NEW ^{14}C DATING OF THE ARCHAIC ROYAL NECROPOLIS UMM EL-QAAB AT ABYDOS (EGYPT)

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ABSTRACT. Since 1977, the German Institute of Archaeology in Cairo has been reexamining the archaic Royal necropolis Umm el-Qaab at Abydos (*ca.* 500 km south of Cairo). The necropolis consists of the tomb complexes of six kings and one queen of Dynasty I as well as two kings of Dynasty II in the southern part, the cemetery with royal tombs from Dynasty 0 and early Dynasty I in the middle and the predynastic cemetery in the northern part. Although partly destroyed and deprived of most of their contents, the tombs and the remaining artifacts are a major source for the early dynastic period and are of utmost importance for the understanding of predynastic development during Naqada I–III and the chronology of the formation of Egyptian culture. Sixteen newly ^{14}C-dated samples were mainly taken from remains of wooden roofs and coffins, or in the case of the earliest tombs from mattings. The dating results in general are in good accordance with the relative archaeological dating of the tombs, but 100–150 yr earlier than the so far established historical chronology.

INTRODUCTION

The archaic Royal necropolis Umm el Qaab (Arabic, "Mother of Pots") at Abydos (*ca.* 500 km south of Cairo) is located in the western desert *ca.* 1.5 km from the cultivated land in front of impressive limestone cliffs and to the southeast of a large wadi. The cemetery was previously excavated by E. Amelineau (1895–1898) and F. Petrie (1899–1900), and partially by E. Naville and E. Peet (1909–1912). Since 1977 the German Institute of Archaeology, Cairo has been carrying out a reexamination (first directed by W. Kaiser, since 1980 by G. Dreyer).

The necropolis seems to have developed from north to south and consists of three parts:

1. the predynastic Cemetery U to the north;
2. Cemetery B with royal tombs of Dynasty 0 and early Dynasty I in the middle;
3. the tomb complexes of six kings and one queen of Dynasty I, and two kings of Dynasty II to the south.

Although partly destroyed and deprived of most of their contents, the tombs and the remaining artifacts are a major source for the early dynastic period and of utmost importance for the understanding of predynastic development during Naqada I–III and the chronology of the formation of Egyptian culture.

In late Naqada I–IIa/b, Cemetery U seems to have been fairly undifferentiated, although there are a few rather rich tombs. Then there is a gap in Naqada IIc, but in Naqada IId the cemetery had obviously already developed into an elite one. Some of the larger tombs of this period are probably to be ascribed to chieftains (and their kin). Beginning with Naqada IIIa, all tombs were lined with mudbricks. The larger single-chamber tombs and the multiple-chamber tombs in all likelihood belonged to a sequence of rulers succeeded by the kings of Dynasty 0 who were buried in double-chamber tombs in Cemetery B.

Of particular importance is tomb U-j with 12 chambers, archaeologically dated to Naqada IIIa2, which contained bone and ivory labels and pottery with inscriptions, so far the earliest evidence of hieroglyphic writing from Egypt.

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The royal tombs of Dynasty I–II are sizeable complexes, consisting of a large king's chamber and many subsidiary chambers, serving as storerooms and (in Dynasty I) for inhumation of servants.

Apart from the earlier predynastic burials in simple pits, all graves were once covered with wood and matting (the small and the large brick-lined chambers also with layers of mudbricks) below desert level, and probably with a barrow of sand above.

Methods

Chemical pretreatment of wood samples was done by A-A-A treatment (Mook and Streurman 1983) or by leaching with 10% NaOH solution in a Soxhlet extractor and leaching with 5% hypochloric acid (Kohl and Quitta 1978). For the small samples of mattings we omitted the first step in the A-A-A pretreatment. In earlier investigations, we found no influence of pretreatment on the dating result. The measurements of the samples Bln-4466 (pretreated wood) and Bln-4466H (humic acid extract) showed the same age, so that we have no contamination by humic acid. The dating was performed with gas proportional counters of the Houtermans-Oeschger type, using methane at 133.3 kPa pressure as filling gas (Kohl and Quitta 1978). Measurement control and data processing were done with the help of computers (Görsdorf 1990; Görsdorf and Bojadziev 1996). The $\delta^{13}C$ measurements were done by H. Erlenkeuser and colleagues (Leibniz-Labor, University of Kiel) and are reported with respect to PDB-standard.

Results

We present the dating results together with earlier published results from the ^{14}C Laboratory in Heidelberg (Boehmer, Dreyer and Kromer 1993). The tree-ring count of wood samples could not be determined, but the wood which was used for construction of the tombs typically had an age of 10 to 20 yr. In the case of the excavated important tombs, reuse of wood is unlikely. In the calibration program (Bronk Ramsey 1995) we used the bidecadal calibration curve (Stuiver and Pearson 1993) as a first approximation.

