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ON THE AGE OF BORDER CAVE HOMINIDS 1–5

by

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ABSTRACT

Cited evidence suggests that Border Cave hominids 1–3 and 5 are associated with MSA phases 1–2 and date back to c. 90 000–110 000 yr B.P. These remains are fully modern in terms of morphology, and incipient Khoisan features are seemingly present in the case of BC1. This evidence is taken to mean that truly ancestral forms of our own species probably range back into the late Middle Pleistocene of sub-Saharan Africa. Such a scenario implies that previous phologenetic reconstructions have been based on only the final quarter or so of modern man's evolutionary history.

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INTRODUCTION

Excavations at Border Cave in 1970–5 were partly directed at obtaining all pertinent data bearing on the age of the human bones found then (BC 4 and 5) and previously (BC 1–3). The purpose of this paper is to detail the various data sets that have been accumulated to date in connection with this specific aspect of the investigation.

Site and setting

Border Cave is situated in northern KwaZulu about 365 m from the Swaziland border at 27°1′19″S, 31°39′24″E (Cooke *et al.*, 1945). It cuts back into a cliff-face high up on the steep western scarp flank of the Lebombo Mountains over 400 m above the Swaziland lowveld and some 2 km north of the Ngwavuma River gorge. By direct line the site is 5 km east of the small agricultural settlement of Nsoko, 12 km north of the district centre of Ingwavuma and 82 km west of the Indian Ocean (fig. 1).

Ongoing cave development is due to the preferential weathering of an agglomeratic zone within the local Stormberg System rhyolites (Cooke *et al.*, 1945). Plan-form is roughly semicircular with a maximum width at mouth and depth from dripline of c. 50 and 30 m respectively (fig. 2). Roof height is very variable with a greatest established reading from bedrock of about 7,5 m (fig. 3). Deposit surface slopes down fairly regularly towards the talus edge at a mean angle of 13–15° (fig. 2).

Excavation history

Border Cave has been excavated on three occasions by persons variously associated with the University of the Witwatersrand. Pre-1970 information is based on details recorded in the Archaeological Survey file B20/1/2, unless otherwise stated.

The site was first investigated in July 1934 by R.A. Dart assisted by A. Galloway, J.H. Gear and G.F. Berry. A fortnight was spent lowering a strip of ten yard squares down to bedrock at a maximum depth of 168 cm (Exc. 1 of fig. 2). This trench yielded MSA throughout except for superficial Iron Age (IA) but no account of that material was ever published (Cooke *et al.*, 1945).

During 1940, W.E. Horton of Nsoko commenced digging in the cave with the object of extracting the fine ash-rich fraction of the sediments for sale as agricultural fertilizer (Horton's Pit in

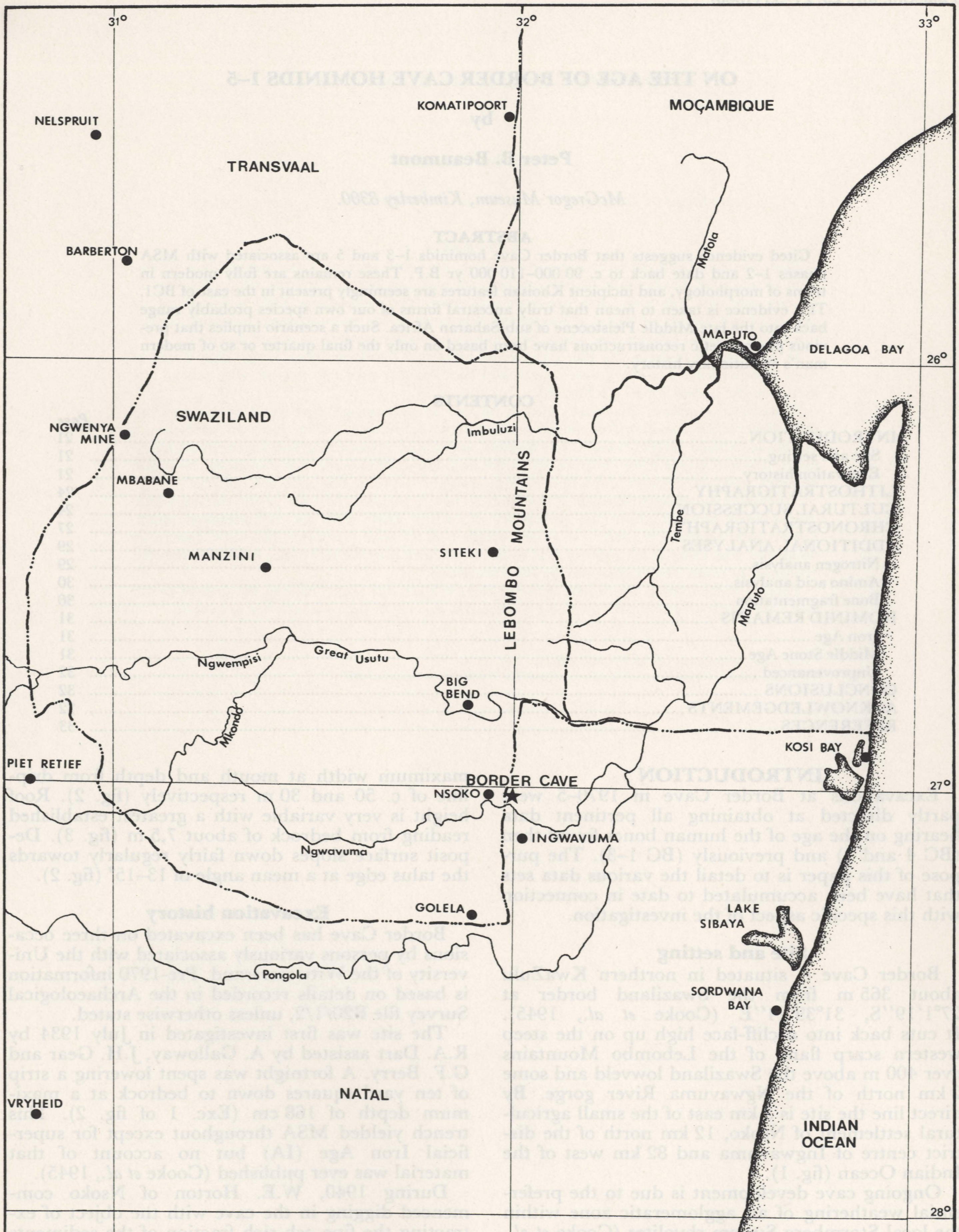

Figure 1. Locality Map.

