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# GLEANINGS FROM THE CAVES

## DEAD SEA SCROLLS AND ARTEFACTS FROM THE SCHØYEN COLLECTION

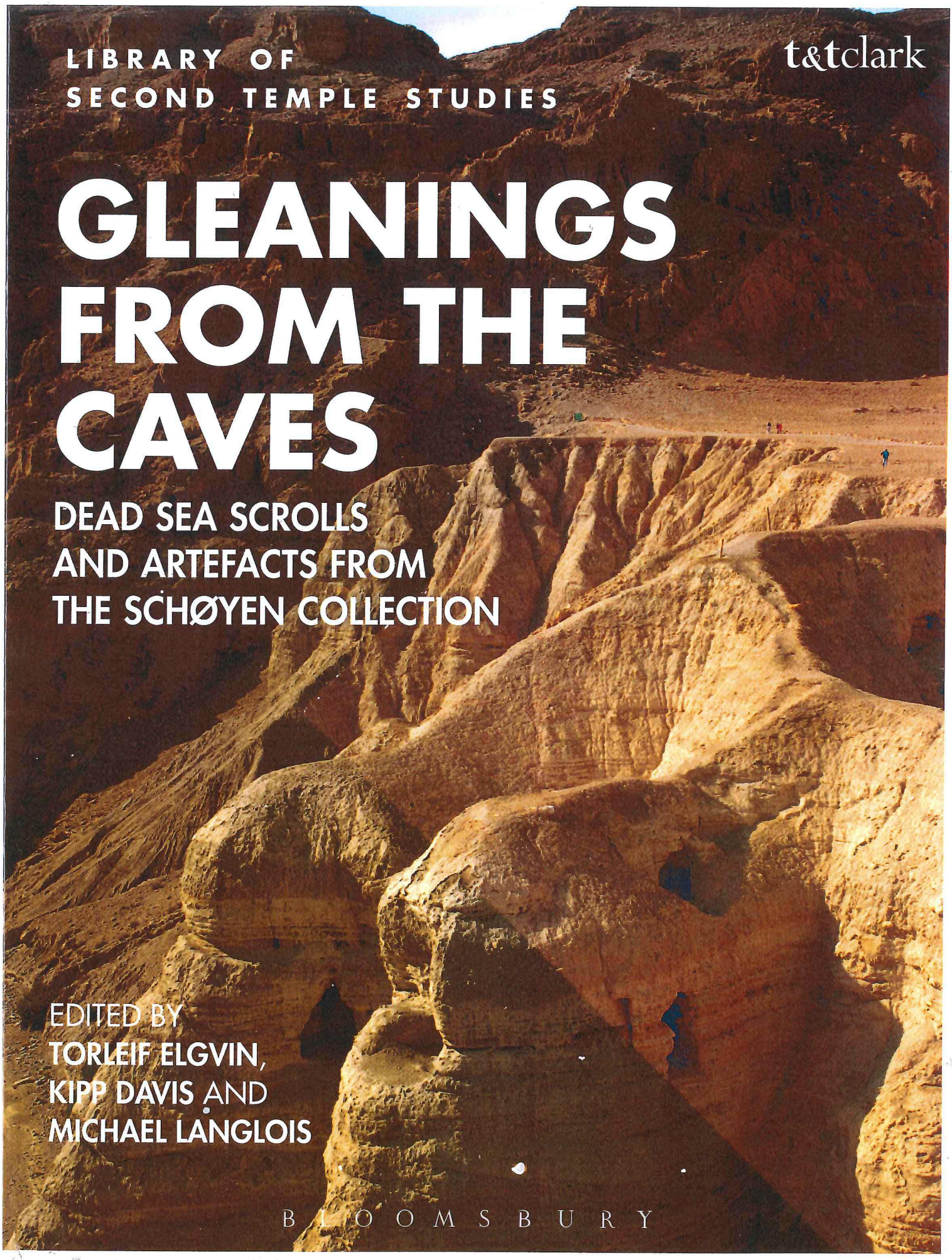

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***Figure 53.*** Temple Scroll *wrapper (scale 1:4)*

# XXXVI

## Radiocarbon Dating of the *Temple Scroll* Wrapper and Cave 11Q

*Joan E. Taylor, Johannes van der Plicht*

A key question concerning the Qumran caves is the dating of the deposits within them. The 'quick hiding scenario', whereby all the scrolls were placed in the caves ahead of the Roman advance in AD 68, has been the most popular theory to account for the presence of manuscripts within the caves. The view that there were several deposits at different times remains an alternative proposition. However, the deposits are configured in terms of different rationales, time periods and relationship with the site of Qumran (see Taylor 2011; 2012, 272–302; Magness 2002, 89; Stökl Ben Ezra 2007). In this context the dating of objects from the caves is of great interest.

