

Although de Vaux Was a Divine, He Was Not Infallible

An example of de Vaux's fallibility is still conspicuously visible at Qumran.

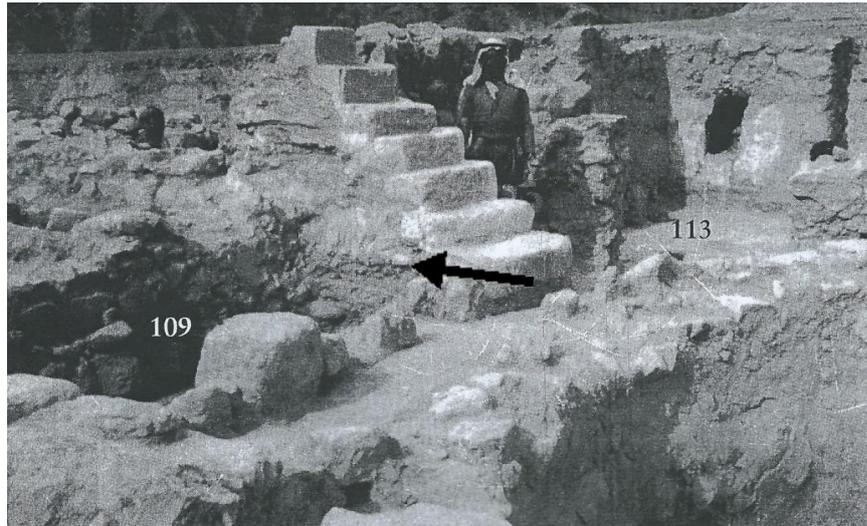
By David Stacey

Field Archaeologist (1975-1987), Jericho Excavations

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A summary of the changing interpretations of the archaeologists involved in the excavations at Qumran in the 1950's, and the alacrity with which the Qumran-Essene hypothesis became an 'incontrovertible fact', can be found in the opening chapter of a book published twenty years ago (Golb 1995) - see e.g. 'they had committed themselves deeply to this interpretation almost at the very outset of their investigation and would cling to it tenaciously' (*ibid*: 18). In the section of a recent book (Stacey and Doudna 2013, henceforth Stacey 2013), written by the author, I draw attention to the fact that no scientific tests designed to detect leather working were carried out in Qumran itself, because de Vaux had already decided that 'the community would have been too strict to permit' (Poole and Reed 1972: 151-2) tanning there (Stacey 2013: 54).

de Vaux's certainty that Qumran was a sectarian settlement meant that no scientific tests for leatherwork were carried out within the settlement, an opportunity lost forever, it is likely that same certainty clouded his interpretations of the archaeology. To this day a monumental mistake on his part is still visible at Qumran, the supposed 'staircase' he reconstructed in L109/113, which might well be called 'de Vaux's folly'. Staircases were usually built running up, and indeed built into, the face of a wall, which helped support them (see e.g. that in L13). That reconstructed by de Vaux is perpendicular to the wall, with its steps resting on a pile of earth (Humbert and Chambon 1994: 227, 231, 236)¹. It would have been impossible to build a staircase in this way. The steps would need to have been supported on a solid construction - a sort of buttress - attached to the wall. It is evident from the photos that no such 'buttress' existed. Moreover, in the section of the earth behind the supposed stairs, at the elevation of the top of the first 'step' and running to the wall, can be seen a row of small cobbles, probably part of the foundation of the plastered floor recorded in L109 (8/2/55) (this and similar notations henceforth refer to Humbert and Chambon 2003), which almost certainly continues under the reconstructed 'stairs'², with the second 'step' resting on this floor and the tread of the first being a part of it.