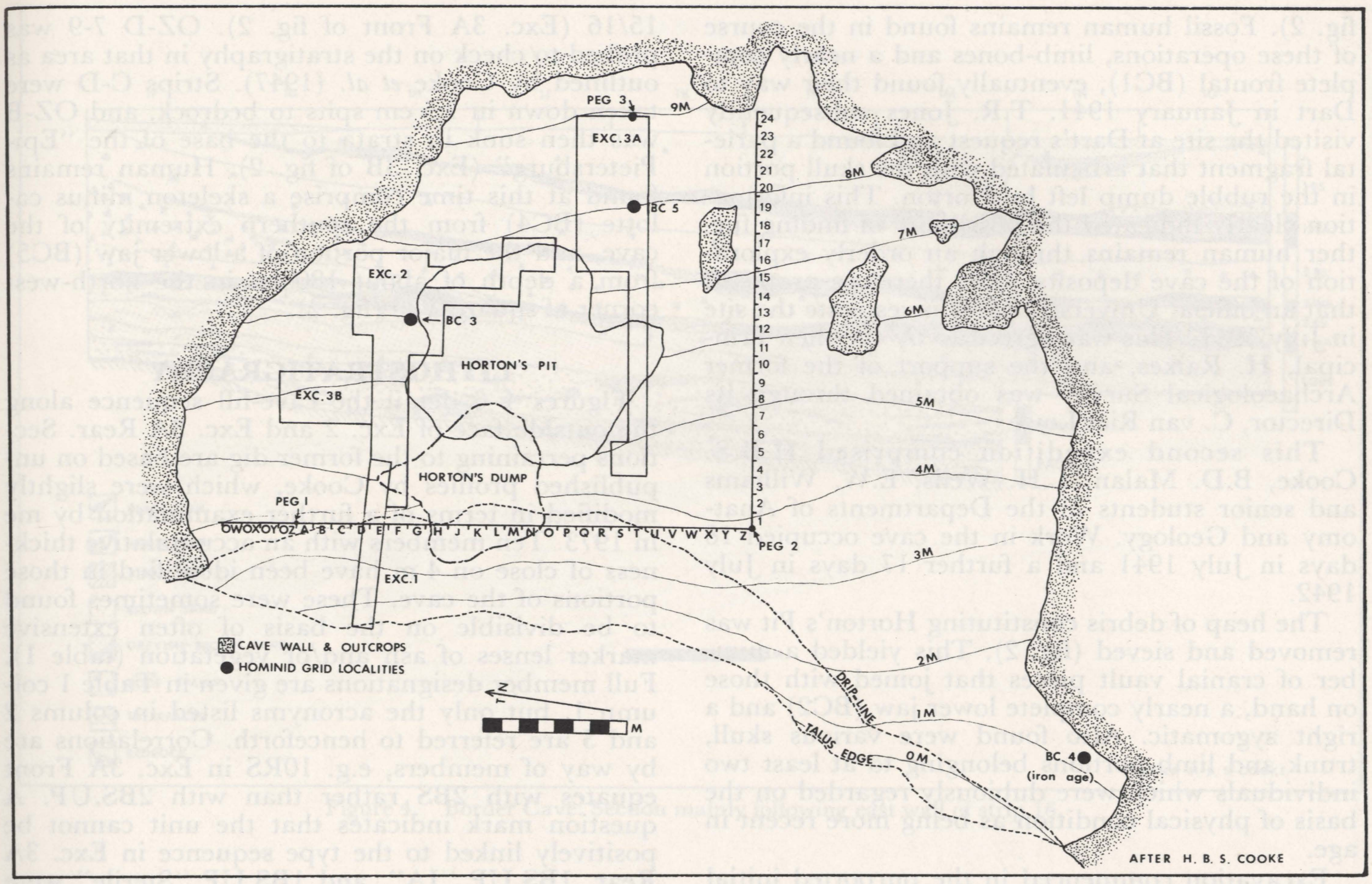

Figure 2. Border Cave: Plan.

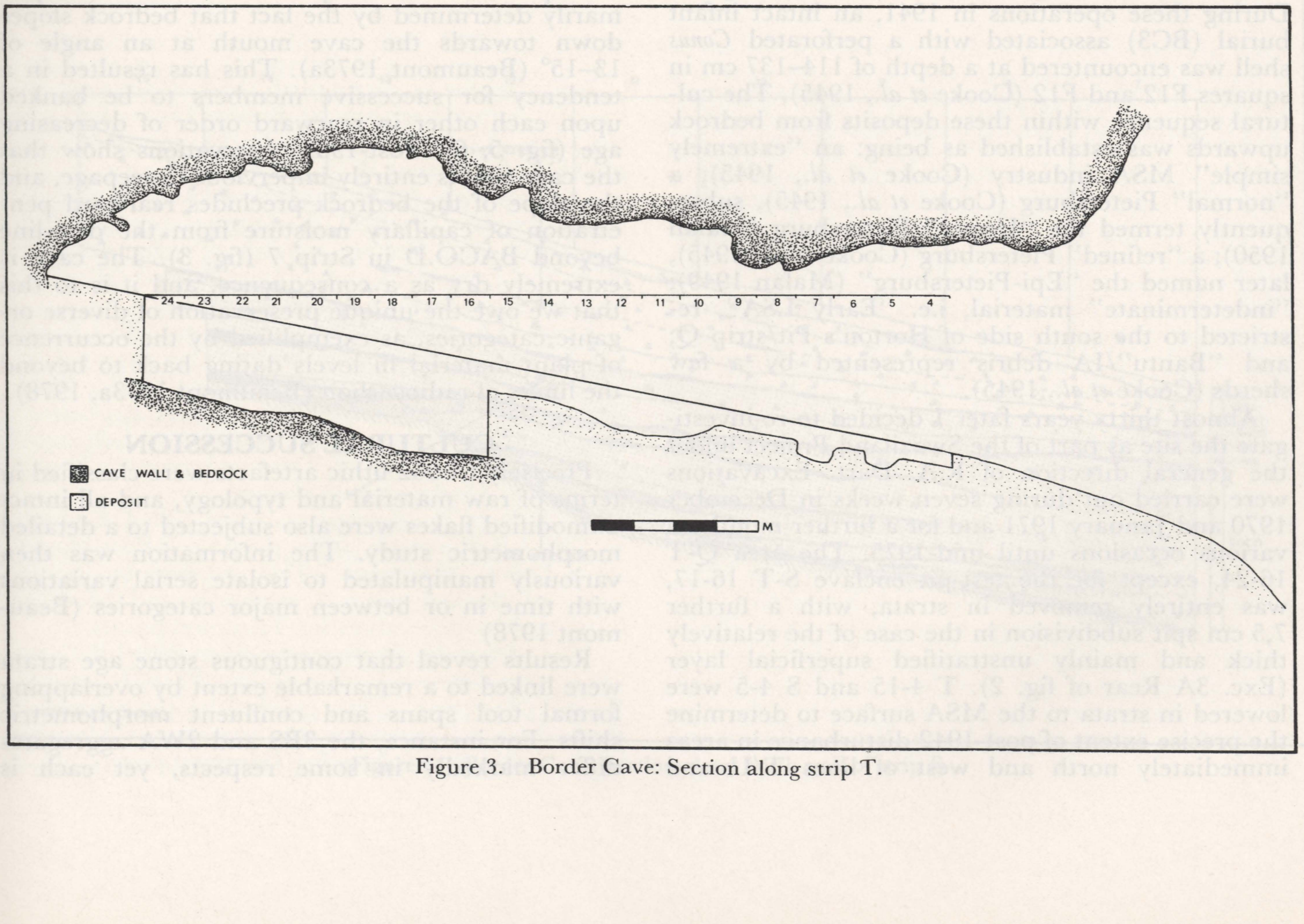

Figure 3. Border Cave: Section along strip T.

fig. 2). Fossil human remains found in the course of these operations, limb-bones and a nearly complete frontal (BC1), eventually found their way to Dart in January 1941. T.R. Jones subsequently visited the site at Dart's request and found a parietal fragment that articulated with the skull portion in the rubble dump left by Horton. This information clearly indicated the possibility of finding further human remains through an orderly exploration of the cave deposits. Dart therefore proposed that an official University party investigate the site in July 1941. This was agreed to by the then Principal, H. Raikes, and the support of the former Archaeological Survey was obtained through its Director, C. van Riet Lowe.

