. With this, they are less than half as pronounced as in the average. As a result, individuality still was prevalent as opposed to the community, but just to a lower extent. Communality had apparently reached a higher importance compared to the individual. Therefore, rituals were not very important anymore.

Village activities amount to 7.9 %, as measured in the artifacts, which is a relatively high amount, as just two dwellings and one burial area were constructed and used in this phase.

In total, the economy of Phase 2 stayed relatively similar to that of Phase 1. The importance of plant use seems to have increased slightly. The mode of mobility did not change distinctly and a permanently used sedentary settlement can be assumed. The most important change is recognized in the social field: The process of an increasing community formation apparently was completed and the role of the individual was hardly expressed in the archaeological remains any more.

Phase 3

In Phase 3 the value of plant use increased to 25.9 %. This is the highest amount of plant use in the settlement. It is clearly above the average value of 17.5 %. Therefore, the trend of increasing plant use is continued in Phase 3. Foraging, on the other hand, is not detectable at all by the artifacts. However, the same constraints as mentioned for the missing indicators in Phase 1 have to be applied here as well. In total, plant use appears to have been still the most important activity for subsistence within the economy and its importance in this phase increased.

The importance of handcraft increased to 37.2 %. The value lies above the average value of the settlement of 35.4 %. As with plant use, the trend of increasing importance is continued. Therefore, mobility was weakly defined and nearly all handcraft activities were conducted in the settlement. Sedentariness was therefore maintained and increased a bit. It is remarkable that jewelry production, as in Phase 2, was obviously not conducted in Phase 3 either.

Even though the value of the personal items slightly increased to 12 % in comparison to Phase 2, the ritual activities make up 13.9 % of the activities in Phase 3. Thus, the value of ritual activities exceeds the value of personal items for the first time. The trend towards more communality, which was indicated since Phase 0, continued. Communality seems to have been established in contrast to individuality in Phase 3.

In contrast, village activities decreased to just 3.56 %, which is less than half of the previous phase, even though twice as many dwellings and burial areas were assigned to Phase 3. Therefore, the decrease of village activities is not clearly evaluable. Even the explanation that the entire assumed settlement was not excavated is not satisfactory. Yet, it has to be taken in account that village activities do not only include the erection of dwellings, but also activities like food processing and fire making. Obviously, the value of village activities does not serve as a proxy for the erection of dwellings or burial areas, and is in general rather vague.

In total, the trends of the previous phases are continued and further established. Based on the information from the artifacts, it can be assumed that the use of plants made up the most important part of subsis-

tence, the settlement was used permanently, and community was distinctly more pronounced than the individual.

Phase 4

In Phase 4 the proportion of activities associated with plant use amounts to only 14.6 %. This marks a decrease with a factor of almost 1.8 in comparison to the previous phase. Put another way, plant use was—as based on the artifact composition—roughly only half as important as before. Thus, the trend of increasing plant use of the previous phases ends and distinctly decreases. At the same time, distinct indicators for foraging were found, even though those make up only 1.42 %. Plant use and foraging activities show a ratio of 10 to 1, which is still a very high amount for plant use. Nevertheless, the importance of foraging had increased distinctly within the economy. It is possible that plant use—which was distinctly lower than before—had become insufficient in Phase 4, and had to be supported with increased foraging activities to enable the food supply.

In contrast to the decreasing activities associated with plant use and subsistence in general, the handcraft activities reached their maximum value of 43 % in Phase 4. Thus, the settlement was—following the interpretation so far—still sedentary, and sedentariness had even increased. Even though plant use had lost importance, the settlement was still permanently occupied. The trend of the previous phases is continued in this aspect.

However, the trend towards a more pronounced communality begins to reverse. Personal items in Phase 4 represent just 6.61 % of the activities, which is distinctly less than in Phase 3. In contrast, however, ritual activities represent only 4.13 % and—as indicators for communality—decreased significantly. The ratio between personal items and ritual activities has turned—even though slightly—in favor of individuality as well. Communality apparently had lost importance, whereas the individual gained importance. Village activities increased to 6.85 %.

In total, the importance of plant use decreases significantly, whereas the importance of foraging increases. This indicates economic changes in comparison to the previous phases. Nevertheless, the settlement was still permanently occupied. The economic changes were possibly accompanied by, caused by, or resulted in social changes. Thus, the major trends of the previous phases end and are reversed, with the exception of sedentariness. Nevertheless, the site was still a permanently occupied settlement with an economy or subsistence focused on plant use, even though some problems had apparently occurred.