Bln-4680	tomb of Qa'a	last king of first dynasty		4244 ± 41 BP
wood from royal chamber, sample 1				2910–2870 cal BC
				2810–2770 cal BC
				2720–2700 cal BC
Bln-4681	tomb of Qa'a	last king of first dynasty	$\delta^{13}C = -27.35‰$	4397 ± 42 BP
wood from royal chamber, sample 2				3080–3070 cal BC
				3040–2920 cal BC
Hd-12907	tomb B 40	2nd king of first dynasty		4440 ± 25 BP
roof-beam				3260–3240 cal BC
				3100–3030 cal BC
				2970–2930 cal BC
Hd-12912	tomb B 40	2nd king of first dynasty		4430 ± 60 BP
rectangular beam				3300–3240 cal BC
				3110–2920 cal BC
Hd-12926	tomb B 19	1st king of first dynasty		4535 ± 40 BP
rectangular beam				3350–3300 cal BC
				3240–3100 cal BC

Hd-12947 tomb B 19 fragment of shrine	1st king of first dynasty		4505 ± 20 BP 3330–3260 cal BC 3240–3220 cal BC 3190–3100 cal BC
Hd-12953 tomb U-j wood from chamber 6, sample 1	Naqada IIIa2		4470 ± 30 BP 3310–3230 cal BC 3180–3160 cal BC 3120–3030 cal BC
Hd-12954 tomb U-j wood from chamber 6, sample 2	Naqada IIIa2		4595 ± 25 BP 3490–3470 cal BC 3380–3330 cal BC
Bln-4464 tomb U-a fragment of wooden shrine	Naqada IIIa2		4526 ± 40 BP 3340–3300 cal BC 3240–3100 cal BC
Bln-4461 tomb U-qq remains of wooden roof, sample 1	Naqada IIIa2		4528 ± 40 BP 3350–3300 cal BC 3240–3100 cal BC
Bln-4462 tomb U-qq remains of wooden roof, sample 2	Naqada IIIa2		4608 ± 40 BP 3500–3430 cal BC 3380–3330 cal BC 3160–3130 cal BC
Bln-4671 tomb U-pp wooden fragment from SE corner of the tomb	Naqada IIIa2	$\delta^{13}C = -23.32‰$	4679 ± 40 BP 3510–3370 cal BC
Bln-4465 tomb U-133 wooden plank from NE corner of the tomb	Naqada IId		4624 ± 64 BP 3510–3330 cal BC 3220–3190 cal BC 3160–3130 cal BC
Bln-4466 tomb U-149 remains of wooden roof	Naqada IId	$\delta^{13}C = -26.65‰$	4691 ± 40 BP 3610–3600 cal BC 3520–3370 cal BC
Bln-4466 H tomb U-149 humic acid from Bln-4466	Naqada IId	$\delta^{13}C = -26.84‰$	4688 ± 40 BP
Bln-4493 tomb U-149 eastern part of wooden shrine	Naqada IId	$\delta^{13}C = -27.11‰$	4676 ± 44 BP 3510–3370 cal BC
Bln-4494 tomb U-207 eastern part of wooden coffin	Naqada IId	$\delta^{13}C = -27.27‰$	4667 ± 40 BP 3510–3410 cal BC 3390–3360 cal BC
Bln-4467 tomb U-210 wood lining of tomb, N site	Naqada IId	$\delta^{13}C = -25.62‰$	4421 ± 43 BP 3100–2920 cal BC
Bln-4463 tomb U-547 wooden plank from SE corner of the tomb	Naqada IId		4688 ± 48 BP 3610–3600 cal BC 3520–3370 cal BC

Bln-4672 tomb U-224 Naqada IId probably a piece of roofing		4607 ± 48 BP 3500–3420 cal BC 3380–3330 cal BC 3220–3190 cal BC 3160–3130 cal BC
Bln-4673 tomb U-287 Naqada IId fragments of wooden coffin	$\delta^{13}C = -27.00‰$	4591 ± 41 BP 3500–3460 cal BC 3380–3310 cal BC 3230–3180 cal BC 3160–3120 cal BC
Bln-4676 tomb U-263 Naqada Ic probably remains of matwork		4802 ± 50 BP 3650–3510 cal BC
Bln-4679 tomb U-503a Naqada Ib matwork		4837 ± 87 BP 3710–3510 cal BC 3400–3380 cal BC

Figure 1 shows the calibration results. The results are in very good accordance with the relative archaeological dating of the tombs (Kaiser and Dreyer 1982; Dreyer 1993; Dreyer *et al.* 1990, 1996). In particular, the close range of determinations of most of the Naqada IId tombs (U-133, 149, 207, 547, 224 and 287), the multiple-chamber tombs of Naqada IIIa2 (U-j, -a, -qq, -pp), and those of early Dynasty I (B 19, B 40) is a basis for a reliable chronological frame. We have no explanation for the fact that the date Bln-4467 (tomb U-210) is inconsistent. We find no evidence for sample contamination. The large calibration intervals are caused by the wiggle structure of the calibration curve. We can reduce the calibration intervals by archaeological wiggle-matching (Weninger 1986, 1992). We present the best match of measurements and calibration curve considering the archaeological information in Figure 2.

