Paul Yule/Wolfgang Böhler

Sisupalgarh: An Early Historic Fortress in Coastal Orissa and its Cousins[1]

Summary

Renowned in the context of Ashokan India (4th century BCE), Sisupalgarh, the largest early historic fortress in the eastern part of the Subcontinent (with exception of Pataliputra, present-day Patna), plays a role in virtually all discussions about this period. Its symmetrical plan and great size (130ha, 1190m x 1150m measured at the top of the glacis) reveal an architectural ideal for its day. South Asia experts usually discuss it as an example of defensive early historic architecture, largely omitting any relation to predecessors, relatives, or successors. Recent research conducted by a team from the University of Kiel, Utkal University in Bhubaneshwar and the University of Applied Sciences in Mainz has rekindled the research largely of the 1940s, revealing the uniqueness of iuplgarh and its role in the eastern part of the India. To our knowledge this is the first application of this kind of scanning in the archaeology of the Subcontinent.

Introduction

Without a doubt, the eastern coastal Orissa is the economic, historic and cultural centre of the region especially *vis à vis* the interior. But was this always so, or was it a development from the medieval period onward? A team centred at the University of Kiel challenged the perceived subaltern role attributed to western Orissa from the iron age into early medieval history by virtue of a series of attributes such as the distribution and size of early historic fortifications (Fig. 1). Despite Orissa's broad area (two thirds that of present-day Germany), until recently the number of archaeological sites in this state was pitifully small. Entire archaeological periods were unrepresented or documented in such a way, often in mere site lists, that the character of a given site or period remained hopelessly intangible. Woefully lacking were maps, plans, and photos of any kind. But in an age of the GPS (Global Positioning System) and advanced surveying techniques, such weaknesses readily can be remedied.

Carried out long ago in 1948 and briefly the following year, the excavation of Sisupalgarh was to remedy partially the undeveloped state of archaeology in eastern India. Its excavator, B.B. Lal, was strongly influenced and supported by Sir Mortimer Wheeler, as the excavation report bespeaks in its form, style, thoroughness, and simple excellence. The excavation report remains for all purposes the first mention and treatment of the site.

[1]A grant from the German Research Society (SPP 1066) made this study possible. Project patron was H. Kulke of the University of Kiel. We thank M. Brandtner for information at various points. The authors also should like to thank B.K. Rath, director of the Orissa State Archaeology, for his support over the years. A vote of thanks goes to the Archaeological Survey of India and the State Archaeology Orissa for their help. Published in Beiträge zur allgemeinen und vergleichenden Archäologie 24, 2004, 15-29.