Arrow points at cobble surface below plaster floor

If the 'stairs' are a figment of de Vaux's imagination, what was here³? The area is difficult to interpret from the limited data published, and because de Vaux removed stones and built them into his folly, without giving a clear description of how and where they were found. De Vaux's notes give us two clues: he notes that 'the plastered floor between L109 and L110 descends abruptly at about two metres west of the channel' (by which he clearly means the 'main' channel) (L109 10/2/55). Over a month later 'We removed the wall between loci 109 and 113. Under the stones of L113 we uncovered the original plaster floor' - (he clearly refers to the upper floor!) - 'which connects by a narrow opening with the channel feeding cistern 110' (L113 22/3/55). This 'narrow opening' can be seen running from the feeding channel, under a stone, onto the plaster 'floor' in front of the stone marked '109' on photo 227. This plaster 'floor' would appear to be, in fact, the bottom of an overflow channel⁴ sunk below the level of the plaster floor to the south, dug through by de Vaux and visible in the section beneath the 'stairs'. This overflow channel was contained between the side of the cistern and the row of stones, including the bottom 'stair', visible in 227, 231 and 232. The channel 'descended abruptly' to the west and probably originally connected either to the drain beneath the floor of L111 or that beneath L103 (or, at different times, to both?). The overflow would have been built into the backfill that was poured around the cistern when its sides were raised. How it managed to navigate the change in levels between that of the feeding channel and that of the sub-floor drain(s) is uncertain. Did it simply slope down 'abruptly', in a covered channel buried within the fill? Or did it flow into a small settling tank, which would have slowed the flow of the water, and which, in turn, was connected with one of the drains?

We shall never know, because the stones, which were prematurely reconstructed into a 'staircase', were probably the remains of whatever method was employed.

De Vaux's reconstructed staircase has been accepted by all subsequent scholars, as far as I know, including, until very recently by myself who, I confess, had not studied it carefully enough. Magness uses it to justify the existence of a dining room above L111, L120 etc (Magness 2002: 126), but that reconstruction is as unlikely as de Vaux's 'staircase'.

At the time that he was excavating, de Vaux had few parallels he could draw on for either the pottery or for the manner in which aqueducts associated with contemporary buildings were constructed. When looking at Qumran 60 years after his excavations it is important to bear in mind that it is likely that some of de Vaux's interpretations were mistaken. Since his time many nearby, contemporary sites have been excavated, the most important for comparative purposes being those at Hasmonean/Herodian Jericho, not only just 14km to the north, but also founded on the Lisan marl.

It would appear that some modern commentators also have limited hands-on knowledge of Jericho, the most crucial site for comparison with Qumran. Magness, for example, writes:-

Stacey claims that the stepped pools at Qumran are not *mikva'ot* (ritual baths) but are cisterns designed with broad steps because they were dug into unstable marl: 'The backfill on which the upper steps were built was even less self-supporting so it was technically better to build broad steps across the whole width of the pools than it was to try to construct a narrow set of stairs against one side of the pool'" (Stacey 2013: 38)... "This assertion is contradicted by Stacey's own observation that the pools at Jericho - many of which have only a narrow set of steps along one side - were also dug into the marl" (Magness 2014: 642-3).

It is 'the backfill on which the upper steps were built' (Stacey 2013: 38) – often over a metre in depth and true for all four of the largest pools at Qumran, L48/49, L56/58, L71 and L91, which is crucial here. All the *mikva'ot* at Jericho are not only of smaller dimension but were dug directly into the marl with no unstable backfill to support the upper reaches.

I claim no expertise on the Halachic principles for *mikva'ot* but will quote from an article on the *mikva'ot* of Masada: 'The miqveh must be built or dug into the ground or as part of a structure that is connected to the ground' (Grossberg 2007: 95). This is based on the Sifra on Leviticus: 'Just as the fundamental characteristic of a spring is that it is in the ground, so the fundamental characteristic of an immersion pool is that it is in the ground.' When *mikva'ot* were first introduced, in the Hasmonean period, it is likely that this principle was paramount.

