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CORRESPONDENCE

THE RONALD REED ARCHIVE AT THE JOHN RYLANDS UNIVERSITY LIBRARY

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1 Introduction

Chance discovery and identification of the first manuscripts from a cave on the western shore of the Dead Sea in the late 1940s initiated a regular hunt in the caves in that area. Although both Bedouin and archaeologists were combing the mountains, it has to be admitted that luck was more often on the side of the former. Bedouin discovered the famous man-made Cave 4 (Figure 1) that contained the lion's share of what later became the Qumran Dead Sea Scroll collection. And this despite the fact that the entrance to the cave could even be seen from the Qumran site which was being excavated by Father de Vaux from the École Biblique in Jerusalem a short time before its discovery.[1,2]

By 1956 the bulk of the Qumran Dead Sea Scrolls collection had been secured and deposited in the Rockefeller Museum in East Jerusalem where scholars started the difficult task of deciphering and matching thousands of fragments. The age of the manuscripts was a key issue. Palaeographic evidence pointed at the Second Temple period. The use of carbon ink indicated, in turn, that the manuscripts were written

Figure1: Wadi Qumran, facing cave 4. (M. Pantos, private archive).

Figure 2: Dr. Ronald Reed. Photo by kind permission of Mrs Marian Reed.

before 4th-5th centuries CE, i.e. before the age of iron gall ink. But such crude dating could not satisfy scholars. Any attempt to understand and to interpret the manuscripts demanded their internal dating. The radiocarbon method was just being developed and required the sacrifice of large pieces of material. Actually, it was archaeologically dated textiles from Cave 1 that validated the first radiocarbon results, namely the linen wrapping of the Book of Isaiah.[3] The search for an alternative dating method based on material study also started. The material of the scrolls comprised leather, papyrus and leather-like parchment. The majority of the documents were written on the last, although it hardly resembled the well-known parchment from the Middle Ages. What could explain the high degree of deterioration in these ancient documents? Could it be that the production techniques of Antiquity were quite different from those prescribed in the Middle Ages?

2 The study of Dead Sea Scroll fragments by Ronald Reed

Dr. Ronald Reed from Leeds University, an acknowledged expert in all matters concerning leather and parchment, was chosen to address some of these questions. The contact was made initially through John Allegro, a Manchester University Dead Sea Scrolls scholar and member of the editorial team working under de Vaux. Reed was eventually given a wide assortment of samples, originating from the Palestine Archaeological Museum's "Scrollery" in Jordanian Jerusalem. These samples match practically every kind of leather and parchment in the collection. The samples contained no text and there was no way to trace any of them to a certain document. This was done on purpose: the dating needed to be independent of textual influence. Reed's extensive study of the fragments took several years. It is documented by a number of scientific publications and the very detailed doctoral thesis of John Poole.[4-11] The latter is especially important, containing details of the study which aimed at complementing the work initiated by Ronald Reed, himself.

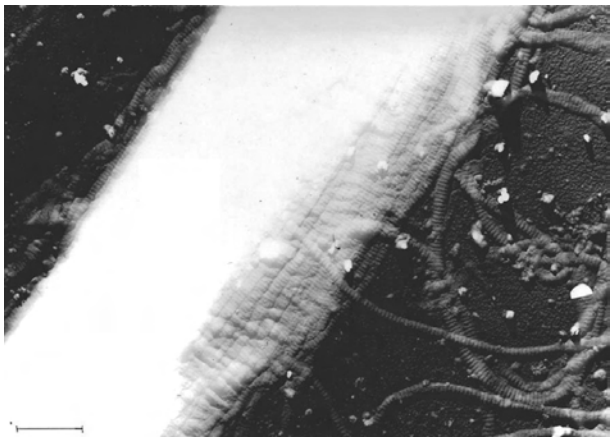

Figure 3: Electron micrograph of the Canterbury parchment (1692). The scale represents 1 micrometer. Photo by kind permission of Dr. John Poole.

Reed and Poole demonstrated that light microscopy and electron microscopy could unequivocally differentiate between leather and parchment structures. They proved it was unsplit parchment that constituted the major part of the scroll media from Cave 4 and Murabba'at. They elucidated the preparation techniques such as the surface treatment of the parchments with vegetable tannins. In addition to its contribution to historical knowledge, this discovery has the utmost importance for the long-term preservation of the scrolls. Furthermore, a dating procedure based on the determination of the collagen shrinkage temperature was developed. It was shown that the majority of the fragments of the Dead Sea Scrolls shrink at between 25 and 35 °C as compared with the temperatures above 40°C for the parchment from the Middle Ages to ca. 1950. In principle, the shrinkage temperature reflects the degree of collagen degradation. Thus, it cannot be used as a general measure of parchment age. In the case of the DSS, however, the fact that all the scrolls were stored under the same conditions for an extremely long period of time rather justifies the assumption that more advanced degradation reflects higher age. Moreover, the shrinkage temperature test is indispensable in cases of doubtful authenticity. As opposed to radiocarbon dating, shrinkage temperature and the appearance of a Dead Sea Scroll cannot be easily forged.