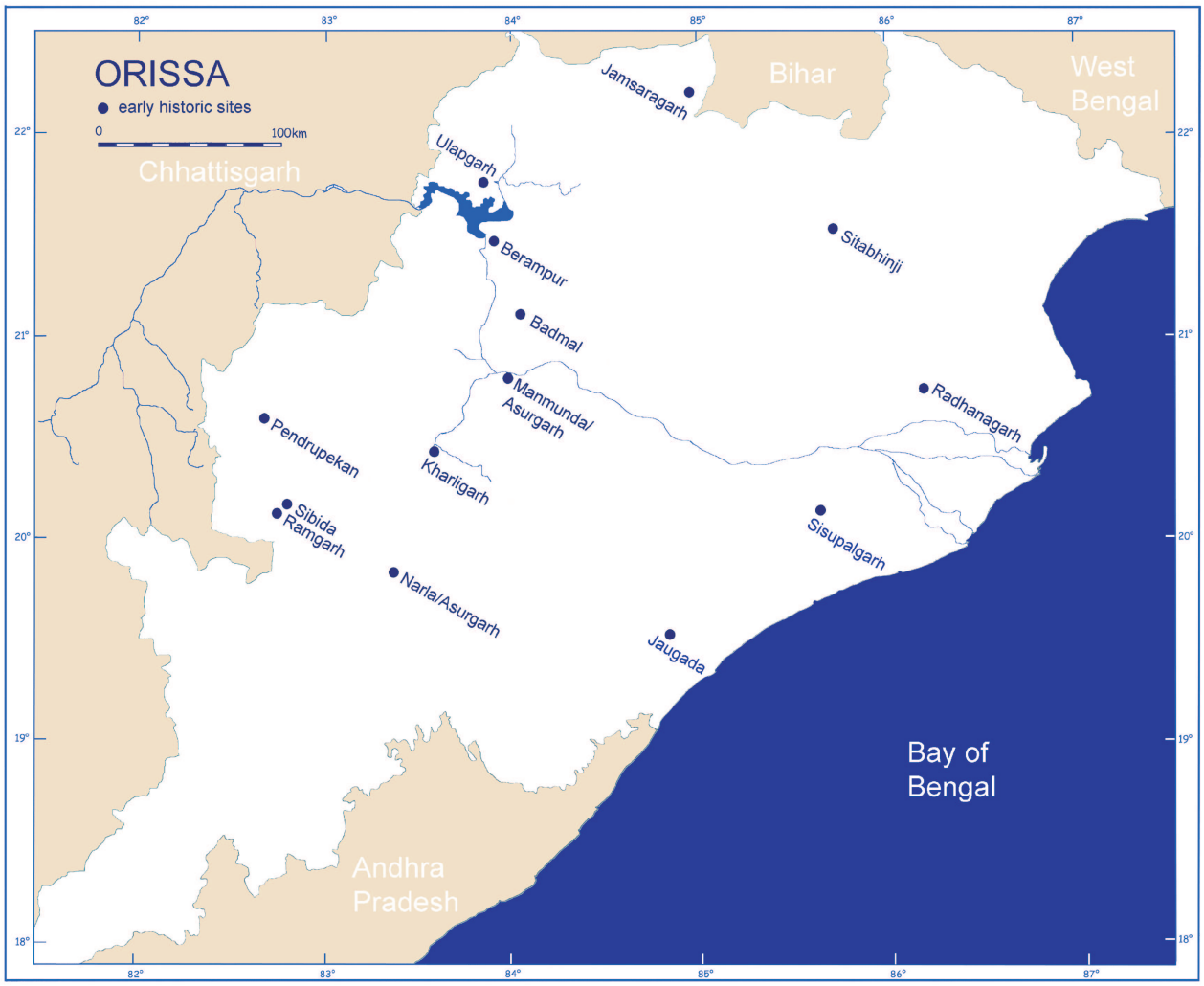


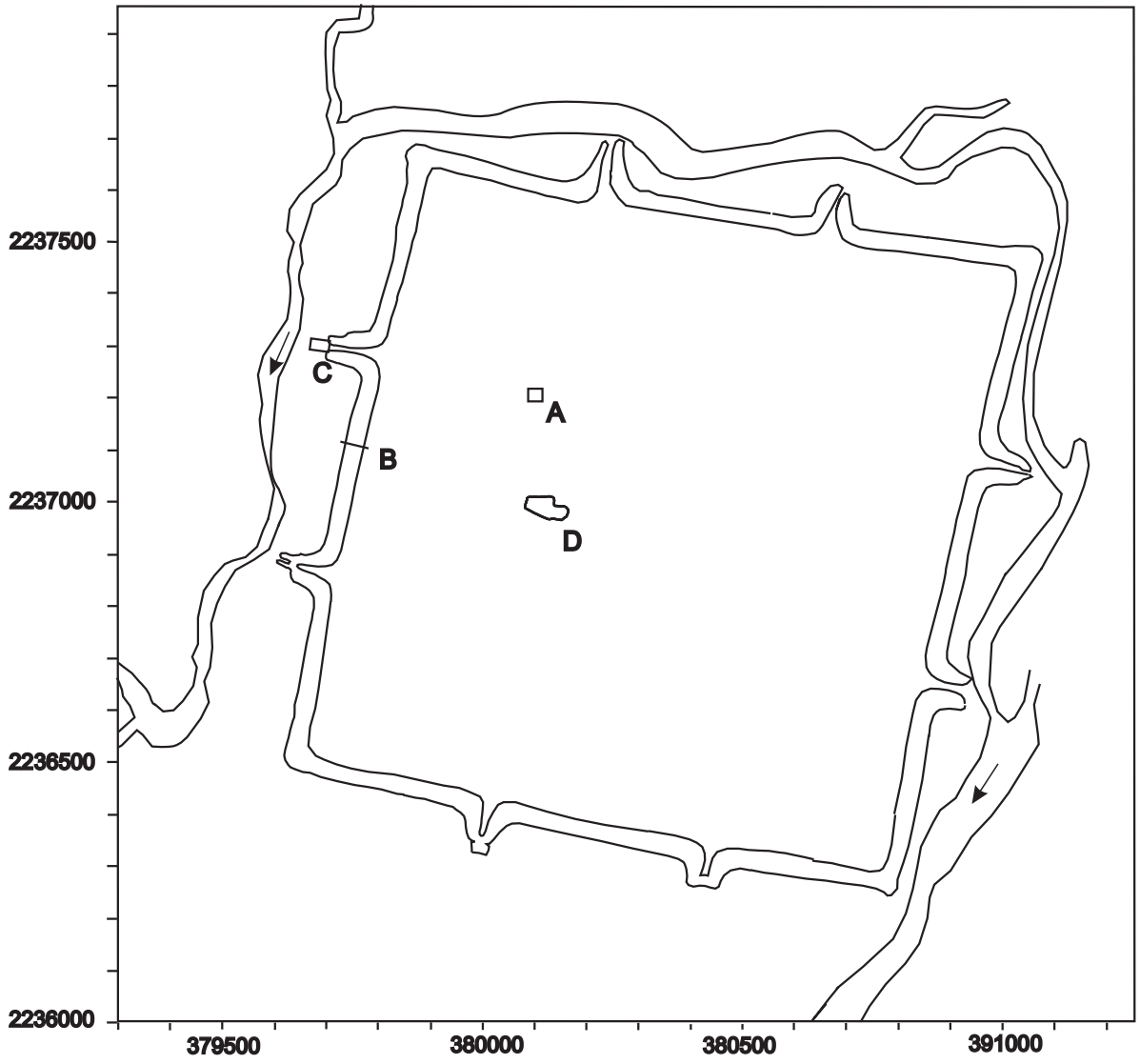
Fig. 1. Early historic ruined forts in Orissa.

Early Historic Forts in Orissa

In fact, Sisupalgarh (Fig. 2) devolved from a long line of defensive architecture which archaeologists have only begun to trace back, and none too soon as Indias archaeological monuments come under increasing pressure by an ever-expanding population. In the face of attrition, the question arises about local rights, duties, and real possibilities with regard to "their" cultural property. In the late 1960s an excellent study attempted the contexting of Sisupalgarh with contemporary settlements and fortificatory architecture, as well as with reference to relevant ancient texts. But for all its merit, given the fewness of SouthAsian archaeologists and indologists with a reading knowledge of German, this study went on essentially unheeded.

While at first glance, the Sisupalgarh fortress seems the only one of importance in the area, in fact it is by no means unique. Its slightly smaller relative at Jaugada (ancient Samapa) in the Ganjam District, some 170 km

2 D. Schlingloff 1967; idem 1970. F.R. Allchin 1995, 222-273. Even here one reads disconcertedly that regarding early historic fortifications, "...but so far no comparative study has been made of them" (p. 223.).



A Habitation Area, SP I
B Trench through rampart, SP II
C Excavated gateway, SP IV
D Site of monolithic columns

Fig. 2. Plan of Sisupalgarh fortress, Dist. Kurda (after Lal 1949 + GPS data, 2003, University of Kiel Expedition; UTM 45Q 380251e, 2236983n (20°13’57”N; 85°50’56.6”E)