Only later, and the Sifra dates no earlier than the mid 3rd century C.E., may the idea that a *mikva* as ‘part of a structure that is connected to the ground’ have become acceptable. Most ancient *mikva’ot* were hewn into the bedrock: ‘Most of the *miqwa’ot* in Jerusalem are cut in bedrock, and in several cases their vaults roofing them survived. Some *miqwa’ot*, where bedrock is deep, are constructed into the ground’ (Ronnie Reich⁵, personal email 18/3/2015); ‘I do not know of *miqwa’ot* which stuck out from the ground’ (Reich, personal email 25/3/2015). In contrast, the four large pools at Qumran were built partially *above* the ground with their maximum water level being higher than previously existing ground levels immediately adjacent to them (see Stacey 2013: 22, isometric drawing 39). Although in the case of L71 the ground level adjacent to the pool was contemporaneously raised to the same elevation as the sides of the pool, that was not always the case. For example, the ground level to the east of L48/49 remained lower than the side of the pool through its existence. In Jericho, the only examples of the sides of pools being built up with spoil dug from the bottom of the pool itself were around the northern end of the Hasmonean ‘swimming pool’ and the southern end of the ‘swimming pool’ in Herod’s second palace, both of which, while theoretically acceptable for use for purification purposes, are unlikely to have been used as such - more likely for pleasure, for water storage, possibly even for use as fish ponds. I suggest that the four pools at Qumran, built partially above ground which is anomalous when compared with contemporary *miqva’ot* elsewhere, indicate that they were constructed as cisterns and not as *mikva’ot*. There was plenty of space for digging *mikva’ot* totally into the ground to the north of the site, close to where water arrived (as was, eventually, L138). I want now to suggest some possible answers to a question posed by Magness, relating to the bone deposits, and other related issues: ‘Is Qumran the only ancient site where animal fat was utilized, and flies and vermin were a problem’ (Magness 2014: 644) ? The last half of the question can be dealt with quickly. Some of the bone deposits seem to have been used to help fill holes in the ground, e.g. they were found ‘in the natural gravel, where there were the potsherds of a jar with bones’ (L23 29/3/55), ‘in a hole in the gravel of the mound’ (L92 26/3/54), but were usually laid on top of the ground where they were part of deliberate fills and were immediately buried, e.g. ‘soil, including a number of bone deposits, deposited in L130 as a back-fill’ (Stacey 2013: 14). This seems to be true of most of the bone deposits, not only those of de Vaux but also those found by Randall Price, and by Magen and Peleg, who also found an undisclosed number unceremoniously discarded in the ‘southern refuse dump’ (Magen and Peleg 2007: 5).

Answering the first part of the question requires a far broader consideration of animal slaughter at Qumran. Three main factors come into play: the undoubted presence at Qumran of transhumant sheep for a month or two in the winter; the demands of the nearby Royal Estate in Jericho and the influence its wealth would have had on the marketplace; and the existence of the Temple in Jerusalem. In Judea the meat market would have been skewed by the very existence of the Temple and its demand for sacrificial offerings assuming that they complied, more or less, with the commands in the Pentateuch, particularly with Leviticus 1-16 and Numbers 28-9. The sacrifices would have accounted for the largest part of the annual cull of surplus male animals, particularly sheep, for a large area around the Holy City. It has been estimated that about 30,000 sheep, goats and cattle would have been required annually to satisfy the demand for sacrificial slaughter, including those that had to be made to Rome (Lapin 2014). The majority of these, particularly the sheep, had to be less than a year old. There were three main types of offering, all of which demanded 'perfect' animals, some or all of which had to be burnt, and the rest consumed on the same day. Mandatory burnt offerings were flayed before the rest of the animal was burnt (Leviticus 1:6) and the hides were a perquisite of the priests performing the sacrifice (Leviticus 7:8). According to Philo the number of these hides 'is incalculable, and this is no small gift, but represents a very large sum of money' (*Laws* 1:151).

What the priests did with these hides is uncertain. They came from young animals and would thus have been quite small, but would have made soft, pliable leather. It is reasonable to suggest that the hides would have been used especially for the manufacture of parchment and for *tefillim* and *mezuzot*. The Temple Scroll (11Q19) suggests that, within Jerusalem, only the skin of sacrificial animals could be used to hold liquids (Lapin 2014: 16) from which it might be postulated that all the products of sacrificial hides had to be used within Jerusalem, just as the meat had to be consumed within the city.