The *Temple Scroll* and its wrapper come from Qumran Cave 11Q. This cave was already found by the Bedouin before the arrival of the archaeological team (de Vaux 1956, 573–77; 1973, 51; Fields 2009, 299), but further material uncovered in the cave, including broken pottery and manuscript fragments such as a scroll of Ezekiel, proved interesting. Compared to other Qumran caves the repertoire of Cave 11Q is richer: it had a wider range of objects than identified in other Qumran caves. The items are listed as follows: Gr 11Q-1: a lid; Gr 11Q-2: a fragment of an iron blade; Gr 11Q-3: a copper buckle; Gr 11Q-4: iron chisel; Gr 11Q-5: a lamp; Gr 11Q-6: an iron pick; Gr 11Q-7: juglet Gr 11Q-8: lamp; Gr 11Q-9a and b: two hide (skin) items; Gr 11Q-10: an iron rod; Gr 11Q-11: an iron key; Gr 11Q-12: a glass bead; Gr 11Q-13: part of a (Chalcolithic) small jar, along with fragments of jars from the Iron Age as well as two lamps from this time (de Vaux 1956, 574; 1973, 51; Humbert and Chambon 1994, 265–66, 344). Two jar lids found here are defined as 'upturned bowls' (de Vaux 1956, 574). There were also textiles, basketry and cord strings, now in the Organic Material Storage Unit of the Israel Antiquities Authority. The archaeological team identified three distinguishable periods of occupation—Chalcolithic, Iron Age II and Roman.

Before the arrival of the archaeologists a number of items were removed from the cave: numerous manuscript pieces (Fitzmyer 2008, 110–16) and at least two scroll jars, one containing the *Temple Scroll* (11Q19) in a linen wrapper, that passed to the well-known antiquities dealer Khalil Iskander Shahin, or Kando, and thereafter to private collections (these jars are shown with Kando in a picture in Fields 2009, 98, cf. 301, and Puech 1989, Pl. 3). The manuscripts excavated by the Bedouin were offered to the Palestine Archaeological Museum by Kando, while the *Temple Scroll* itself was requisitioned by Yigael Yadin upon the capture of Bethlehem in 1967 (Yadin 1985; Fields 2009, 300; Fitzmyer 2008, 110–16).

Kando reported that in the same jar with the *Temple Scroll* there were: the *Temple Scroll* wrapper (MS 5095/2), two groups of threads (SW2 and SW3), a linen cord (SW4), a small piece of textile (MS 5095/4), pieces of textile upon which strips of parchment were stuck (MS 5095/1) and what has been designated as a palm leaf stylus (MS 5095/3), cf. Sukenik, p. 339. The distinction between the linen wrapper (MS 5095/2) and the pieces of linen (MS 5095/1) is not significant. The larger fragments were put in the large display case together with the string (cf. *Figure 53*). When acquired by The Schøyen Collection, the smaller fragments were also first put there, but shifted place when there was handling of the large frame, so they were then mounted in a small frame, where they are more stable (personal communication from Martin Schøyen; see *Figure 54*). They are designated MS 5095/4.

***Figure 54.*** Temple Scroll *wrapper, small frame with textile piece taken for radiocarbon dating highlighted*

The fragments of the *Temple Scroll* wrapper are particularly useful for radiocarbon dating because, unlike many textile fragments from the Qumran caves, they have never been cleaned or treated, so that there are no modern contaminating residues that would influence radiocarbon dating results. They appear to have been bleached in antiquity (cf. Sukenik, p. 342). Since these small fragments were already separated from the larger piece they proved to be ideal for radiocarbon dating, as no cutting is required. Martin Schøyen kindly permitted one of the present authors, Joan Taylor, to take a piece for dating by the Centre for Isotope Research, Groningen, and this was sent to the laboratory on 17 December, 2014 (*Figure 54* shows the piece chosen).