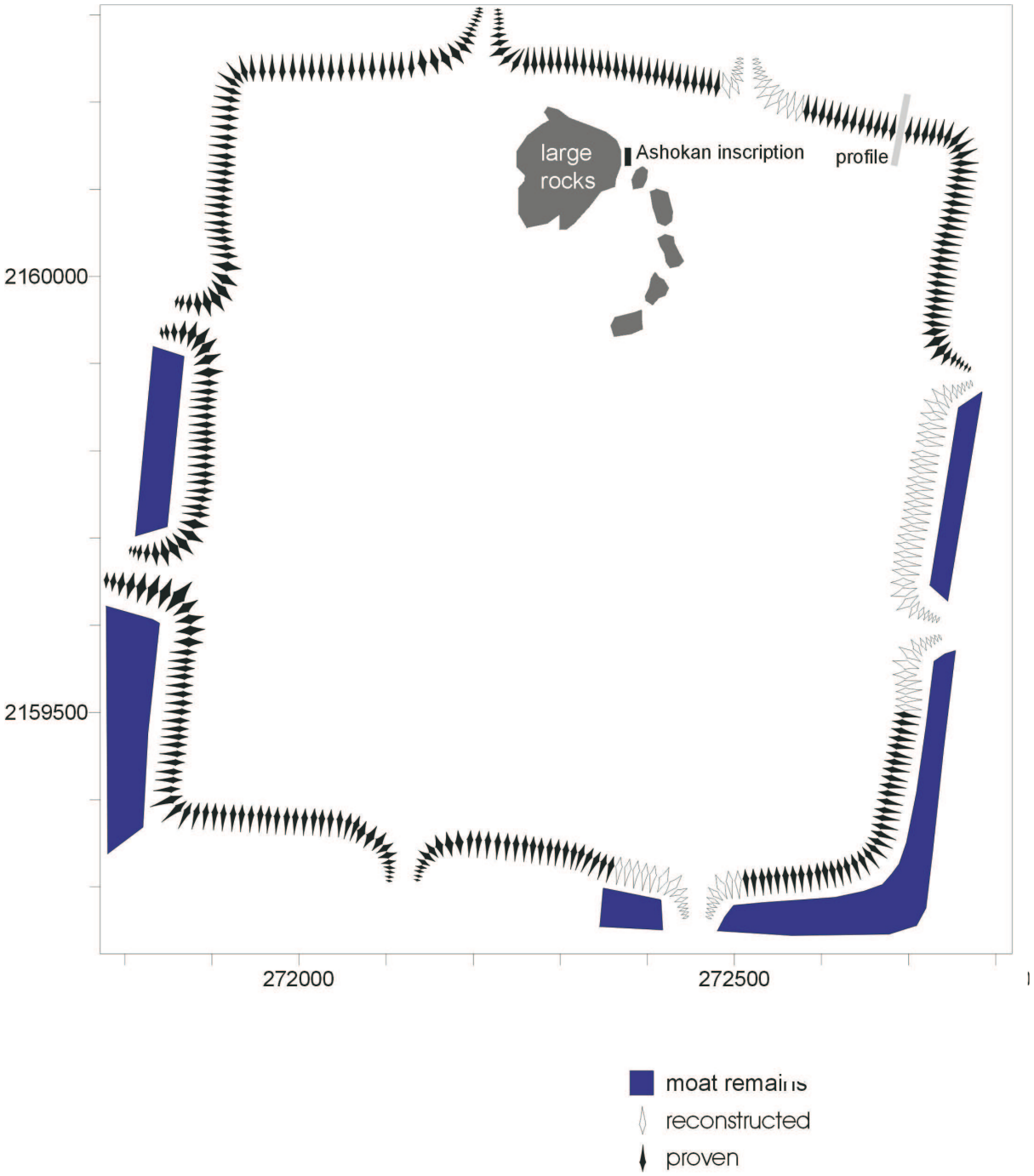


Fig. 3. Plan of Jaugada/Samapa fortress (GPS-assisted plan: D. Modarressi, T. Rosarius, P. Yule; University of Kiel Expedition, 2002-2003; UTM 45Q 0272181E/2160244N).

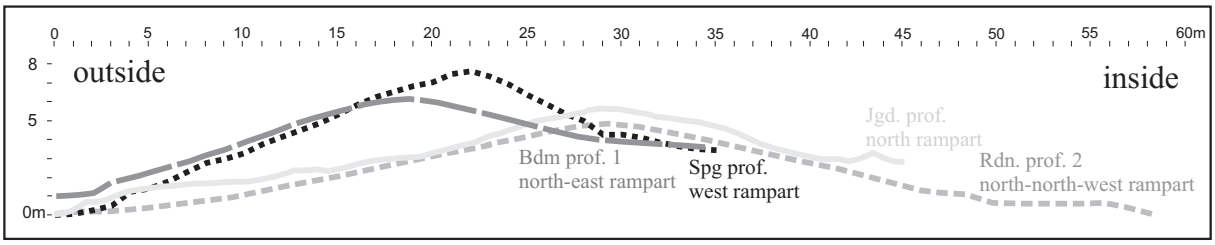


Fig. 4. Profiles of the Jaugada, Sisupalgarh, Radhanagar, and Badmal glacis superimposed on each other.

to the south-west, is noted for its version of Ashokas rock edicts. On inscriptional and archaeological grounds, the two seem to have developed at about the same time. The similarity between the plan of Sisupalgarh and that of Jaugada (80 ha, 900m x 1050m, exterior) is such that they are indistinguishable, except to the trained eye (Fig. 3). Similar are the quadrangular shape, two entrances on each of the four glacis, and their orientation, tipped a little clockwise of north. The profiles of the glacis resemble each other in their preserved form, the higher interior than exterior, and their similarity in size (Fig. 4). But, as preserved, the glacis at Jaugada are broader and flatter.

To illuminate the history of early historic fortifications we turn to Jaugada, where in the 19th century J.D. Beglar described the rampart, moat, towers which all were still clearly visible. Debala Mitra excavated certain points there in 1956 for the Archaeological Survey of India (ASI)[3]. Without drawings, these descriptions of the site are difficult to comprehend let alone visualize. Her now collapsed trench appears to have lain east of the eastern gate in the northern glacis. While about 40% of the quadrangular rampart are obliterated, with careful study they are still discernable. Farmers have planed off the rampart, turning much of it into a threshing surface for their main crop: rice. To map this slowly disappearing site and others like it, we paced the inner and outer perimeter of the glacis three times, taking a readings with a hand-held GPS on its height and width every 30m. This instrument was not intended for this kind of measuring, but gives a surprisingly good two-dimensional plan at least of large fortifications. The vertical data are of no real use in such magnitudes. Since the gates are smaller and more complicated, here we took a reading every 3m. Jaugadas preservation is best on its west side and worst on the now inhabited south-eastern and eastern sides. Remains of the antique moat are still visible in spots outside the glacis. Those of the eight gates still exist to varying degrees. Aside from the ASI's protective building around the Ashokan rock inscription, no other preservation measures took place. In 1956 the glacis reportedly measured 23m x 4.75m extant maximal width to height (Fig. 4). Recent measurements exceed these figures with a maximum of 45m x 6m on the surface, naturally in its weathered and eroded state. Originally, the glacis was both narrower and higher than today; its size being a matter of interpretation.