This second expedition comprised H.B.S. Cooke, B.D. Malan, L.H. Wells, E.W. Williams and senior students in the Departments of Anatomy and Geology. Work in the cave occupied 18 days in July 1941 and a further 17 days in July 1942.

The heap of debris constituting Horton's Pit was removed and sieved (fig. 2). This yielded a number of cranial vault pieces that joined with those on hand, a nearly complete lower jaw (BC2) and a right zygomatic. Also found were various skull, trunk and limb portions belonging to at least two individuals which were dubiously regarded on the basis of physical condition as being more recent in age.

Excavation commenced in the purported initial hominid find area on the north-east side of Horton's Pit, and this was subsequently extended via trenches to the south and west (Exc. 2 of fig. 2). During these operations in 1941, an intact infant burial (BC3) associated with a perforated *Conus* shell was encountered at a depth of 114–137 cm in squares F12 and F12 (Cooke *et al.*, 1945). The cultural sequence within these deposits from bedrock upwards was established as being: an "extremely simple" MSA industry (Cooke *et al.*, 1945); a "normal" Pietersburg (Cooke *et al.*, 1945), subsequently termed the "Upper" Pietersburg (Malan 1950); a "refined" Pietersburg (Cooke *et al.*, 1945), later named the "Epi-Pietersburg" (Malan 1949); "indeterminate" material, i.e. "Early LSA", restricted to the south side of Horton's Pit/strip Q; and "Bantu"/IA debris represented by a few sherds (Cooke *et al.*, 1945).

Almost thirty years later I decided to re-investigate the site as part of the Swaziland Project under the general direction of R.A. Dart. Excavations were carried out during seven weeks in December 1970 and January 1971 and for a further month on various occasions until mid-1975. The area Q-T 16-24, except for the test-pit enclave S-T 16-17, was entirely removed in strata, with a further 7,5 cm spit subdivision in the case of the relatively thick and mainly unstratified superficial layer (Exc. 3A Rear of fig. 2). T 4-15 and S 4-5 were lowered in strata to the MSA surface to determine the precise extent of post-1942 disturbance in areas immediately north and west of lines T/U and 15/16 (Exc. 3A Front of fig. 2). OZ-D 7-9 was probed to check on the stratigraphy in that area as outlined by Cooke *et al.* (1947). Strips C-D were taken down in 7,5 cm spits to bedrock, and OZ-B was then sunk in strata to the base of the "Epi-Pietersburg" (Exc. 3B of fig. 2). Human remains found at this time comprise a skeleton minus calotte (BC4) from the southern extremity of the cave, and the major portion of a lower jaw (BC5) from a depth of about 180 cm in the north-west corner of square T20 (fig. 2).

LITHOSTRATIGRAPHY

Figures 4–6 detail the cave-fill sequence along the outside face of Exc. 2 and Exc. 3A Rear. Sections pertaining to the former dig are based on unpublished profiles by Cooke, which were slightly modified in terms of a further examination by me in 1973. Ten members with an accumulative thickness of close on 4 m have been identified in those portions of the cave. These were sometimes found to be divisible on the basis of often extensive marker lenses of ash and/or vegetation (table 1). Full member designations are given in Table 1 column 1, but only the acronyms listed in colums 2 and 3 are referred to henceforth. Correlations are by way of members, e.g. 10RS in Exc. 3A Front equates with 2BS rather than with 2BS.UP. A question mark indicates that the unit cannot be positively linked to the type sequence in Exc. 3A Rear. 1BS.UP "IA", and 1BS.UP "Sterile" were only separable in terms of cultural content and are therefore not formal lithological entities.

Disposition of the deposits as a whole was primarily determined by the fact that bedrock slopes down towards the cave mouth at an angle of 13–15° (Beaumont 1973a). This has resulted in a tendency for successive members to be banked upon each other in rearward order of decreasing age (fig. 5, 6). Post-1969 observations show that the cave roof is entirely impervious to seepage, and the slope of the bedrock precludes rearward penetration of capillary moisture from the drip-line beyond BACO.D in Strip 7 (fig. 3). The cave is extremely dry as a consequence, and it is to this that we owe the unique preservation of diverse organic categories, as exemplified by the occurrence of plant material in levels dating back to beyond the limits of radiocarbon (Beaumont 1973a, 1978).

CULTURAL SUCCESSION

Precisely 64 962 lithic artefacts were classified in terms of raw material and typology, and all intact unmodified flakes were also subjected to a detailed morphometric study. The information was then variously manipulated to isolate serial variations with time in or between major categories (Beaumont 1978)

Results reveal that contiguous stone age strata were linked to a remarkable extent by overlapping formal tool spans and confluent morphometric shifts. For instance, the 3BS and 2WA aggregates differ markedly in some respects, yet each is