Phase 5

In Phase 5, plant use had distinctly increased to 27.9 %. However, foraging activities had increased to 4.46 % as well. The ratio between plant use and foraging in Phase 5 was thus 6.3 to 1. Therefore, the importance of plant use activities had actually decreased in relation to foraging. The ratio of 6.3:1 is the second lowest for plant use after the same ratio of Phase 0. The trends which began in Phase 4 with a decrease of plant use activities and an increase of foraging in the economy were therefore continued in Phase 5.

In contrast, handcrafts had decreased drastically to just 17.9 %. This value matches the value of 17.3 % of Phase 0. Therefore, as in Phase 0, it can be assumed that Pernil Alto was no longer permanently occupied, but was repeatedly visited in the frame of increased mobility.

The personal items and the rituals have increased distinctly to 18.5 % and 19 % respectively. Thus, individuality had become important again, and it is possible that this trend was accompanied with more community-building rituals. Village activities were not determinable within the artifact composition of Phase 5, even though three dwellings and three burial areas were assigned to this phase.

In total, the trend of increasing importance of foraging is continued and mobility increased simultaneously. The more frequent presence of personal items and rituals indicate that these economic changes were accompanied by social problems. But the following has to be taken into account when evaluating the activities of Phase 5 based on the artifacts: the remains of Phase 5 were strongly damaged by intrusions of the later settlement of the Initial Period and the fewest amount of all artifacts, radiocarbon dates, and botanical macro-remains were recovered from Phase 5. Therefore, the interpretation of Phase 5 has to be rated as less valid and as only indicating some less pronounced trends. That said, it seems that Pernil Alto was not permanently occupied during this phase, even though some dwellings and burial areas were erected. Possibly the settlement had been abandoned during Phase 5 because of the problems starting in Phase 4. This would explain the construction of dwellings with a coincidental lack of indicators for a permanent occupation. Furthermore, the indicators cannot be distinguished any further. In addition, Pernil Alto could have been used after its abandonment as a burial place by another settlement that could have emerged close by. Consequently, Phase 5 is best explained as an after-use phase, in which Pernil Alto was not occupied in the sense of a sedentary settlement any more.

14.5 Conclusion of the activity analyses

In the development of the activities throughout the different occupation phases of the Archaic Period the following trends emerge: At the beginning of the occupation in Phase 0, Pernil Alto appears to have been a campsite for still relatively mobile groups which repeatedly visited the site for more or less long stays but who did not live there continuously. The economy was dominated by plant use, but foraging was still very important. The site was probably a specialized campsite in which the plant resources available during certain seasons, especially those of the river valley, were used during these seasons. Either foraging in the sense of hunting was conducted as well, or the accompanying artifacts were brought to the site but not used. The social structure was apparently more individualistic and the community was of less importance.

In the following Phases 1 to 3 some trends were distinctly discernible: Plant use increases steadily in importance, whereas foraging was of little importance, if any. Simultaneously sedentariness on the site increases continuously. Furthermore, communality gains more importance in comparison to individuality. In total, Pernil Alto was—based on the artifact spectrum—a permanent settlement with an economy based on the use of plants during Phases 1 to 3. This was accompanied by changes in social interaction. Social interaction takes different forms in a permanent settlement and internal conflicts have to be solved in different manners than would be the case for a mobile group. Furthermore, the use of plants could have made the organization of communal labor more necessary.

However, from Phase 4 onwards the opposite trend begins. The importance of plant use decreases, whereas the importance of foraging increases. However, the site apparently was still a sedentary settlement (see Chapter 18). Simultaneously, the social structure seems to change and the individual gains more importance. One possibility is that the use of plants within the economy (compare Chapter 17) had reached the limits of economical reliability and had to be complemented by foraging involving at the same time a more pronounced individuality. Or, alternatively, the organization of social life was not yet sufficiently developed, leading to more internal conflicts with effects on the economy which was then conducted less communally and more individualistically. The first explanation could be indicative for changes in the micro climatic situation, however such changes are so far unknown. All in all, the economy and social structure that developed during Phases 1 to 3 began to crumble during Phase 4.

In Phase 5, some dwellings still were erected, however the settlement was abandoned and visited sporadically maybe from a settlement close by.

Thus, Phase 0 represents based on the artifacts by the artifact composition, a "pre-use" phase and Phase 5 is an "after-use" phase, while the effective development—initially towards plant use and sedentariness—took place during Phases 1 to 4.

The results of this chapter will be important for the overall discussion and interpretation of the society (Chapter 16), economy (Chapter 17), and mobility (Chapter 18) of the site and its inhabitants.