Conclusion

The relative order of the ^{14}C dates is in good accordance with the so far established historical chronology of the dynastic period (Beckerath 1971), but the dating results are more than 100 yr older. We are able to determine the age for Qa'a, the eighth and last king of the first dynasty: the overlapping range of the calibration results of the two dated samples from the tomb of Qa'a give an age between 2920 cal BC and 2910 cal BC. These results are in agreement with earlier measurements of the first and second king of the first dynasty (Boehmer, Dreyer and Kromer 1993).

Our predynastic datings supply a more accurate form of the general chronology (Hassan 1988). Using our measurements we can date Naqada IIIa2 to the middle of the 34th century BC and Naqada IId to the middle of the 35th century BC.

The results for Naqada I/IIa-b, *ca.* the middle of the 37th century BC, also seem to fit into the archaeological scheme, but for final conclusions more dated samples are needed.

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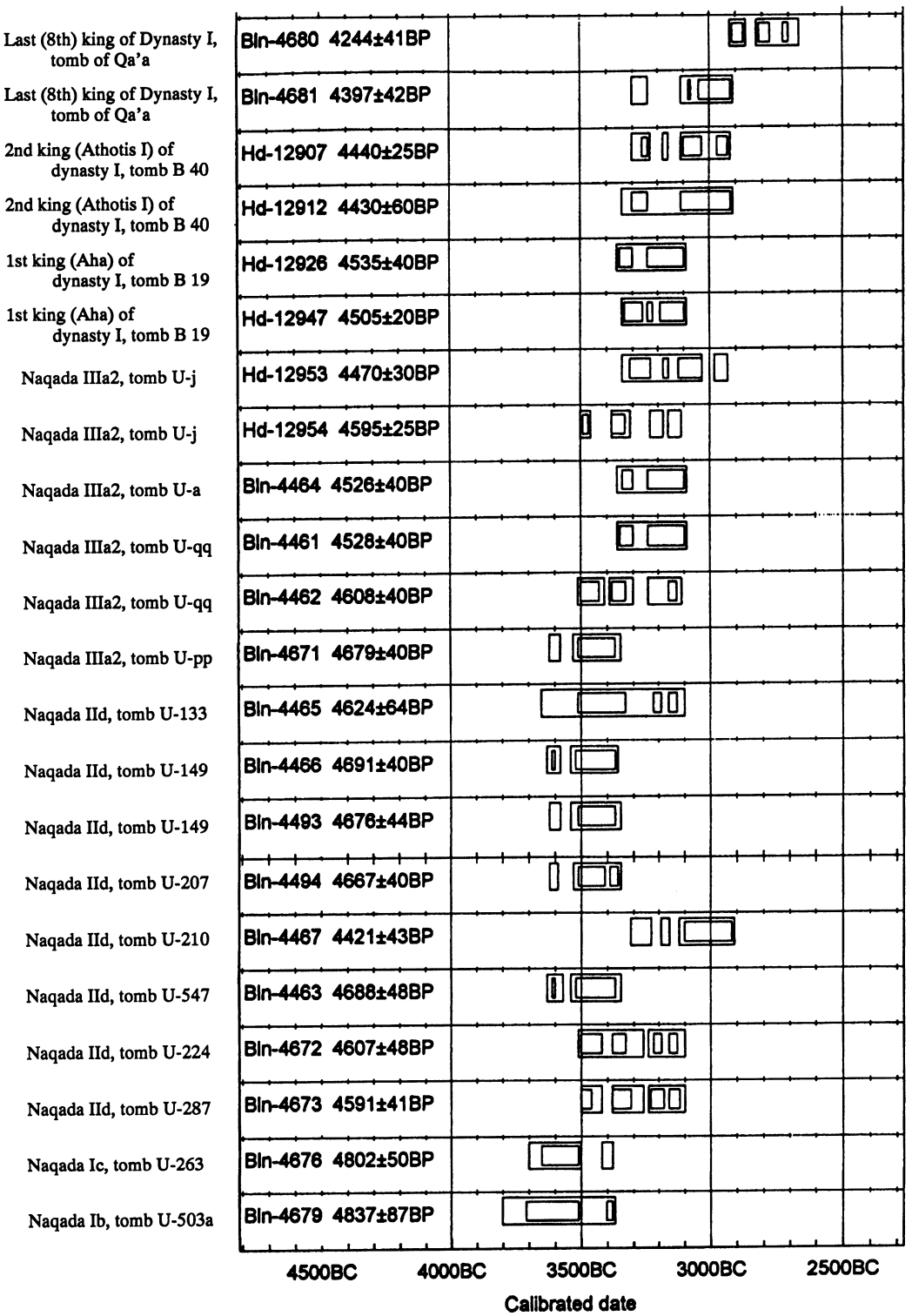