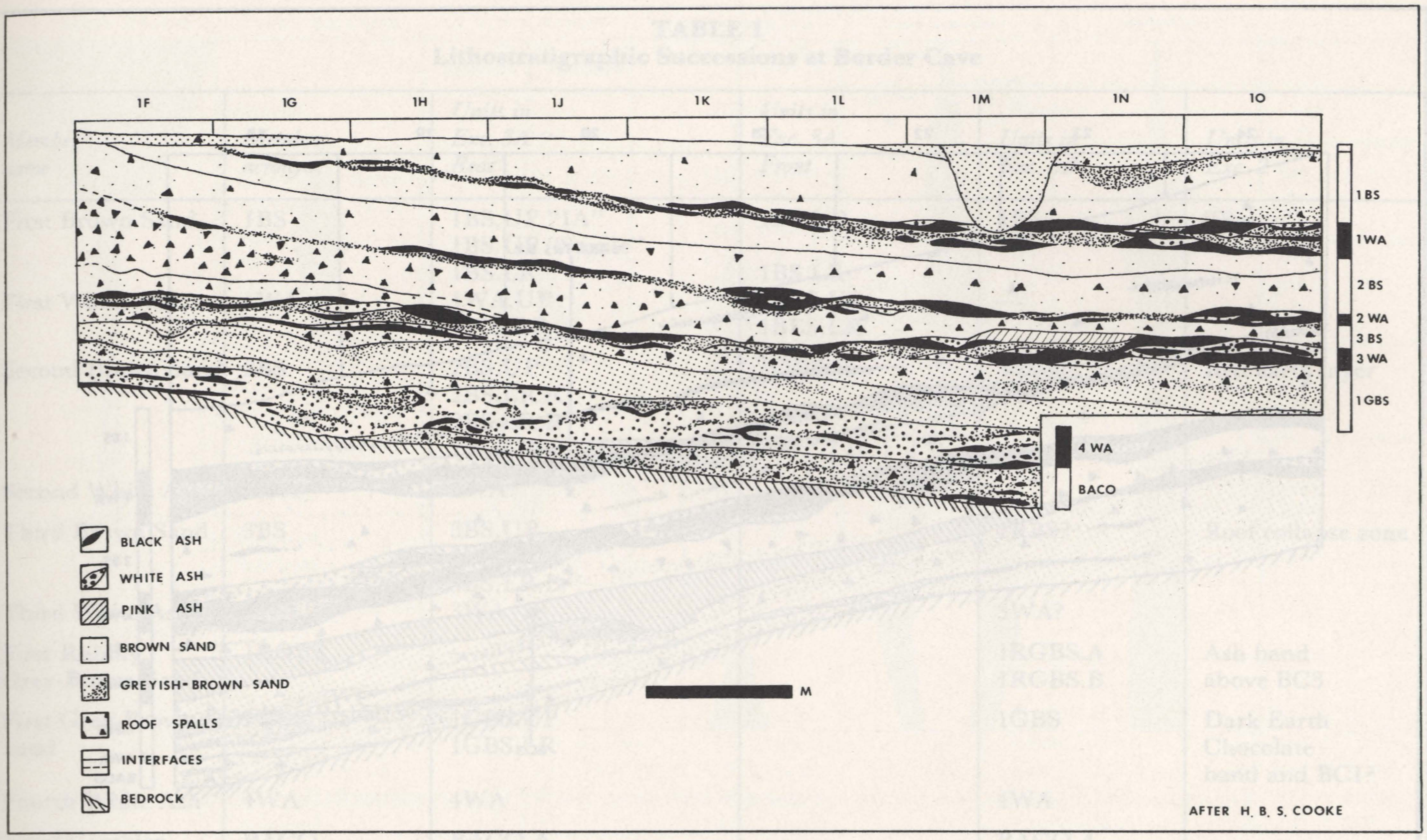

Figure 4. Border Cave: Section mainly following east wall of strip 16.

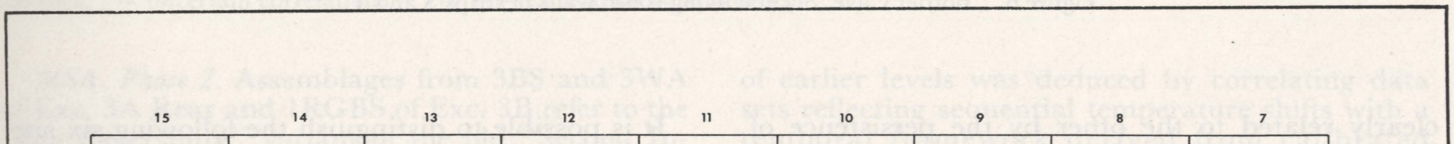

Figure 5. Border Cave: Section along north wall of strip E.

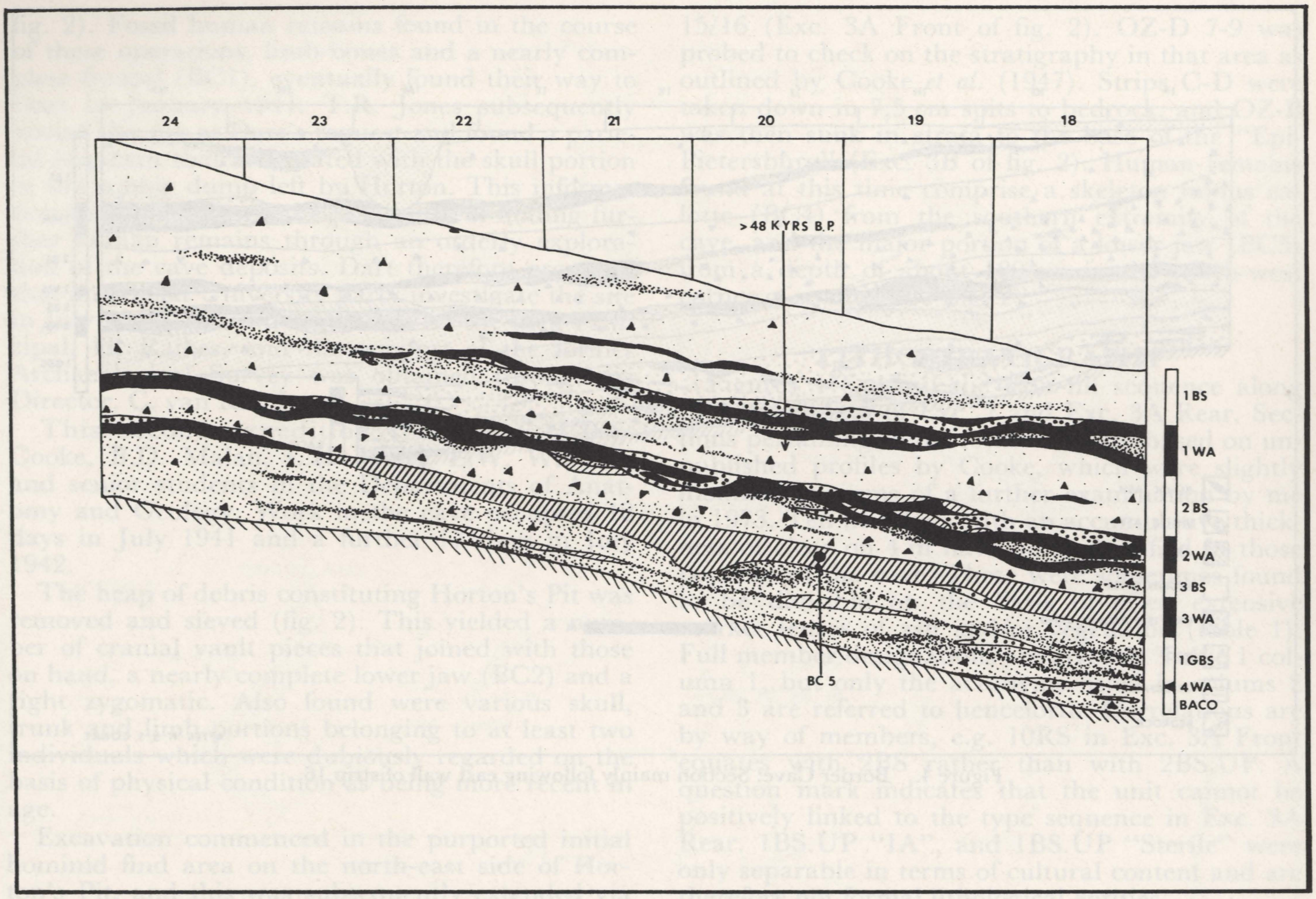

Figure 6. Border Cave: Section along south walls of strips S and T.

clearly related to the other by the persistence of Backed pieces 2 in the latter and by the advent of Modified butts in the former (fig. 7). Similarly, Irregular 2 flake subclass mean length changes patently show a patterning in which the values pertaining to any given level are related to those of its neighbours (fig. 8). The essential inference that can be drawn from these findings is that the entire lithic sequence at this site may be best regarded as representing major portions of an entirely unbroken cultural trajectory in which no portion can be construed as being "intrusive" (cf. Wymer 1979).

Many of the observed frequency shifts, such as the apparent partial replacement of Trimmed points 1 by Backed pieces 2 between 1RGBS.B and 3BS (fig. 7) or the decrease in artefact length between BACO.D and 3WA (fig. 8), are reflections of very widespread trends (e.g. Mason 1957, Sampson 1974). It would seem rather unlikely on the basis of minimum hypothesis that these changes were not synchronous on a subcontinental level, a conclusion that is at least partly confirmed by the compatible dates for comparable industries at Border Cave and Klasies River (Beaumont 1978).

