Stone Age Archaeology and Paleoecology of the Geelbek Dunes, West Coast National Park, South Africa
Report on the 1999 Fieldwork

Based on the results of the 1998 field season, the Geelbek Project was awarded a grant from the Deutsche *Forschungsgemeinschaft* funding three years of research through the year 2002. The grant supports a doctoral candidate (Timothy J. Prindiville), a technician (Maria Malina) and three years of field and laboratory research in South Africa and Germany. With these resources, the 1999 season was planned for February and March with the hope of gathering more data from the deflation bays surveyed in the Geelbek Dunes in 1998. In contrast to the previous year's focus on the southern and central parts of this 5 km^2, mobile dune system, the 1999 research examined seven bays in the northern part of the dunes.

In addition to increasing the area of spatial coverage within the dunes, the 1999 field season addressed several other questions:

- Is the archaeological setting in the dunes unique, or are there similar finds buried throughout the local landscape?
- Can a general stratigraphic system be established for the dunes and underlying strata?
- Were the ecological conditions at Geelbek relatively constant during the Stone Age, or can clear temporal trends in plant and animal life be established?
- How are finds from different archaeological periods distributed across the landscape preserved in the dune sytem?
- What human activities can be documented at sites in the dune system?
- Can one use the observations at Geelbek to define recognizable types of open-air sites?

Progress could be made on some of these issues, but others must still be addressed. Particularly frustrating is our poor understanding of the chronostratigraphy of the dune system.

After Andrew Kandel spent a week preparing for the field season, the crew began arriving on February 15. The excavation team consisted of four students from Tübingen (Philipp Drechsler, Liane Giemsch, Conny Meister and Christina Weiss), two technicians in training (Maria Malina and Melanie Scheller), Andrew Kandel, Timothy Prindiville and Nicholas Conard. The crew had an average size of seven people. Fieldwork began on Monday, February 22 and continued until Thursday, March 25. Although the configurations varied, five crew members were generally in the field, while two processed finds at home.

After the main period of excavation, Timothy Prindiville, Maria Malina and Conny Meister made two shorter trips to Geelbek from April 7-9 and 14-16. The purpose of these trips was to complete the surveying of one bay and to re-measure the five bays from 1998 in order to calculate the rate of dune migration. In addition, observations in the field prompted the examination of another locality.

In all, seven bays were examined in the 1999 field season. These were named Frikkie, Check, Mathilda Rose, Snock, Rhino, Pottery and Homo. The methods used to document the bays remained nearly the same as those from 1998. The single exception was that the five faunal size classes used in 1998 (0 to 4) were expanded to seven size classes (0 to 6) to allow for greater resolution in describing the size of faunal remains. The classes were defined following Brain's (1981) and Klein & Cruz-Uribe's (1991) systems for the classification of bovids, with size classes 0 and 6 added to record other species such as microfauna and pachyderms. The classes are defined in the legend of Table 1.

All finds on the surface within the chosen deflation bays were piece-plotted using a Leica total station, a field computer and corresponding software. In certain cases, scaled drawings were made of concentrations of faunal remains and lithic artifacts. Within each bay, excavations were conducted to determine both the presence of sub-surface finds and to evaluate the success of the methods of surface

recovery. All sediment from these excavation units was screened though 5 and 2.5 mm mesh to improve the recovery of small artifacts and the remains of small aquatic and terrestrial species.

The crew collected finds over a total surface of more than 2.4 hectares and excavated 455 m^2 (Table 1). This work led to the recovery of 4,422 piece-plotted finds including 741 lithic artifacts and 3,681 faunal remains. A total of 239 other finds included the following items: pottery; ostrich egg shell beads; manuports; marine shells; and historic artifacts, such as fragments of glass, glazed ceramics, clay pipe and metal.

A synopsis of the seven bays studied in 1999 follows:

Frikkie is an east-west oriented bay (ca. 35 x 30 m) consisting of two roughly symmetrical lobes in which both intact rhyzoliths (east) and exposed calcrete (west) were visible (Figure 2). This small bay was chosen to begin the field season because of its low find-density and geological setting. Frikkie contained only three lithic artifacts, 39 faunal remains and one fragment of a clay pipe (Table 1).

Check is a medium-sized (ca. 160 x 40 m), elongated, north-south oriented bay containing areas with intact root casts in the south and smaller areas of calcrete in the north (Figure 3). Like Pottery and unlike Rhino (see below), the larger part of the bay lies topographically, and likely stratigraphically, higher than other localities within the Geelbek system. Forty-nine chipped stone artifacts were recovered. Among these are a small number of backed bladelets and points which typologically belong to the LSA. The bay also yielded a relatively high number of cores (Table 1), most of which are single or multiple platform blade or bladelet cores. The larger mammalian fauna is comprised mainly of size class 1 and 3 animals. The bay also produced abundant fragments of marine mussel shell and two sherds of prehistoric pottery. Two concentrations of apparently unburned calcrete blocks, each ca. 6 m in diameter, were documented. These circular features rested upon aeolian sand, indicating their anthropogenic nature. Such features have been identified elsewhere in the Western Cape Province and are believed to be remains of roasting platforms or possibly architectural structures (G. Avery and J. Deacon 1999, Pers. comm.) Even in cases where the calcrete pieces are unburned, their geological contexts appears to rule out their natural occurrence.