Fig.1. Calibrated age ranges of dating results. The confidence limit of the inner boxes is 68.2%; of the outer boxes, 95.4%.

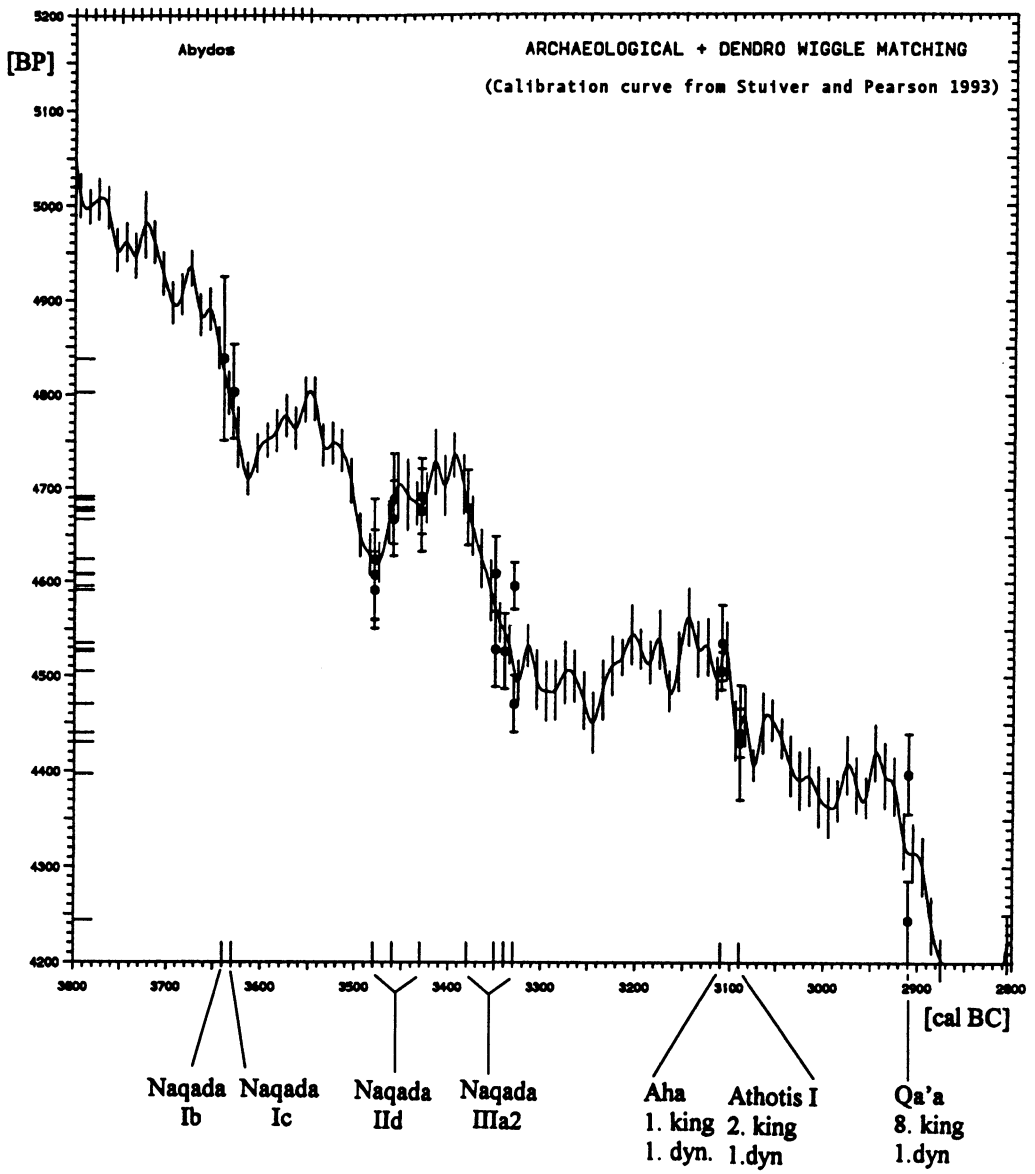

Fig. 2. Calibration of dating results in agreement with archaeological information (archaeological wiggle-matching)

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