It is possible to distinguish the following six site specific cultural entities at Border Cave (fig.7) on the basis of typological criteria that are widely applicable (Beaumont 1978, 1979):

Late Iron Age. A low density of IA objects in the upper reaches of 1BS.UP suggests sporadic visits only to the site. Pottery consists of unincised black matt and burnished sherds that do not differ perceptibly from modern Swazi wares.

Early LSA. Phase 1. Artefacts from 1BS.LR and 1WA/1BES fall within a revised definition of the "Early LSA" (Beaumont and Vogel 1972, Beaumont 1978), characterized by the first appearance of ground bone points and ostrich eggshell beads and by the absence of Trimmed points, Backed pieces and Modified butt classes.

MSA.Phase 3b. Aggregates from 2BS.UP (base) to 2BS.LR.B equate with the late "Post-Howieson's Poort" (Sampson 1974), typified by the absence of Backed piece 2 segments and Modified butts and by low values for Trimmed points.

MSA. Phase 3a. Implements from 2BS.LR.C and 2WA compare with the early "Post-Howieson's Poort" (Sampson 1974), typified by the absence of Backed piece 2 segments, the presence of Modified butts and by low values for Trimmed points.

TABLE 1
Lithostratigraphic Successions at Border Cave

Member name	*Member acronym*	*Units in Exc. 3A Rear*	*Units in Exc. 3A Front*	*Units in Exc. 3B*	*Units in Exc. 2*
First Brown Sand	1BS	1BS.UP "IA" 1BS.UP "Sterile" 1BS.LR	1BS.UP 1BS.LR	1BS	"Bantu"
First White Ash	1WA	1WA.UP 1WA.LR	1BES.UP 1BES.LR	—	
Second Brown Sand	2BS	2BS.UP 2BS.LR.A 2BS.LR.B 2BS.LR.C	1ORS	1RBS?	Red earth layer
Second White Ash	2WA	2WA		—	
Third Brown Sand	3BS	3BS.UP 3BS.LR.A 3BS.LR.B		1RBS?	Roof collapse zone
Third White Ash	3WA	3WA		3WA?	
First Rubbly Grey-Brown Sand	1RGBS	—		1RGBS.A 1RGBS.B	Ash band above BC3
First Grey-Brown Sand	1GBS	1GBS.UP 1GBS.LR		1GBS	Dark Earth Chocolate band and BC1?
Fourth White Ash	4WA	4WA		4WA	
Basal Complex	BACO	BACO.A		BACO.A BACO.B BACO.C BACO.D	

Abbreviations: B = brown; G = grey; W = white; BE = beige; OR= orange; A = ash; S = sand; R = rubbly; BA = basal; CO = complex; ? = uncertain correlation; ┌┬┬┬┐ = excavation base/bedrock.

MSA. Phase 2. Assemblages from 3BS and 3WA of Exc. 3A Rear and 1RGBS of Exc. 3B refer to the "Epi-Pietersburg" variant of the old "Second Intermediate" (Malan 1949), distinguished by the obtrusive presence of Backed pieces 2 (mainly segments) and by low values for Trimmed points.

MSA. Phase 1. Samples from 1GBS.UP to BACO.D were originally described as grading between "simple" and "normal" Pietersburg (Cooke *et al.*, 1945) and equate broadly with those from Beds 5-8 at the Cave of Hearths (Sampson 1974). They are epitomised by the absence of Backed pieces 2 and by very high values for Trimmed points 2. A progressive increase with time in the relative proportion of formal tools in those levels apparently constitutes a major basis on which "middle" and "later" stages of the Pietersburg, etc. are often identified, but it is evident from the data (fig. 7) that this separation cannot be sustained in terms of formal tool class typology alone (Beaumont 1978).

CHRONOSTRATIGRAPHY

Dating of the 1BS.UP — 2BS.UP sequence is based on a suite of 37 broadly conformable C-14 measurements that were mainly processed by J.C. Vogel at the NPRL of the CSIR (table 2). The age of earlier levels was deduced by correlating data sets reflecting sequential temperature shifts with a temporal framework derived from calibrated global ice-volume fluctuations (Beaumont 1978; Beaumont *et al.*, 1978).

The total evidence derived from those sources is taken to indicate (Beaumont 1979): 1BS.UP (Iron Age) = 100–600 B.P.; 1BS.UP (sterile) = 600–30 000 B.P.; 1BS.LR–1WA (Early LSA 1) = >30 000–38 000 B.P.; 2BS.UP–2BS.LR.B. (MSA 3b) = c. 55 000–70 000 B.P.; 2BS.LR.C.–2WA (MSA 3a) = c. 75 000–85 000 B.P.; 3BS.UP–1RGBS.B. (MSA 2) = c. 85 000–95 000 B.P.; 1GBS.UP–4WA (MSA 1 "late") = c. 100 000–110 000 B.P.; BACO. A-D (MSA 1 "middle") = 110 000–130 000 B.P. Of particular note is the close correspondence that these estimates show with the ages deduced for levels with comparable aggregates at Klasies River (Butzer 1978), thereby suggesting that similar industries were probably more or less coeval over wide areas of southern Africa.

Comments concerning the antiquity of the 1WA have been largely founded on the three readings from square T21 (table 3). However, it may be that 1BS.LR dates to 38 600 B.P. (Pta-704) and that 1WA has an age of up to 45 000 B.P. (Pta-1190) (Beaumont 1978).