Some 50 km north-east of Bhubaneshwar in the Jajpur Dist. lies a third contemporary ruined rampart (80ha, 780m x 1040m) of which Radanagarh village occupies the north-

4 J.D. Beglar 1882 [1970] 112. Excavation report: D. Mitra 1957, 30-31, pls.40-44.

5 We thank B.K. Rath and H. von Stietencron for this oral information. Regarding this site see also J. Mishra 2000, 507-550, also for further sources.

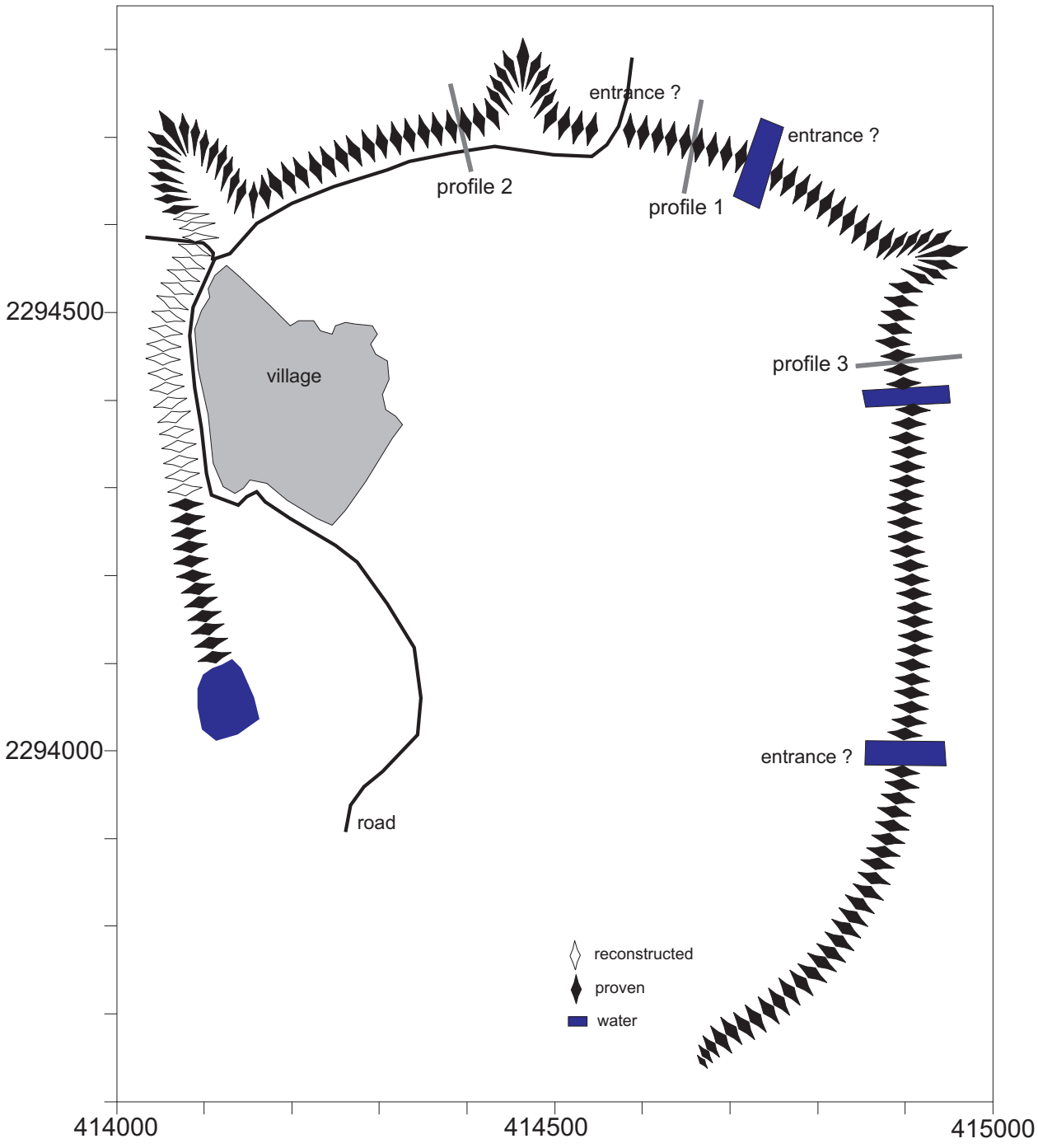


Fig. 5. Plan of Radhanagarh Early Historic fortress, Dist. Jajpur (GPS-assisted plan: M. Blumenroth, D. Modarressi, T. Rosarius, P. Yule; University of Kiel Expedition, 2002-2003; UTM 45Q 414050E/2294950N; 22°44'50"n; 86°10'39").