## A. Preparation and Testing of the Sample

Successful dating depends on the samples being cleaned thoroughly since they may contain foreign carbon with a different $^{14}C$ content, such as carbonate, humic substances and/or plant remains, and preservatives. These must be removed in order to obtain the correct radiocarbon age of the sample itself. Standard procedures for the chemical pre-treatment of samples have been developed (*e.g.* Mook and Streurman 1983).

The standard treatment of samples consists of the following steps: (i) Acid (HCl) in order to remove soil carbonate and possibly infiltrated humic acids; (ii) Alkali (NaOH) to remove *e.g.* soil humates; (iii) Acid (HCl) to remove any $CO_2$ absorbed during step (ii). This treatment is referred to as the 'AAA' (Acid-Alkali-Acid) treatment.

The scroll wrapper was an 18.6 mg sample of linen textile, yielding 6.0 mg of extracted Carbon after the AAA treatment. The prepared and purified sample fraction is combusted into $CO_2$ gas using an Elemental Analyser coupled to an Isotope Ratio Mass Spectrometer (IsoCube/IsoPrime). This EA/IRMS provides the stable isotope ratio $^{13}C/^{12}C$.

For $^{14}C$ analysis, part of the $CO_2$ is routed to a cryogenic trap to collect the samples for further processing. The $CO_2$ is transferred into graphite powder by the reaction $CO_2 + 2H_2 \rightarrow 2H_2O + C$ at a temperature of 600°C and using Fe powder as catalyst (Aerts et al. 2001). Next, the graphite is pressed into target holders for the ion source of the AMS (Accelerator Mass Spectrometer). The AMS is based on a 2.5 MV particle accelerator built by High Voltage Engineering Europa. The AMS measures the $^{14}C/^{12}C$ and $^{13}C/^{12}C$ isotope ratios of the graphite (van der Plicht et al. 2000). From these numbers the conventional $^{14}C$ age is determined.

This conventional $^{14}C$ age is based on the Libby half-life value, oxalic acid as a reference material and correction for isotopic fractionation using $^{13}C/^{12}C$ (Mook and van der Plicht 1999). These ages are reported in BP, 'Before Present'. For absolute dates, the conventional $^{14}C$ ages need to be calibrated into calendar ages. This is done by the recommended calibration curve IntCal13 (Reimer et al. 2013). The calibrated ages are reported in calBC or calAD.

For the *Temple Scroll* wrapper, the conventional $^{14}C$ age is determined as 1900±30 BP. The laboratory code is GrA-62331, and the $^{13}C/^{12}C$ ratio (expressed in the $^{13}C$ value) is -25.12‰. Both the $^{13}C$ value and the organic Carbon content (the most important quality parameters for sample integrity) are well within acceptable range for linen textile.

The calibration is shown in the figure (*Figure 55*). The radiocarbon date is plotted in red along the vertical axis, the calibrated date in black along the horizontal axis. The relevant part of the calibration curve IntCal13 is shown in blue. The calibrated age range is 70–130 calAD. Both the $^{14}C$ age in BP, and the calibrated age range in calAD are reported at 1-sigma (68.2%) confidence level, with numbers rounded to the nearest significant 5. At 2-sigma (95.4%), the calibrated age range is 30–215 calAD (numbers rounded and combined).