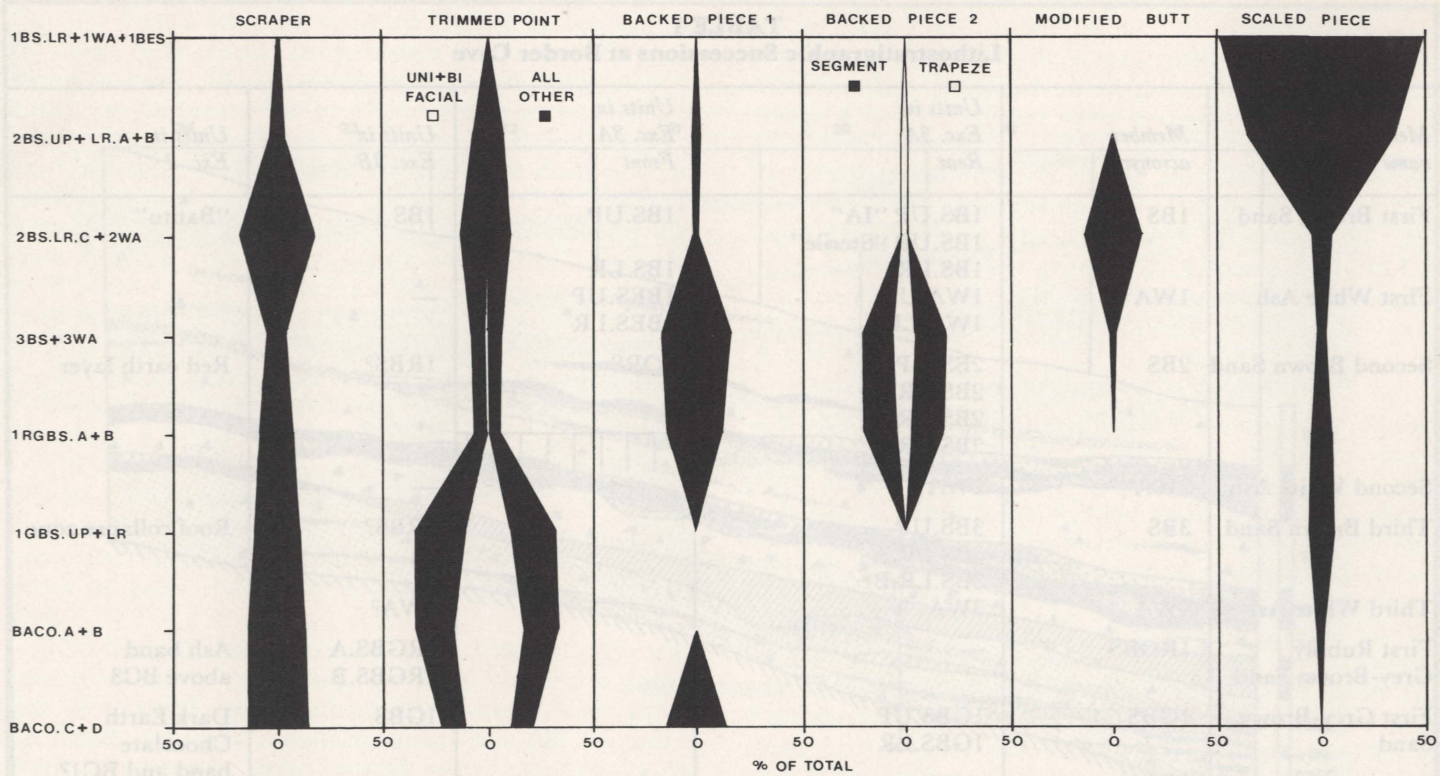

Figure 7. Formal tool class proportion changes with time. Border Cave excavations 3A and 3B.

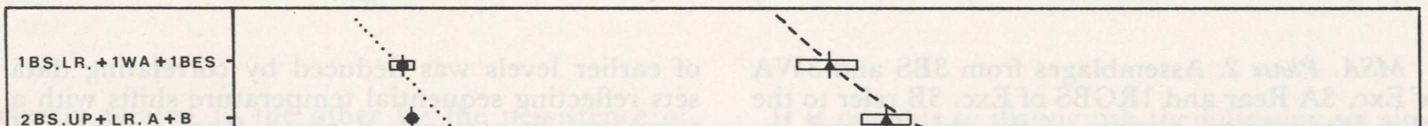

Figure 8. Twelve subclass length changes with time. Border Cave excavations 3A and 3B.

TABLE 2
Radiocarbon Dates from Border Cave

Lab. no.	*Material Fraction*	*Square Depth (cm)*	*Stratum*	*Industry*	*Age B.P*
Pta-1728	Maize cob. Acid	T21 8–15	1BS.UP "IA"	IA	90 ± 105
Pta-870	Vegetation. Acid	T21 8–15	1BS.UP "IA"	IA	170 ± 45
Pta-703	Vegetation	T22 8–15	1BS.UP "IA"	IA	500 ± 45
LJ-2889	Vegetation	T22 30–38	1BS.UP "IA"	IA	500 ± 70
LJ-2890	Vegetation	T22 38–46	1BS.UP "IA" (base)	IA	590 ± 70
Pta-715	Vegetation	T19 30–38	1BS.UP "IA" (base)	IA	440 ± 55
Pta-777	Bone collagen (BC4)	2S 13	1BS.UP "IA"	IA	340 ± 45
Pta-1318	Bone collagen (BC4)	2S 13	1BS.UP "IA"	IA	480 ± 45
Pta-506	Vegetation. Acid	S19 38–46	1BS.UP "Sterile" (top)	—	2010 ± 50
Pta-721	Vegetation	S19 46–53	1BS.UP "Sterile" (base)	—	13,300 ± 150
LJ-2891	Vegetation	T22 46–53	1BS.UP "Sterile" (top)	—	650 ± 70
LJ-?	Charcoal	T22 61–69	1BS.UP "Sterile" (base)	—	28,500 ± 1800
LJ-2892	Charcoal	T22 69–76	1BS.LR (top)	Early LSA 1	33,000 ± 2000
Pta-704	Charcoal	S21 69-1WA	1BS.LR (base)	Early LSA 1	38,600 ± 1500
Pta-1964 (Mini counter)	Grass. Unidentified	Q18	1WA	Early LSA 1	>25,500
Pta-1995 (Mini counter)	Leaves. *Linociera*	S21	1WA	Early LSA	>25,500
UCLA-1754 C	Bone collagen	Q19	1WA (top)	Early LSA	33,000 ± 2000
UCLA-1754 D	Bone collagen	Q19, R19	1WA (base)	Early LSA	34,800 ± 2500
Pta-446	Charcoal. Acid	T21	1WA (top)	Early LSA	37,500 ± 1200
Pta-422	Charcoal. Residue	T21	1WA (top)	Early LSA	36,800 ± 1000
Pta-423	Charcoal	T21	1WA (mid)	Early LSA 1	36,100 ± 900
Pta-424	Charcoal	T21	1WA (base)	Early LSA	35,700 ± 1100
Pta-1190	Twigs	R19	1WA (base)	Early LSA	45,000 + 2750 − 2200
Pta-1274	Charcoal	Q20	2BS.UP	MSA 3b	47,200 ± 4200 − 2750
Pta-1275	Charcoal	Q21	2BS.UP	MSA 3b	>49,100
Pta-877	Charcoal	Q22	2BS.UP	MSA 3b	45,400 + 3000 − 2000
Lj-?	Charcoal	Q23	2BS.UP	MSA 3b	>41,000
Pta-1244	Charcoal	R21	2BS.UP	MSA 3b	>48,800
Pta-872	Charcoal	T23	2BS.UP	MSA 3b	>42,300
UCLA-1754 E	Bone collagen	R20, S22	2WA	MSA 3a	>45,000
Pta-489	Charcoal	A7	1RGBS.A	MSA 2	>48,700
Pta-421	Charcoal. Acid	OZ 7	1RGBS.B	MSA 2	36,000 ± 1000
Pta-447	Charcoal. Acid	OZ 7	1RGBS.B	MSA 2	>47,500
Pta-459	Charcoal. Residue	OZ 7	1RGBS.B	MSA 2	>48,350
Pta-463	Charcoal. Extract	PZ 7	1RGBS.B	MSA 2	>42,600
Pta-719	Charcoal. Acid	OZ 7, OZ 9	1RGBS.B	MSA 2	42,000 + 3000 − 2000
Pta-488	Charcoal. Acid	A8	1RGBS.B	MSA 2	>48,500

Abbreviations: Acid = acid pretreatment only.

Butzer has presented sedimentological data which he interprets to mean that the basal strata range back to the onset of δ ^{18}O stage 6 (Butzer *et al.*, 1978). This inference is apparently incompatible with other evidence which would rather suggest that those levels have a maximum age of 130 000 B.P. (Beaumont 1978, Beaumont *et al.*, 1978). Additional information and particularly adequate macrofaunal samples from BACO would seem to be necessary in order to resolve this particular problem (Klein 1977).

ADDITIONAL ANALYSES

Other data sources that require consideration to provide a proper perspective for the results presented in Tables 3 and 4 are nitrogen analysis, amino acid analysis and bone fragmentation.