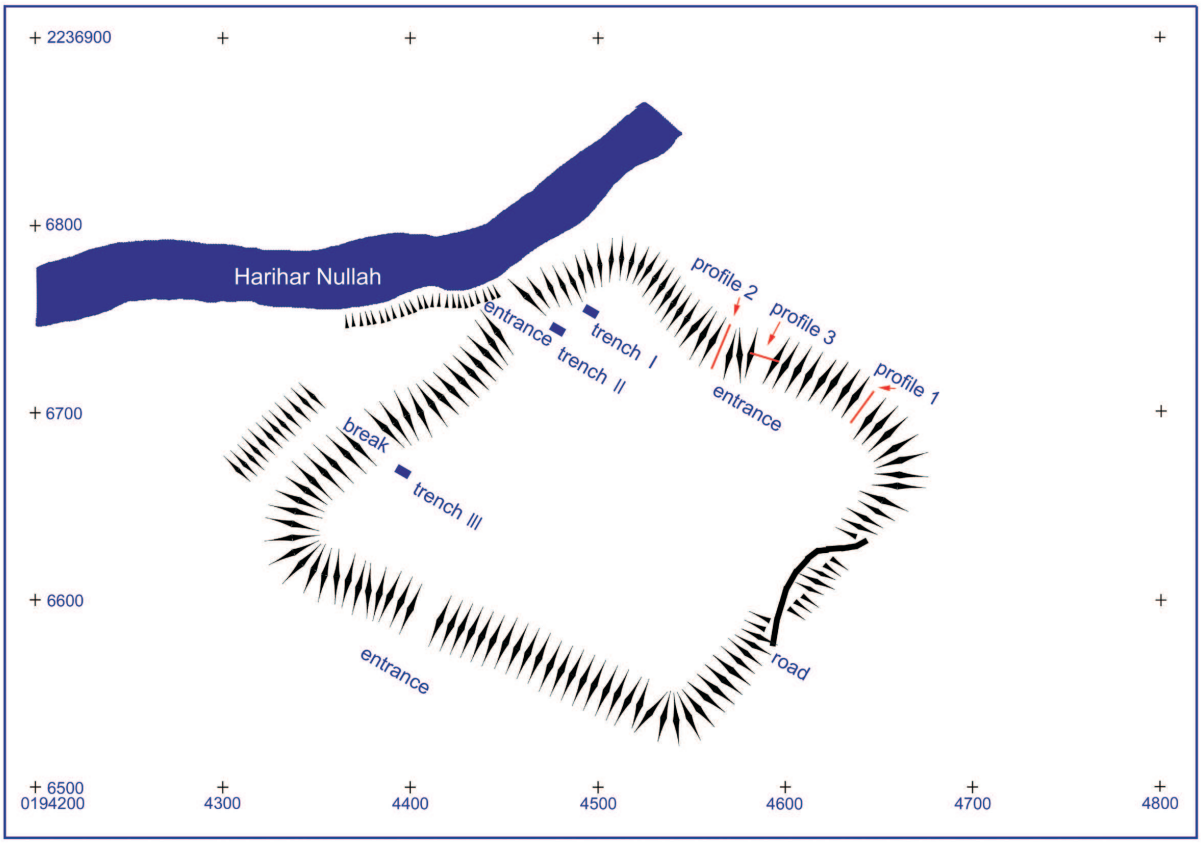


Fig. 6. Plan of Badmal fort (GPS-assisted plan: P. Behera, M. Blumenroth, T. Rosarius, P. Yule; University of Kiel, 2002; UTM 44Q 194586E/ 2336718N).

western corner (Fig. 5). K.S. Behera, prior to retirement from the Utkal University, was the first to mention this site publicly, in the local newspaper in the mid 1980s[4]. The irregular ground plan differs from that of Mauryan Jaugada. Unfortunately, its south-west corner is completely destroyed. Despite the erosion of the glacis, in the north they still stand prominantly. Unusual is that the interior and exterior of the glacis are of nearly the same height. Till now, this large fortified settlement has hardly been discussed in the context of early historic building foundations. Diagnostic finds suggest a dating in the 1st centuries BCE/CE, postdating that for the main building phases in Sisupalgarh and Jaugada. But within 6 km of the site at Languri lies a large Ashokan stupa which suggests a possible importance for the site *en gros* during the Mauryan Period.

Turning to the north-west, in mid 2002 P.K. Behera of the Sambalpur University discovered yet another fort at Badmal (4 ha, 180m x 220m) in the Sambalpur Dist. and made three small trenches near the glacis (Fig. 6). On the basis of radiocarbon and the pottery from these trenches, which are under study, the site was first built in the iron age and continued in use into the early historic period[5], making it the earliest known fort of its type. Badmals four fenestrated sides, were strengthened by a

5 Radiocarbon calibrated assays:
1 Badmal trench BDMII Stratum -125cm b.s.
σ1 standard deviation 799-766BCE KIA20153
2 Badmal trench BDMII Stratum -115cm b.s.
σ1 standard deviation 799-766BCE KIA20154
3 Badmal trench BDMII Stratum -50cm b.s.
σ1 standard deviation 640-588BCE KIA20155
The stratigraphy between the glacis and the trenches will be investigated in the near future. Organic material that came into being between 750 and 400 cal BC accumulates usually the same 14C content. A dating 750-400 BCE is possible. Our first two determinations predate this and require further study.