The trace elements study of fragments was also conducted. Though it did not result in a definite provenance for the scrolls, it revealed an uneven distribution of the main constituents, indicating different origins for the scroll materials. The last

Figure 4: Electron micrograph of the dermal layer of the fragment 4Q13. The scale represents 1 micrometer. Photo by kind permission of Dr. John Poole.

observation has been recently confirmed by the quantitative XFR study of the DSS fragments.[12]

The discovery of the archive stored in the loft of Ronald Reed's family and its transfer to the John Rylands Univeristy Library of Manchester has been described recently.[13] In the summer of 2006 John Poole and his thesis were casually mentioned within the discussion of a project on DSS studies involving Jerusalem and Manchester scientists. Soon after that, the Jerusalem project partner arrived in Manchester to make a catalogue of the collection. The fragments in the Manchester archive have not been subjected to any substantial contamination by modern treatments as have been administered to many other Dead Sea Scroll fragments and in that respect alone the collection represents a unique set for comparison purposes. It would be a very worthwhile task to attempt to identify the "mother" parchments from which they have each been selected. This would require research into the material in the custody of the Israeli Antiquities Authority, the present keeper and guardian of the majority of the DSS.

3 The Catalogue of the JRUL archive

Besides the DSS samples, the 9 cardboard boxes of materials from Ronald Reed's personal collection, now in the John Rylands University Library contained many leather and parchment pieces, experiment descriptions, photographs, lecture notes, letters and various publication offprints. All the material was thematically arranged and carefully assembled. Moreover, a most detailed handwritten description of the items greatly eased the task of cataloguing. In addition to the listing, the items were photographed and incorporated into an Excel table together with the catalogue (Table 1). Furthermore, the analysis data and pictures from the thesis of John Poole were added to same Excel table (Figure 4). Several original envelopes and boxes not recommended for archival storage conditions were replaced with suitable archival material. These originals with their original inscriptions were retained and stored separately.

item	itemnr	container	box	photo1	photo2	photo3	LM Poole	EM Poole
4Q	1	1	1A	4Q1	4Q1.1	4Q1.1a		
4Q	2	1	1A	4Q2	4Q2(a)	4Q2(a)a		XXIV
4Q	3							
4Q	4							
4Q	5	1.1	1B	4Q5	4Q5a			
4Q	6	1.1	1B	4Q6				
4Q	7	1.4	1E	4Q7	4Q7a			
4Q	8							
4Q	9	1.1	1B				XXV	
4Q	10	1.1	1B					
4Q	11	1.1	1B	4Q11	4Q11a			XXXV, XXXVI
4Q	12	1	1A					
4Q	13	1.4	1E	4Q13	4Q13a			XLIII-XLVIII
4Q	14	1.1	1B	4Q14	4Q14a			
4Q	15	1.4	1E	4Q15	4Q15a			
4Q	16	1.1	1B	4Q16				
4Q	17	1.1	1B					
4Q	18	1.4	1E	4Q18	4Q18a			
4Q	19	1.4	1E					
4Q	20a	1	1	4Q20a			photo 4Q20a	
4Q	20b	1.1	1B	4Q20b				
4Q	21	7						
4Q	22	1	1A	4Q22	4Q22a			
4Q	23	1	1	4Q23				
4Q	24							
4Q	25	1.4	1E	4Q25	4Q25a			
4Q	26	7		4Q26	4Q26a			
4Q	27							
4Q	28	1	1A	4Q28	4Q28a			
4Q	29							XXXVII, XXXVIII
4Q	30	1.2	1D	4Q30	4Q30v			
4Q	31	1	1A	4Q31	4Q31a			

Table I: Extract from the collection documentation. Links are made to photographic records and other information in the archive. Note that the numbers (4Q1 etc) are those of Reed and Poole and do not correspond with numbers used by current editors of 4Q manuscripts.

The major part of the original collection of DSS samples is still present and in good condition. Other important parchment samples comprise dated medieval samples, which are very valuable materials for ongoing parchment study.

4 Future work

A current international DSS project comprises an ambitious enterprise to obtain the fullest information about the degradation processes induced by various treatment materials and the environment at different structural levels. The understanding of these processes would allow for the production of DSS tailored dummies that could in turn be used to test new treatment materials. Furthermore, elucidation of the natural ageing processes is mandatory to ensure adequate long-term preservation conditions.

The majority of physical techniques applied nowadays are non-destructive, i.e. do not demand sampling, but even so most of the DSS manuscripts should not be moved. In addition, the instruments used are either not mobile or can be transported only with difficulty so there is a problem in bringing together the samples and the instrument. This problem is solved by the availability of the Reed collection for research. Now samples can reach different labs across the globe to be fully characterized with the help of e.g. synchrotron radiation based techniques.[14,15]

Another noteworthy aspect of this project concerns the testing of newly developed methods as well as of simpler mobile instruments. One of the project's goals is to realize a system to monitor the state of the DSS collections around the world.[16]

The last, but not less relevant, aspect of the project is the completion of the historic study started by R. Reed and J. Poole. Application of micro-XRF and 3D-XRF could provide new information about the preparation techniques used on the scrolls in antiquity and their provenance.[17,18]

5 Acknowledgement

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