Mathilda Rose, with maximum dimensions of about 180 x 60 m, is the largest locality studied in 1999. It is a roughly east-west oriented bay which consists of a large, deflated surface and two ancillary lobes, one to the southeast and the other northwest of the main area (Figure 4). Calcrete was exposed within the two lobes, whereas aeolian sand and vegetation were present in the central portion of the main area. Along with the typical array of prehistoric artifacts, this bay produced historic artifacts including glass and metal (Table 1). As was the case in Check and Snoek, the lithic artifacts consisted of LSA types, including single and multiple platform cores and two backed tools. Over 150 larger mammalian bones were recovered from Mathilda Rose, most of which belong to medium and small-sized mammals.

Snoek is an oval bay with dimensions of approximately 80 x 50 m (Figure 5). Differential erosion has exposed calcrete in the southeast, while intact root casts are preserved in the northwest. Among the noteworthy finds are ten ostrich egg shell fragments which preserve the partially complete holes of water bottles. At least one cut-marked bone was identified, a vertebra from a size class 4 animal. Aside from the usual array of finds, Snoek produced one of the more important lithic assemblages thus far documented at Geelbek. A sufficient quantity of tool and tool fragments were recovered to allow more convincing characterizations of the bay's LSA assemblage. The majority of retouched pieces are on bladelets, with points and backed bladelets representing the most abundant forms. As observed at other bays, both whole points as well as the tips of points were recovered. The small points, usually under 20 mm in length and 8 mm in width, would have been ineffective weapons in their own right. Thus it is probable that these points served as delivery systems for poison, as is well documented in the ethnographic literature. In combination with other data, it seems likely that the systematic study of the distribution of whole and broken backed points will provide useful information about the spatial and temporal dynamics of hunting during the LSA of the region.

Rhino is a medium-sized, narrow bay (ca. 110 x 20 m) oriented roughly southeast-northwest (Figure 6). In the deeper lying portions to the northwest, an irregular calcrete pavement has been exposed, while areas to the southeast are less deflated. A concentration of well-preserved rhinoceros bones in the northwest, for which the bay was named, were recovered from the calcrete and include mostly axial elements (cranium, mandible, vertebrae and pelvis), although several fragmentary limb elements are also present. These elements may show signs of impact fractures. Relatively abundant, large flakes of quartzitic porphyry were spatially superimposed upon the remains of the rhinoceros and one or more large bovids. Three concentrations of small quartz debitage were recovered from the central area, in a stratigraphic position above the rhinoceros remains. Several samples for absolute dating were obtained from Rhino Bay, including: apparently burnt roots in both high and low lying positions, for ^{14}C; calcrete, for Uranium-series dating; and, sand situated beneath the calcrete which contained the rhinoceros remains, for OSL.

Investigations in **Pottery** are not yet complete. However, many interesting aspects of the finds from this bay can be discussed here. Pottery Bay is comprised of two large (ca. 250 x 120 m total), irregularly shaped areas (Figure 7). Intact root casts are present over much of its surface, thus placing the bay relatively high in the stratigraphy. Named for two concentrations of pottery sherds, this bay also contained numerous ostrich egg shell beads, 2-3 mm in diameter. Many beads appear unfinished, suggesting the presence of different stages of production. The majority of the beads appear to have been burnt black, though an incidental contact with fire is also possible. Two of three features consisting of concentrations of calcrete were documented in 1999. The concentration of unburned stones to the east may represent weights used in the construction of a wind-break or similar structure, while the concentration of blackened stones to the west may represent the remains of a roasting platform. On the basis of the calcrete concentrations and pottery, one can see similarities between Pottery and Check. Most important, bays with contextual information such as is present in Pottery provide important data on the relative age of surfaces in the dunes at Geelbek.