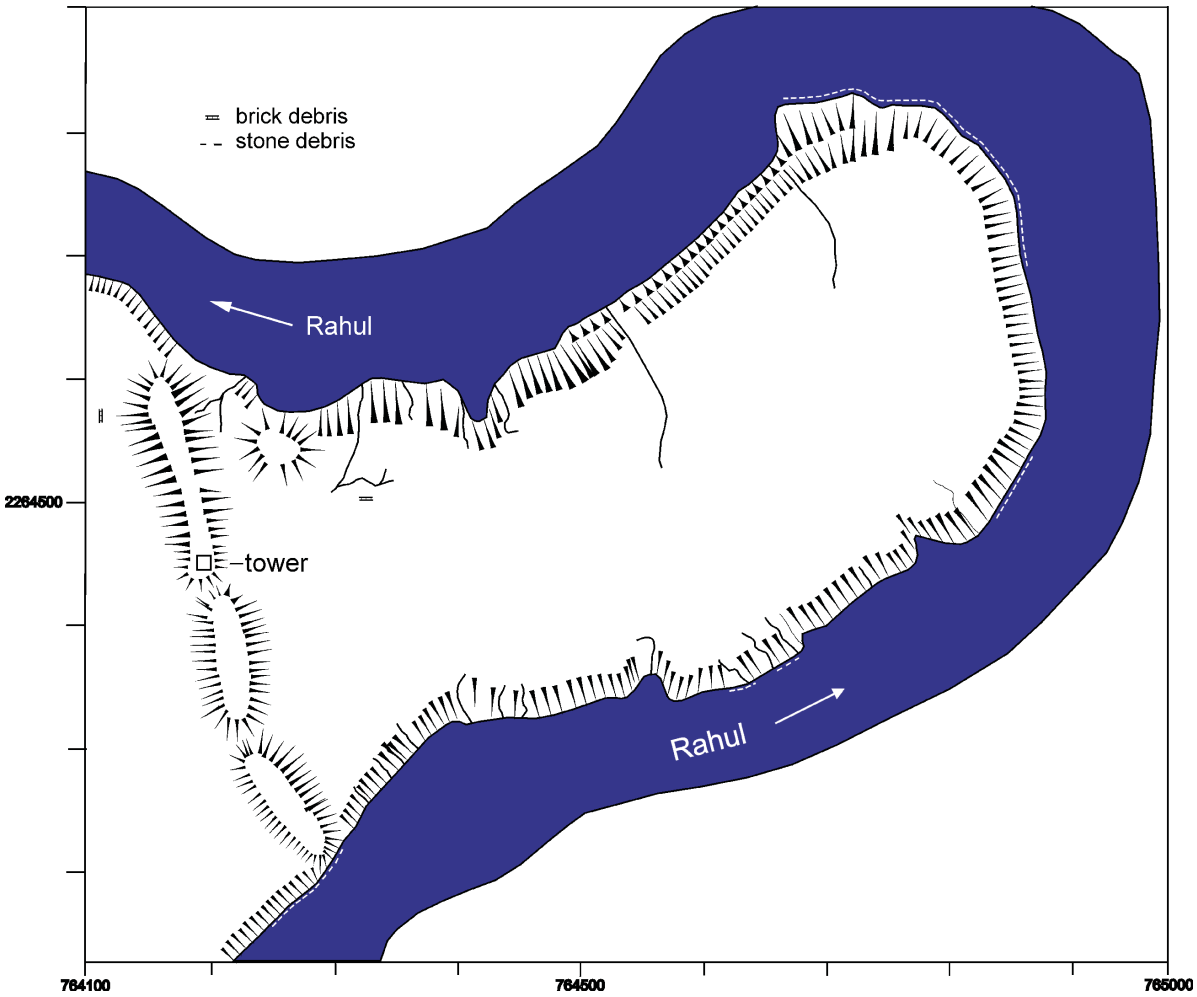


Fig. 7. Plan of Kharligarh fortress, Dist. Balangir (GPS-assisted plan; P. Yule; UTM 45Q 764600E/2264500N).

flanking defensive trench, best visible on the western side. Typically with such early forts, the interior is elevated relative to the exterior (Fig. 4). P.K. Behera proposes a dating from the 2nd century BCE to the 4th century CE for Badmal on the strength of surface finds and those from test trenches.

In 2000 and 2001 by means of photos and GPS-plots we began the mapping of the little-known 600+m long, 28ha Kharligarh fort in Dist. Balangir, which in fact turns out to be the largest early historic fortress known in western Orissa (Fig. 7). But for this, it is typical in South Asia at this time in its heavy reliance on the topography (the terrain and river) for defensive purposes, such as neighbouring Vidi (Besnagar, Madhya Pradesh).

Thus, there seem to be two main early historic fort types in India: those formed in river meanders (Kharligarh, Jamsaragarh) as well as anthropogenic ones quadratic in plan. Those of Kharligarh type, date to different points in early historic India. Badmal, which represents the earliest of the second type, dates well into the iron age by virtue of carbon dating. Others include Narla/Asurgarh, Sisupalgarh, Jaugada, and Mahasthan (Bangladesh). Radhanagar belongs in a class of its own.

Sisupalgarh the Fortress

In light of the foregoing research, one may turn in greater detail to Sisupalgarh, which illuminates and is illuminated by contemporary forts. While most writers address the symmetry of the eight city gates, closer scrutiny reveals differences in their individual size, shape, and details of construction. The western gate of the northern glacis appears to be the largest of all. But as year for year the encroaching rice paddies increase in size, it and the other gates so decrease in size. A newly measured plan of the excavated gate in the western glacis shows the fortifications to be somewhat asymmetrical in plan.

The moat was certainly not the present-day Gangua Nala in its present form. This stream meanders around Sisupalgarh, and anciently fed as well as drained the moat. For a moat to be an effective defense, it should be simple and afford attackers no protection from defending archers. Turning to a handbook for administrators, the original version of which was written in the 4th century BCE, the Arthashastra, a chapter on fortificatory architecture prescribed triple defensive trenchs should measure 25.20m, 21.60m and 18.00m (= together 64.8m), not archaeologically verifiable for early historic South Asia fortifications. Furthermore, their depth should come to between 1/2 and 3/4 of the breadth. The moats are to be lined with gravel or bricks. They are to be fed from (spring-)water, or are to be filled and drained with water from a river. Lotus and crocodiles give the final touch. Again the Arthastra, the earth displaced from the moats served as the material for the glacis, which was tamped by elephants and cattle. Atop this glacis a brick or stone wall was erected twice as high as wide.

A published aerial photo in the preliminary report shows the shape and size of the glacis and that of the Gangua Nala, also enabling a first glance at the defenses. A zig zag water course on the southern and south-eastern sides, which has been proffered as a remnant of the moat, vaguely similar to European ones built from the 16th century onward, seems a most unlikely form. Today the borders of fields especially on the north-western and north-eastern corners parallel the ancient glacis. Several of the borders of the plots may be fossils reflecting the positions of the moats. The interior was not densely inhabited, but rather it also was possible to cultivate, graze and carry out functions in a low-population environment.

Aside from the moat, other features are lacking in the context, as known from the original excavation report, which certainly existed, including galleries, merlons, towers, and/or uppermost fortifications, which can be simulated with the help of a computer. At its historic apex, the city defenses measured some 35m width and 16m in height. Two strands of information illuminate the question of the reliability of the simulation: First, other excavated early historic forts and secondly, the Arthastra as the main textual source. The size and shape of the glacis of Sisiupalgarh have been compared to other early historic fortifications in India, whereby presumably also widespread is a stone wall without a glacis, as at Rajagrha[6]. Moreover, regarding the original appearance of the fortifications, we must consider the oft-cited description of Megasthenes, ambassador of Seleukos Nicator, in reference to the wooden fortifications of Pataliputra (present-day Patna), once the largest city in the world, which were excavated in the early 20th century. This certainly contradicts the ban on wood for fortifications suggested in the Arthashastra. Conceivably wood was used for the upper part of the fortification.

The excavations at Sisupalgarh included a city gate, the glacis and a part of the settlement. A further area designated "D", while

6 D. Schlingloff 1967: 53, fig. 11, citing Rjagaha as typical. R.E.M. Wheeler 1948: 93 fig. 2 for the plan and section drawings.

Fig. 8. Sisupalgarh, isometric reconstruction of the northern *pratoli* gate type of the western rampart (SP IV).

photographed, thereafter was never seriously investigated. The northern gate of the western glacis at iuplgarh has been compared with other early historic examples, and in relation to the descriptions in the Arthashastra, reveals a rather good correspondence with the written source. As the weakest point in the fortification, both the attackers and defenders focussed attention to the gates. They must both successfully serve as a platform from which the archers could hold the enemy far at bay and also be defenseable at close quarters. Kautiliya's description of an ideal gate can be simulated despite certain problems in the dimensions which gave (Fig. 8). The gate at Sisupalgarh differs in its form from that which Kautiliya described, but the various termini still can be readily identified there. Three computer simulations successively built on each other which culminated in the final version shown Fig. 8 and in *animation1.avi* on the accompanying CD. An early roofed version of the gate was corrected to be open. Later, the gate was drawn with hemicircular "monkey head" merlons and then its upper reaches were rendered as painted white. According to the Arthashastra, the gate should be recessed behind the line of the glacis and have a square rather than an long chamber, as actually exists at Sravasti.