It is not known where these hides were processed. An instruction from the Mishnah (BB 2:9), from a later period, says that a tannery, because of the smell generated, should be situated only on the east side of town, at a distance of 50 cubits (c. 25m) from the outskirts. In Jerusalem much of this prescribed area was already being utilised as a burial ground, indicating that any tannery would have had to be even further from the city, probably on the eastern slopes of Mt Scopus.

A text from Qumran (MMT) says that dogs were prohibited from Jerusalem lest they gnaw on the bones of sacrificial animals thereby desecrating the sacred meat, which hints that the bones, like the meat, were held in reverence and would have been disposed of on the day of

sacrifice. A large rubbish dump, containing many bones from young animals, identified as coming from sacrifices, has been excavated recently east of the city (Bar-Oz et al: 2007). Analysis has shown that many of the sheep came from desert regions beyond the immediate hinterland of Jerusalem (Hartman *et al*: 2013).

As meat was unlikely to have been a large part of the average person's diet⁶, and as so many animals were required for sacrificial purposes at the Temple, any large scale slaughtering outside Jerusalem was unlikely. The prevalence of the bone deposits found at Qumran indicates that that site was an exception.

When the bones from Jerusalem are compared with those found at Qumran the age at death suggests that those from Jerusalem were raised and utilised for meat whilst the primary purpose of those from Qumran was wool/hair and milk for caprines, and milk and labour for cattle (Bouchnick 2013). Animals at Qumran were clearly slaughtered beyond the remit of the Temple and probably satisfied the more mundane purposes of the wealthy Royal Estate in nearby Jericho, which would have been visited by the King predominantly in the winter months precisely when transhumant sheep and cattle would have been in the sparsely populated region south of Jericho. Trade would have been stimulated in all sorts of meat and dairy products, ranging from meat destined for diplomatic and secular Royal feasts to the production of humble glue. That this trade could have been conducted beyond the oversight of the Priestly hierarchy may well have been welcomed by Herod, and even perhaps by some of the Hasmonean High Priests.

Most of the products that I suggest were processed at Qumran (Stacey 2013: 52-61) would have been of general value beyond the Royal Estate, but several would have had a more specific value to particular aspects of the Estate, such as its large scale building programme and the maintenance of fighting troops. The more mature animals slaughtered in Qumran would have produced larger and tougher hides, and such leather would have been necessary for the manufacture of *inter alia* sandals, aprons, and animal harnesses, for both soldiers and those toiling on Royal building projects.

The Estate may also have stimulated a trade in preserved meat, to both feed those who laboured on the construction of remote palace forts, and those of the royal entourage who lived in them once they were completed. The flesh of all the numerous sacrificed animals in Jerusalem had to be either burnt or consumed on the day of slaughter so none could be preserved. A ready reserve of sausages or preserved meat that could be rapidly distributed as rations would speed the deployment of any military force.

Meat was commonly preserved in the Roman world (Frost 2001). Cato, writing in the 3rd century BCE, gives instruction for the salting and smoking of a leg of pork, and Columella (4-70 CE) describes two methods of salting meat, one of which is that ‘the flesh is cut up into pieces of a pound each. Parched salt . . . is laid down in large containers. The small pieces of meat are thickly arranged, and salt placed on alternately. But when the throat of the jars has been reached, the remaining part is filled with salt and with weights placed on top, is pressed down into the container’ (Curtis 2001: 397).

An early modern traveller in Palestine observed that ‘among the Arabs ... there is a way of preserving mutton by boiling and putting it in large earthen jars, covered up with its own tallow or dripping, which is poured in a boiling state upon the meat as it lies in the jar’ (Kitto 1841: 398).

The earliest reference to sausages in Palestine apparently dates no earlier than the 4th century CE (Weingarten 2010), by which time the demand for sacrificial meat at the Temple was long past and meat for preservation would have been more plentiful. However, it cannot be assumed that they did not exist earlier, and the demand for them from the Royal Estate may have encouraged their production at Qumran.