Nitrogen analysis

Nitrogen analysis depends on the fact that the proportion of nitrogen in any given bone tends to decrease with time as protein is removed by way of various agencies (e.g. Oakley 1963). However, that effect only holds true and comparisons between readings are only justified if various potential sources of distortion can be shown to have been inoperative.

First, anomalous values will occur if the sample undergoes heating by overlying and/or contiguous hearths (de Graaff 1961), resulting in the perferential release of low molecular weight hydrocarbons (Silverman 1964). Amino acid printout configurations strongly suggest that temperature extremes have not affected BC 1-3 (J. Bada pers. comm.). The other human remains all came from shallow graves or depressions, and sediment infill would have tended to protect them from the effects of contiguous fires. These two lines of evidence are taken to indicate that the readings on BC 1-5 are probably free of heat induced aberrations.

Secondly, anomalous values will occur unless vertical and lateral variations in the physicochemical environment being sampled are minimal (Protsch 1973). Comparison of Exc. 3A Rear and Exc. 3B macrofaunal readings reveal that there are indeed marked differences between areas deep within the cave and those near the drip-line. A markedly higher nitrogen attrition rate was found to be applicable to the latter excavation, presumably as a result of backward moisture movement from the drip-line (Beaumont 1978). It follows that samples drawn from that region must be regarded as minimum values if compared with those from the cave interior.

Thirdly, anomalous values may occur in view of variations between some species in initial bone nitrogen content (Protsch 1973). This possibility has been offset here by confining comparison to the hominid remains (table 3).

Amino acid analysis

Much work has recently been carried out on amino acid enantiomer shifts with time as a means of dating bone in relative or absolute terms (e.g. Bada 1972, Bada and Protsch 1973). Since possible limitations in the availability of the hydroxide ion in the cave interior could have led to a reduction in the racemization rate there relative to the chemical situation near the drip-line (Bada and Schroeder 1975), sampling was confined to uncharred bone fragments from the former area. A major limitation of the method is that racemization reaction is a chemical process and thus inherently a function of both time and temperature. Sampling was confined to the microfauna in an attempt to obviate the latter variable during the construction of an aspartic acid temporal framework for the site. The assumption underlying this approach was that the original encapsulating owl pellets would have provided optimal protection of the fragments from hearth-derived heating. Resultant readings that conformed with the sediment sequence were regarded as undistorted by temperature damage, and only these have been retained for presentation in Table 4.

Bone fragmentation

A coarse analysis was undertaken of the extent of bone damage in the various levels represented in Exc. 3A Rear (Beaumont 1978). Values obtained in terms of fragments per kg were found to vary widely with extremes of ~780 and ~1 410 but with a site mean of ~1 160. Equivalent readings from other localities indicate that the Border Cave average may be regarded as indicative of extreme fragmentation. The frequent recovery during exca-

TABLE 3
Nitrogen Readings on Hominid Bones from Border Cave

Grid Location	*Stratum*	*Culture*	*Lab. no.*	*Material*	*N % (washed)*
2S 13	1BS.UP "IA"	IA	BM-SA 166	BC 4	0,93
Exc. 3A	3WA	MSA 2	BM-SA 167	BC 5	0,48
Exc. 2	1GBS.UP	MSA 1 (late)	BM-SA 151	BC 3	0,44
Exc. 2	1GBS.UP	MSA 1 (late)	UCLA-1754 A	BC 3	0,44
Horton's Pit	?	?	BM-SA 164	BC 1	0,28
Horton's Pit	?	?	UCLA-1754 B	BC 1	0,41
Horton's Pit	?	?	BM-SA 165	BC 2	0,29

TABLE 4
Aspartic Acid Readings on Bone from Border Cave

Grid Location	*Stratum*	*Culture*	*Lab. no.*	*Material*	*D/L value*
Exc. 3A Rear	1BS.UP "IA"	IA (lower)	LJ-AA?	Microfauna	0,26
Exc. 3A Rear	1BS.UP "IA"	IA (base)	LJ-AA?	Microfauna	0,29
Exc. 3A Rear	1BS.LR	LSA 1	LJ-AA?	Microfauna	0,55
Exc. 3A Rear	3BS	MSA 2	LJ-AA?	Microfauna	0,61
Exc. 2	1GBS.UP	MSA 1 (late)	LJ-AA?	BC 3	0,72
Horton's Pit	?	?	LJ-AA?	BC 1	0,77
Horton's Pit	?	?	LJ-AA?	BC 2	0,72

vation and analysis of contiguous joining bone fragments suggests that a substantial proportion of that breakage postdates deposition. This fraction is considered to have been largely induced by human trampling in a setting where low sediment accumulation rates were the norm.

HOMINID REMAINS

Border Cave human remains have been numbered according to the scheme adopted by de Villiers (1975). Stratigraphic data for BC 1-3 are based largely on information drawn from Archaeological Survey file B20/1/2.

Iron Age

Anatomical description of IA hominid BC 4 was undertaken by de Villiers and is recorded in Beaumont (1978). The skeleton, minus calotte, belongs to a slightly built individual of uncertain sex and with an age at death of c. 38–45 yrs. Measurements, indices, and non-metrical characters of the mandible fall well within the corresponding ranges of the male South African Negro. The vertebrae and limbs indicate nutritional deficiencies and extreme osteoarthritis, and the teeth show severe attrition with dentine exposure. Artificial damage to the shaft of the right humerus may represent a witchdoctor's attempt at curing a "frozen" shoulder. Low ^{13}C bone values point to an exclusive C4 intake which probably reflects a diet largely based on cultigens such as millet and/or sorghum (Vogel 1978).

The remains were found in the southernmost portion of the cave and close to the back wall while clearing surface debris prior to setting up a sleeping area at the onset of fieldwork in December 1970 (fig. 2). It came from a very shallow grave that had been cut through the locally very rubbly 1BS from at or just below the present surface to bedrock at a maximum depth of ~15 cm. The body was largely surrounded and partly covered by casually stacked rock slabs. Apparently the previous removal of some of these had partly exposed the skull, thereby leading to its disappearance. BC 4 was found lying contracted on its left side with back to the west, head to the north and arms crossed over the chest, the right under the left. The right hand was over the left shoulder and on it rested the mandible. The ribs had collapsed inwards and the pelvis was cracked, possibly because of the overlying rocks. Almost all of the postcranial portions were present despite the bone being generally friable. Shells of carrion beetle pupae surrounded the body, and a small piece of leather was found immediately east of the pelvis.

A very rusted iron bracelet 8 cm broad encircled the left wrist, from which a date within the past two millennia may be inferred (Dart and Beaumont 1969). Two corrected and calibrated radiocarbon determinations of the bones indicate age of A.D. 1460 (J.C. Vogel, pers. comm.). This is quite close to the lower limits of the IA occupation at this site as documented by the readings in Table 2.