7 The colour of the wall on rampart according to a text by Kalidasa in which he compares fortifications with a snow-capped mountain. Personal communication D. Schlingloff 12.08.2003.

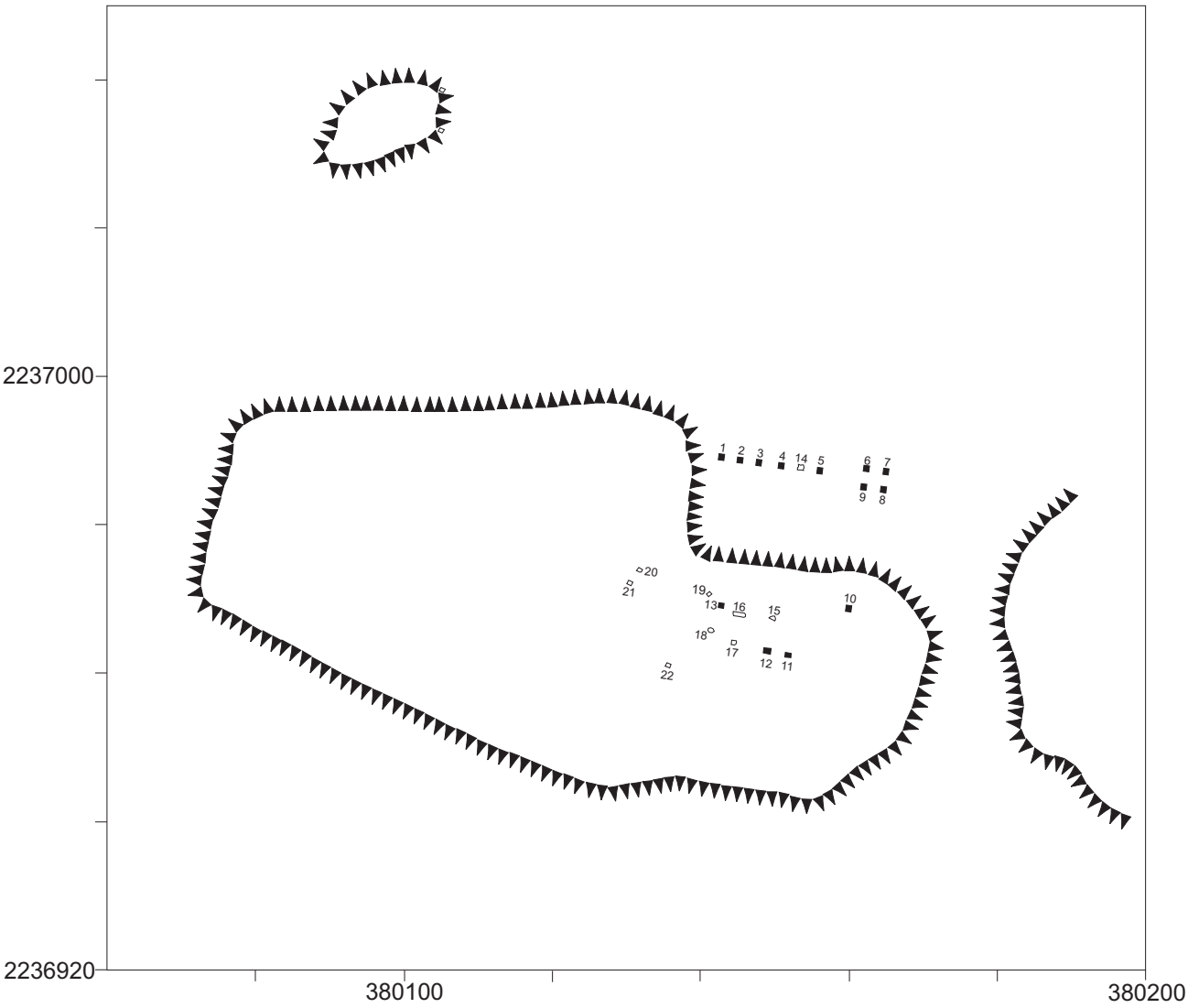
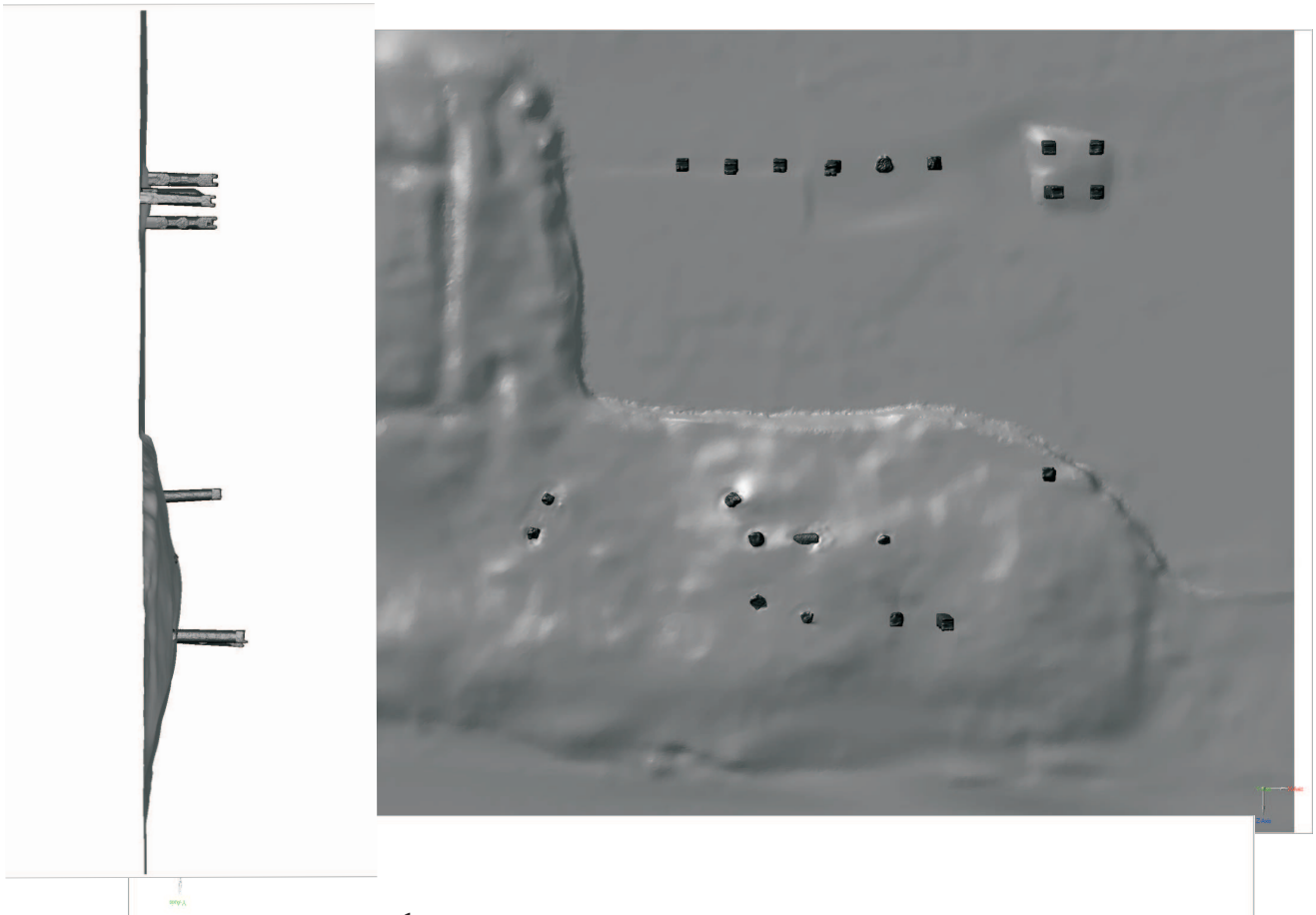