Qumran certainly had an illimitable supply of salt from the Dead Sea, and it is possible that the pottery kilns there could have been utilized for smoking meat. Columella mentions a ‘large container’ in which meat was salted, a container which would presumably have needed a wide mouth to enable meat and salt to be packed within it. Such a vessel, satisfactory in all respects and found almost uniquely at Qumran, would have been the so-called ‘scroll’ jar. These jars, which were probably originally designed for some industrial process, were pressed into secondary uses, including sub-floor storage, the collection of urine and even, perhaps, the storage of scrolls!

According to Cato ‘After twelve days the hams are taken out, brushed off, and dried for two days. They are then cleaned, coated with oil, and cold smoked for another two days before being hung to store in the meat house’ (Rust. 162.1–3). He was describing the preservation of pork on the bone, but it is likely that some variation of that process would have been valid for mutton on or off the bone. Meat could be salted in the jars for some days and then removed for drying and smoking. Presumably the jars could then be reused for salting more meat. The resulting preserved meat could have been distributed as it was or, perhaps, further processed into sausages. The handful of ‘scroll jars’ found at Masada may represent a small shipment of meat still in the process of being salted.

In Jerusalem, the bones that remained after sacrifices seem to have been rapidly discarded on the city dump, but in Qumran these by-products of the preparation of both fresh and preserved meat, would not have been wasted as they could be processed into glue or gelatine. According to Ernest Spon, writing in 1903, ‘Common glue is extracted from hoofs, horns, and cuttings of the hides of various animals. For this process the materials are first steeped in water for 2 or 3 days, well washed, and afterwards boiled to the consistency of a thick jelly, which is passed while hot through osier baskets to remove the grosser particles of dirt or bones from it, and allowed to stand some time to purify further. When the remaining impurities have settled to the bottom, it is melted and boiled a second time. It is next poured into flat frames or moulds, from which it is taken out hard and solid, and cut into square pieces or cakes, and afterwards dried in the wind in a coarse kind of net’ (Spon 1903: 27). Such a process was unlikely to have taken place in Jerusalem. Not only would the stench from the boiling up of old bones be avoided but so much wood was required to fuel the burnt offerings in the Temple that little would be left over for more mundane purposes.

At Qumran, the only minor changes in the process would have been the substitution of a reed basket for one of unavailable osiers, and the use of any available cooking pot or jar, either whole or a part thereof, rather than a special mould, in which the glue hardened. To extract the glue the vessel often needed to be broken, which would account for the frequent discovery of sherds in association with the bone deposits found at the site.

A glue, supposedly made from horse’s hooves, was still commonly in use until after WWII when it was replaced by synthetic substances. In my childhood my grandfather, a bricklayer by trade, used it for rough carpentry and for shoe repairs; its advantage was that the gluing process could be reversed simply by the application of mild heat such as steam from a kettle. In the Second Temple period it would have had similar uses, as well as in the manufacture and maintenance of horse/ox harnesses. A more niche application, of particular importance to the Royal Estate, would have been by fletchers, for securing the flights and tips to arrows, and also in the making of composite bows (Stiebel 2015: 435).

Glue was used in antiquity as a binder for some dye-based paints which may have been used by the wealthy, such as those at the Estate, for decorating furniture. ‘It is likely that a bone glue based ink binder was used’ (Murphy *et al* 2010) for writing at least some of the scrolls found at Qumran.