Middle Stone Age

BC 3 is an incomplete skeleton representing an infant aged between four and six months (de Villiers 1973). Various metrical and morphological features align it with both Khoisan and South African Negro (de Villiers 1973). The remains were found straddling squares F12 and G12 during systematic excavations in 1941 (fig. 2). It came from a shallow but indubitable grave, 38 cm long and 30 cm wide with the long axis north-east to south-west. The shaft walls sloped inwards except in the north where they had been undercut. Base depth increased southwards with a maximum of ~137 cm in the north-west quadrant of square G12. The first human fragments were found at just less than 114 cm, and the grave lip appears to have been marginally higher. Remains seem to have been rather scattered, and the original posture cannot be deduced. The associated *Conus* shell was perforated and presumably an ornament or amulet and indicates some form of contact with the coast, 82 km or more to the east (fig. 1). Some of the bones show reddish-brown stains (de Villiers 1973) that may represent an application of red ochre (Beaumont 1973b) before or after dissolution of the flesh (Beaumont 1978).

The base of an undisturbed 8 cm thick layer of deep brown sand overlying black ash is recorded as lying 5 cm above the apparent grave rim at a depth of 107–109 cm in squares E12 and G12 (table 1). The brown sand and black ash mark the lower limits of the "Epi-Pietersburg" industry in Exc. 2. Malan's field diary also notes an increase in *Achatina* shell from square E12 between 107 and 114 cm, which strongly suggests that the lower portion of that spit was cutting into the typically mollusc-rich 1GBS.UP (Beaumont 1978). It follows from these stratigraphic details that the burial amost certainly refers to the surface reaches of my late MSA 1. Further confirmation of this interpretation is provided by the nitrogen and aspartic acid readings as recorded in Tables 3 and 4. BC3 has thus a ^{14}C age in excess of 49 000 B.P. (tables 1 and 2) and an inferred dating of c. 105 000 ± 5 000 B.P. (Beaumont 1979).

Anatomical description of BC5 was undertaken by de Villiers (1976, see also Beaumont 1978). That specimen comprises the major portion of a lower jaw, probably belonging to a male, with an estimated age at death of 25–35 yrs. Wear surfaces of all intact teeth show severe attrition with pulp cavities being exposed in some instances. The metrical and morphological features as a whole appear to favour a link with the South African Negro. BC5 was recovered in my presence by Colleen Powell on 10th April 1974 (fig. 9). It came from just above the base of the intact 3WA in the north-west corner of square 20 immediately adjacent to a marked depression to the east. This stratigraphic anomaly, perhaps a grave, extends into the face of the trench and would require the lowering of strip U for its further investigation. From these data it is evident that the mandible relates to artefacts representing a middle stage of the "Epi-Pietersburg" MSA 2. This phase has a C-14 date of greater than 49 000 B.P. (table 2) and an inferred age of 90 000 ± 5 000 B.P. (Beaumont *et al.*, 1978).

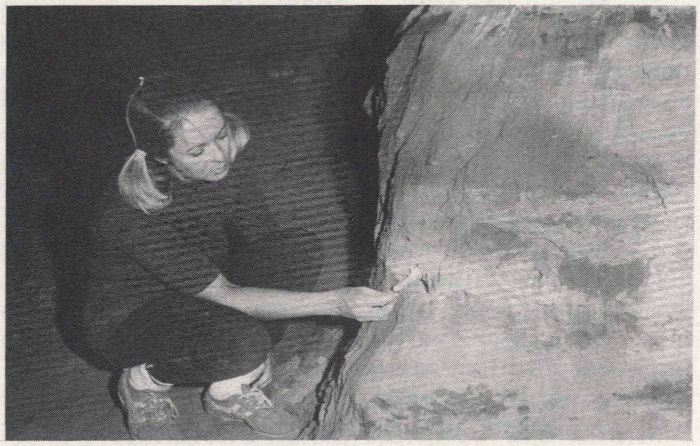

Figure 9. C. Powell holds Border Cave hominid 5 in the precise position where it was found by her on April 10, 1974. It is located just above the base of the 3WA and some 25 cm below the visibly intact surface of that stratum. Photograph by courtesy of Dr. G. Baker.

Unprovenanced

BC 1 and 2 comprise an incomplete adult male cranial vault and a partial adult female mandible respectively. Multivariate statistics indicate that BC1 is "not markedly dissimilar" to Tuinplaas (de Villiers 1973) and that it has affinities with the Khoisan (Rightmire 1979). Discriminant analysis shows that separation from modern indigenous populations is mainly a result of greater size with particular respect to breadth (de Villiers 1973). This difference is possibly significant in view of the established reduction in that parameter between Upper Palaeolithic and Neolithic crania from Western Europe (Frayer 1972). BC2 metrical indices, on the other hand, correspond closely with the norms applicable to San females according to de Villiers (1973, 1976). The hominid bones as a whole contrast strongly with mean macrofaunal fragment mass values (~1,0 g), which suggests that burial may have protected the former group from post-depositional damage (Beaumont 1978).

BC1 is said to have come from the north-west sector of Horton's Pit, and the preservation state alone supports a derivation from backward of strip 7 (fig. 2). Guano digger accounts differed as to its precise position within the c. 170 cm depth of sediments exposed in that portion of the cave (figs. 5, 6). The 1942 observations revealed that the 4WA surface extended undisturbed over the floor of Horton's Pit, thereby providing a firm lower limit to the strata potentially linked to BC 1 and 2. On the basis of soil adhesions in the small interstices of the skull, Cooke *et al.* (1945) concluded that it had come from a distinctive chocolate brown layer lying immediately above the 4WA, corresponding to our 1GBS.LR (table 1).

That claim is supported by the nitrogen and aspartic acid readings, which indicate that BC 1 and 2 are perhaps somewhat older and certainly not younger than the 3WA (tables 3, 4). Any possibility of an IA ascription is clearly precluded by the nitrogen value for BC4 which is about 2-3 times higher than the others despite the fact that it came from an area where a relatively rapid nitrogen depletion rate prevails. The likelihood of a post-4WA but pre-3WA age for BC 1 and 2 would clearly be in good accord with the F and N-verified (Protsch 1973) association of the comparable Tuinplaas skull with an "advanced" Pietersburg assemblage (van Riet Lowe 1929).

The overall conclusion regarding BC 1 and 2 is, thus, that all available data exclude an IA ascription, which would thereby imply a pre-1BS.UP "Sterile" dating of at least 30 000 B.P. (table 2). Other concordant evidence supports the original contention of Cooke *et al.* (1945) that the remains refer to the 1GBS.LR with an inferred age of about 110 000 B.P. (Beaumont *et al.*, 1978).

CONCLUSIONS

Hominid remains from the 3WA and 1GBS at Border Cave (Beaumont *et al.*, 1978) and from the MSA I and II levels at Klasies River Mouth (Singer and Smith 1969, Rightmire 1978) demonstrate the presence in southern Africa of anatomically modern *Homo sapiens* in Last Interglacial deposits dating to c. 90 000–130 000 B.P. Most of the specimens are fully modern in morphology, and archaic features are not obtrusive. It is deduced that those humans ultimately derive from an as yet undiscovered primal form which is perhaps linked to aggregates near the MSA/ESA interface at something like 160 000 ± 40 000 B.P.

If this scenario is correct, then it would follow that Eurasian prehistory may in fact document only various terminal developments in the unexpectedly protracted physical evolution and cultural development of our own kind in Africa south of the Sahara (Beaumont *et al.*, 1978). The further investigation of modern man's formative history in appropriate areas of the subcontinent should constitute one of the major objectives of archaeological endeavour during the coming decade, for it is only by placing that record in true time perspective that we can hope to comprehend the interacting environmental and cultural forces which have led to the world as we see it today.

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