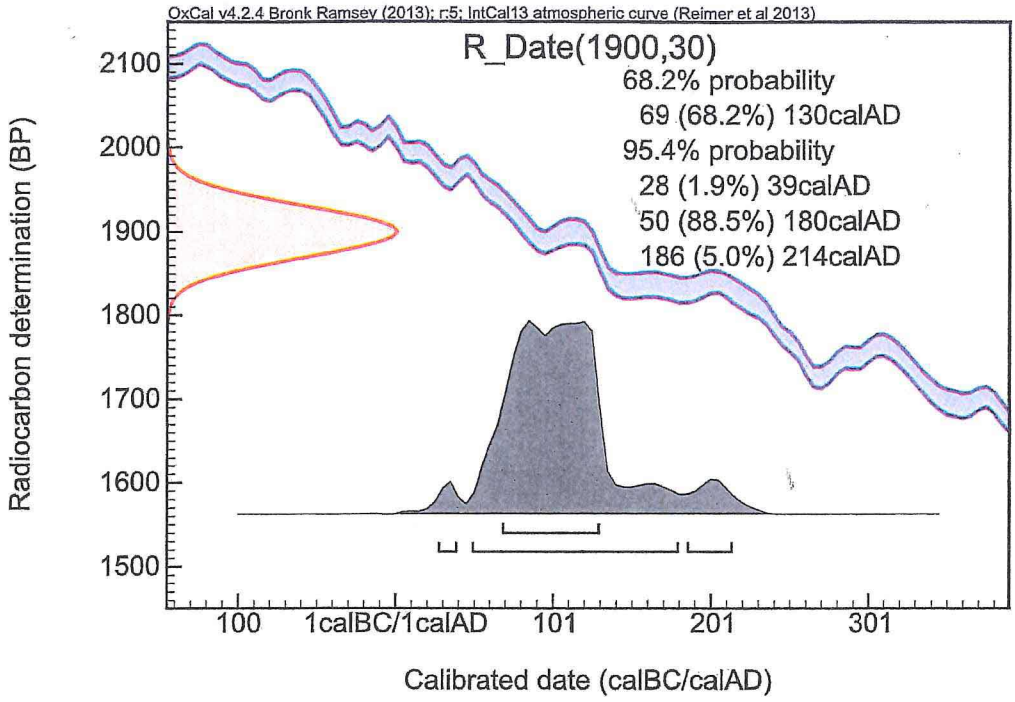



***Figure 55.*** *Radiocarbon test results for textile from the* Temple Scroll *wrapper*

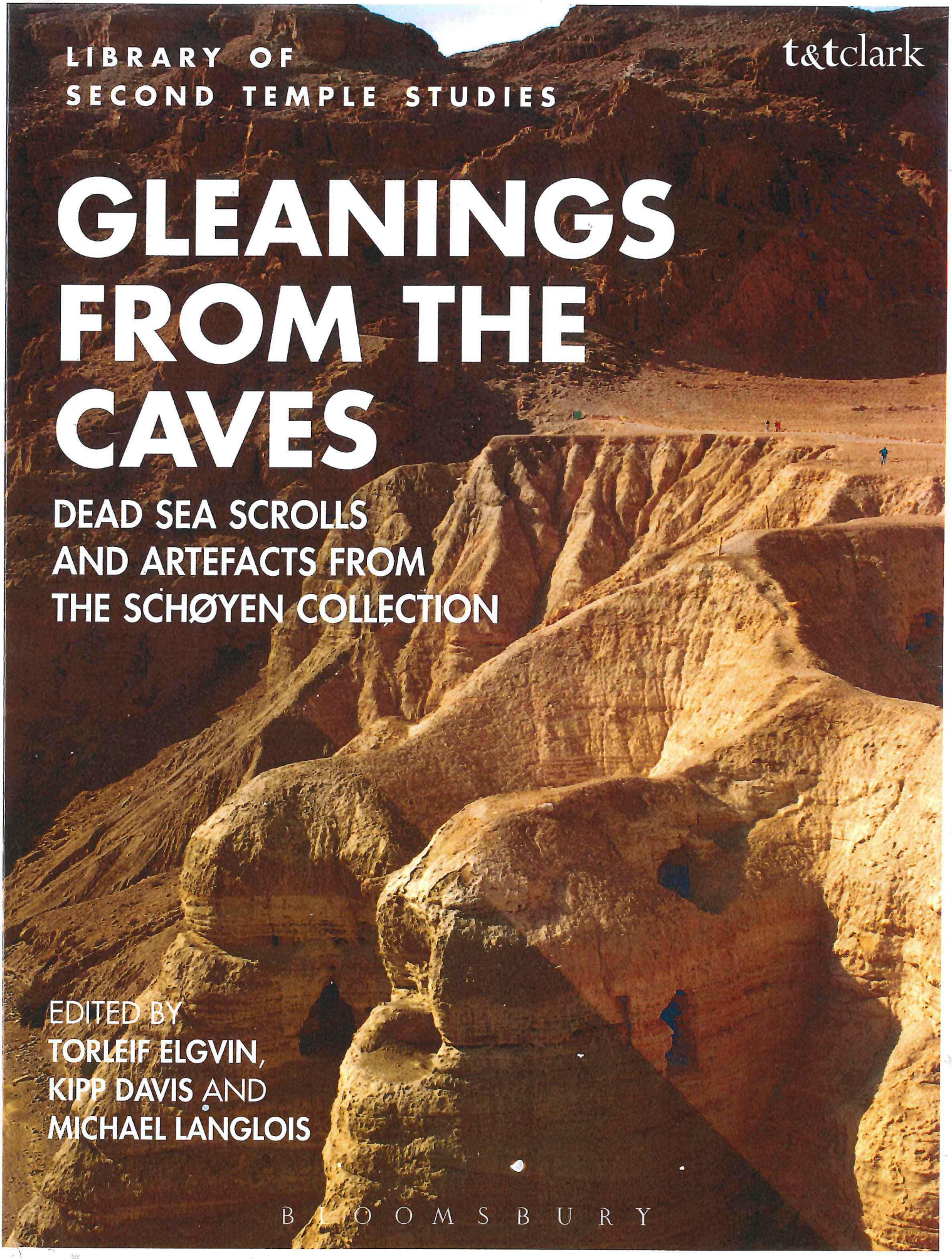
## B. Other Datings from Cave 11Q

The calibrated date range of the linen sample from the *Temple Scroll* wrapper is particularly interesting given the later than usual parameters. Within the 2-sigma range (95.4%) probability, 88.5% confidence attaches to a date between 50 and 180 AD. The relatively late date range of the results needs to be contextualized within other dates that have been obtained from Cave 11Q materials.

Gelatinized and ungelatinized samples of the *Temple Scroll* were radiocarbon dated in the ETH Zurich laboratory in 1990 and provided a result of 2024±49 (gelatinised) and 2066±78 (ungelatinized) years BP, at 1 sigma (68% probability), giving it an averaged result of 2030±40 years BP, or calibrated date range of 97 BC–1 AD (Bonani 1992, 845), and the 2-sigma calibration of Gregory Doudna (1998) has yielded a range of 166 BC–67 AD. Tests done in 2004 (Rasmussen et al 2005, 151–52) included six samples from Cave 11Q. Of these, a cotton textile yielded a result of 860–1020 AD at 2-sigma, a dating result matched by two wood samples, indicating an employment of the cave in the Abbasid to Fatimid periods, not identified by the archaeologists. In addition, there were two linen samples that provided dates of 190 BC–30 AD, and 100 BC–70 AD at 2-sigma, while a piece of wood was dated 1880–1610 BC, in the Middle Bronze Age. The linen samples clearly cohere with the occupation period of the Qumran settlement and deposit of scrolls in jars in the Qumran caves.

The current test of the *Temple Scroll* wrapper would be consistent with a date of hiding around the time of the First Revolt, but it would also keep open the question of whether this scroll was deposited later than AD 68, at a time corresponding to occupation Period III in de Vaux's system, or even the Bar Kokhba period, and only further tests would enable greater precision in this regard. It should also be remembered that the radiocarbon date relates to the cutting of the flax to make the linen, and not the date of the deposit, which would have been any time after this linen was made. The dating range of the linen is also significantly later than the dating range of the manuscript at 1-sigma, with overlapping

dates only in the 2-sigma range. This may indicate that the *Temple Scroll* was an older manuscript that was covered in a relatively fresh wrapper prior to its deposit. Yadin has suggested that textiles tended to be used for a relatively short time, perhaps fifteen years (1963, 171). It should also be borne in mind that the scripts of Cave 11Q are often of a later date than those of other caves. In agreement with Stökl Ben Ezra (2007; 2010), García Martínez (2010, 205) states, 'That Cave 11 is a "young" cave seems certain, since Herodian and late-Herodian manuscripts make up the majority of its holdings.'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