Fig. 9. Sketch map of Sisupalgarh Area D and its surroundings. (Measured plan: D. Modarressi, T. Rosarius, P. Yule; University of Kiel Expedition, 2003; UTM 45Q 380130.4; 2236985.5=20°13’35.5”n; 85°51’09.5”e

In addition to a ground floor, Kauilyas gate has an upper storey, raising the height of the gate to that of the wall on glacis. This gives the archers a tremendous advantage over assailants.

Sisupalgarh, Area D: "16 Columns"

A mysterious complex belonging to Sisupalgarh of some 13 laterite columns first became known from a single published photo and descriptions from the late 1940s onward (B.B. Lal 1949, pl. Xib opposite p. 75). In the Oriya tongue the locals designate this complex "16 columns" (*shola khamba*). Other similar antique columns stand in the immediate area. Obviously, it is an important ruin within Sisupalgarh, perhaps the palace of the ruler, to judge from the Arthashastra, which prescribes such to be in the centre of a given settlement. For all their rarity and importance, a group of some thirteen stone columns nearly 5m in height were essentially unrecorded (Fig. 9). A lack



a b

c

Fig. 10a-c. Sisupalgarh Area D, vertical, oblique and horizontal views.

of information about their true appearance hindered discussing their number, state of preservation and original purpose.

The Institute for Spatial Information and Surveying Technology (i3mainz) of the University of Applied Sciences in Mainz came up with a solution for this task the use of a laser scanner to record the topography and architectural complex three-dimensionally. The institute has examined the accuracy of laser scanners (Bö hler et. al. 2004) and proved their suitability for those cultural heritage documentation tasks where complex spatial surfaces have to be recorded with high accuracy and resolution (Böhler 2004). In this way the columns could be recorded three-dimensionally and their preservation monitored. The second aspect is important, for the encroachment of the rice fields on the archaeological remains is otherwise impossible to monitor over time. On the enclosed CD the columns (the files *col0l* to *col13*) are reproduced from the scans individually. In addition, the scene can be viewed as a high resolution animated simulation (CD file *animation3.avi*) with the PC or Mac software which is generally available at no extra cost. Selected perspective views of the entire site (Figs. 10-12), give a more concrete idea of the appearance of this monument than thusfar possible. Lals original published photo of 1948 can be superimposed with an animated computer simulation (on the enclosed CD *animation2.avi*).

The scanner documented not only the size and position of the columns and their relation to each other, but also their appearance more exactly than measured drawings which we made. To the north a row of columns terminates to the east with a group of four. Some 15m to the south a second parallel row of columns stands on a ground some 5m higher than the northern row. The scanner revealed the columns in their context, namely that they originally lay together with walls, the stone of which now has been robbed. The robbed walls are visible in the scan in an axis parallel and perpendicular to the column group.

The recording of the column complex and topography rests on some 15 million measurements recorded at a rate of nearly 1000 points per second a veritable cloud of laser-measured points. In order to achieve a complete coverage, 20 scans were taken from different observation stations. The single scans were registered to form a common point cloud and thinned to the necessary resolution, resulting in 3 million points which were connected by 6 million small triangles which actually describe the surface. A final step was to render and animate the recorded data in order to make it "come to life" and to convey render its spatial appearance more vividly than possible simply with elevational lines. For this kind of representation special software is required (Fig. 13). With the impetus of a concrete documentation of the condition at the time of the recording, the authorities will be able to more readily protect this site which in any case has been declared to be a national monument.

The position of the northern and southern rows of columns of Area D requires explanation. If the complex were originally of a single building phase, one would expect the columns to stand on the same height and be identical in appearance. But this is not the case. Circular, octagonal and oval cross sections of the columns occur. Nor are all finished. Perhaps anciently the columns were taken from other monuments. Two in the north-east have circular medallion-like fields on four sides. Those in the northern row are notched vertically and horizontally at the top in the "capital". The horizontal notching suggests secondary building and use *in situ*. Why some of the columns have medallions on four sides is a further matter for speculation. The laterite is rough and now is weathered. Were one to use it as a field for decoration or writing, then it must first have been smoothed with a fill material.

Further research should investigate whether only two rows of columns existed or a chess board pattern of many columns existed. Perhaps some of the columns originally were of other materials such as wood. Whether or not foundations exist must also be determined.

There is no way at this time to determine

Fig. 11. Sisupalgarh Area D, early historic ruined column complex “Shola khamba” (16 columns) (plan rendered with elevational lines. M. Bordas Vicent, P. Yule; 2003, 2004; scale 1:250; UTM 45Q 380130.4E/2236985.5N).

from whence the two above-mentioned types of building structures originate. To postulate precedence in western or in eastern Orissa for the one or the other, would to be too simple and too good to be true. Curiously, four of the seven known and datable early historic forts lie in the West, perhaps a political and cultural geminal area in what has become Orissa.

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