Investigations at **Homo** are not yet complete. On April 14th the survey team discovered five fragments of human bone on the surface of this small bay (ca. 60 x 20 m). Although thorough collection took place in the vicinity of the human skeletal remains, only the largest and most fragile finds were recovered in the rest of the bay because of time constraints. The geological setting in Homo is similar to that in the lower portion of Bay 35, which was studied in 1998. Here, several small, isolated islands of soft calcrete are preserved on top of a pavement-like, find-bearing surface. Fifteen stone artifacts and 20 bones were recovered from this surface. Test excavation into this sediment found a sterile, presumably aeolian sand. The geological setting in Homo can be seen as analogous to that in Stella where weathered calcrete is present. The human remains (two refitted fragments of a left femur shaft, two fragments of a right femur shaft and one shaft fragment of a left humerus) were found in a small concentration, about 7 m in diameter, and presumably belong to the same individual. The remains are well-preserved, white in color and appear not to be strongly mineralized. Although only preliminary osteological analysis has yet been undertaken, a few observations can made at this time. The specimens indicate a relatively robust individual, based on the overall size of the diaphyses and the well-developed *Linea aspera* of the femora: These probably fall within the range of variability of modern humans. The age of the remains is currently unknown. Two heavily fossilized teeth from a large equid (*E. capensis*?) were recovered on the same surface. However, it must be noted that the human bones are not as mineralized as other bones from this bay which were presumably embedded in calcrete. This observation suggests that these human remains were not embedded in the calcrete and are therefore likely younger than the calcrete. Further geological and osteological analysis will shed light on the antiquity of the remains.

A variety of fundamental problems still remains unsolved at Geelbek. In many respects, our poor understanding of the geological and chronostratigraphical relationships in the dunes represents the greatest deficiency. Only a few absolute dates as measured by Stephen Woodborne in 1998 and 1999 are currently available for Geelbek, and all of the absolute dates must be considered preliminary until Woodborne's analyses are complete. The results include an IR-Luminescence age of ca. 150,000 b.p.

for the sterile sand underlying the calcrete at Stella. This could be taken as an approximation of the maximum age of the calcrete formation at Geelbek (S. Woodborne 1998, Pers. comm.). An OSL da of ca. 11,000 b.p. was determined for the sand which contained the artifacts in Stella B1. Woodborn considers this date to be a minimum age of the finds buried in the sediment. A U/Th date of a calcre sample from Stella yielded an age of ca. 40,000 years b.p. This age could correspond to the last movement of $CaCO_3$ in the calcrete, and may, given that such calcrete formations can be multi-cyclic give a minimum age of the finds within the calcrete. In 1999 additional samples were taken for ^{14}C, U/Th and OSL from Stella and Rhino. Clearly much more work will be needed before we can establish a reliable chronostratigraphy in the dune system.

Again in 1999 numerous geological observations were systematically recorded. These observations confirm the complexity of the geology in the dune system and suggest that the different stratigraphic sequences are preserved in different bays. Particularly interesting are the first systematic data on the movement of the dunes. These data demonstrate that the leading edges of dunes in the bays examined in 1998 are highly mobile and have moved up to 12 m northward over the last year. This figure agrees with average rates of movement calculated using aerial photographs (J. Compton 1999, Pers. comm.) For the purposes of the archaeological investigations at Geelbek, surfaces on which finds rest are continually being buried in certain areas and simultaneously exposed in others. Thus one can expect that some features such as the concentration of rhinoceros remains in Rhino or the burnt stones in ottery, which lie close to the approaching dune, will not be available for study in the future. Rather than see this situation as deleterious to the current research, investigations at Geelbek can target areas with newly exposed, find-bearing surfaces. Examples could include such settings as the trailing edge of the mobile dunes or further deflated surfaces within the bays themselves. One example of the latter was observed within Stella where stone artifacts from the area of Scatter B1 were found in 1999 despite the rigorous collection in 1998.

The focus of the Geelbek project is an attempt at diachronic study of the landscape. The project aims to study features such as lithic scatters, the remains of roasting platforms and possible architectural features in combination with information on seasonality from faunal studies and the spatial distribution of ornaments, lithic tools and their production debris. In this way, the project should be able to offer a significant contribution to the already existing body of knowledge on settlement and subsistence patterns for the MSA and LSA in the region.

Archaeological investigations in the Geelbek dunes is planned to continue in the year 2000 with the longest campaign of the project. Reservations have been made with the National Parks Board to conduct fieldwork from January 10 until April 28.

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Nicholas J. Conard
April 30, 1999
(Data and graphics compiled by Timothy J. Prindiville and Philipp Drechsler)

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Figure 1. Geelbek. Lo
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FIGURES

Figure 1. Geelbek. Location of measuring points (n =114) in deflation bays based on coordinates from the Garmin 12XL GPS receiver superimposed on sections of orthophotos 3318 AA 18&19 (1993). Circles indicate the twelve localities which have been investigated in detail during the 1998 and 1999 field seasons.

Figure 2. Geelbek, Locality Frikkie. Distribution of finds and excavation units.

Figure 3. Geelbek, Locality Check. Distribution of finds and excavation units.

Figure 4. Geelbek, Locality Mathilda Rose. Distribution of finds and excavation units.

Figure 5. Geelbek, Locality Snoek. Distribution of finds and excavation units.

Figure 6. Geelbek, Locality Rhino. Distribution of finds and excavation units.

Figure 7. Geelbek, Locality Pottery. Distribution of finds and excavation units.

Figure 8. Geelbek, Locality Homo. Distribution of finds and excavation units.