Weingarten mentions ‘a group of Babylonian sources which talk about *tziqei qederah*, clearly a very desirable luxury food (eaten by kings’ daughters, among others) which included plenty of wine. The word *tziqei*, which only occurs in this context, may come from

a root meaning something poured into a mould. One source speaks of making this dish from horns, hooves and skin. Previous commentators have found this problematic for a luxury food, but it is just possible that *tziqei qederah* was the equivalent of calves' foot jelly, a traditional and much-loved Jewish dish in later times, sometimes made with wine in non-Jewish contexts in the Middle Ages.' (Weingarten, forthcoming, but generously shared with me:- <https://www.dropbox.com/s/nhhjhw459i3wh7r/weingarten%20qederah.pdf>)

Could this luxury food have been produced at Qumran destined for the 'kings' daughters' living at the Royal Estate in Jericho? Is it yet another example of the influence of the power and wealth of Jericho on Qumran?

It has been suggested that local plants were burnt at Qumran and the ashes used to produce lye (Amar 1998). I, in turn, indicate the value of lye for scouring wool (Stacey 2013: 61). A more specialized use to which the ashes could have been put would have been to mix them with tallow (animal fat, particularly that from around the kidneys, which would have been readily available in Qumran), in the manufacture of hard soap. Although the ancient Greeks and Romans tended to cleanse themselves by scraping oil and sweat from their bodies with a *strigil*, Pliny the Elder (23-79 C.E.) recommended the use of soap made from tallow and ash for the dispersal of scrofulous (tubercular) sores (*Natural History* XXVIII. 191). Moreover, before the Roman style bathhouse with under-floor heating was introduced to Palestine, the aristocracy bathed in bath tubs, examples of which have been found at Jericho ('Twin-Palaces'), Masada (Western Palace) and in Jerusalem (House 'T-4' Jewish Quarter; Mt Zion). The evidence from Jericho indicates that these tubs were filled with hot water and it would seem that soap, particularly scented soap, would have been more useful than a *strigil*. All of these processes would have been malodorous. For an interesting description of the effects of the meat industry in 19th century Australia which 'diffuses a sickening stench and shocks the sight with a reeking mess of putrescence', see p. 14 in:-

https://www.academia.edu/4801909/Meat_and_By-Products_The_meat_industry_and_animal_by-product_works_of_Melbournes_West

Clearly the meat industry of Australia was on a far vaster scale than anything in Qumran but the detrimental effects would have had some similarity, and efforts would have been made to locate such a malodorous industry well away from the Palaces of Jericho. Qumran was a convenient site as an Iron Age system for gathering rain water already existed and could be revived with minimum effort.

And finally to respond to Magness' penultimate paragraph which asks, in part:-

In interpreting Qumran as part of the royal Jericho estate – a seasonally occupied, industrial suburb of Jericho – Stacey never explains: why Qumran? Of all the spots in this rugged and desolate region, why would Qumran have been selected as a suitable location for an industrial suburb of Jericho which is twenty kilometres⁷ to the north? Industries connected with the production of leather and wool (such as tanning, dyeing and fulling) require large amounts of water. The lack of water and other natural resources at Qumran would have made such an investment costly and unfeasible. Why would the ‘royal Jericho estate’ have established these industries on this distant and arid plateau?’ (Magness 2014: 646).

Did she, I wonder, read my book? I made frequent mention to the preference, if not downright necessity, for soft water for many of the industrial processes (*inter alia* Stacey 2013: 56, 57, 59, 61-2). I pointed out the shortage of excess water in the area of the Royal Estate in Jericho, which required the construction of aqueducts to bring water from far afield most of which was used for irrigating valuable crops, or for the pleasure of the inhabitants of the Estate. Thus it was obviously an advantage if water-hungry processes could be carried out utilising water gathered somewhere other than Jericho, but easily accessible from it (and despite Magness’ attempts to isolate Qumran in a ‘distant, rugged and desolate region’ there are no towering hills, impenetrable gorges or major impediments in the journey between Jericho and Qumran. And Qumran is green in the winter months, only becoming ‘desolate’ in the summer, when the site would have been abandoned to the sun, or does she dispute that the site was primarily seasonal?). The water from all the springs between Jericho and Ein Bokek is extremely calcareous, and thus unsuitable for scouring wool, dyeing cloth, retting flax or preparing perfume etc. At Qumran the main supply of water for most of its time of occupation came from the collection of soft rain water. Most of the suggested industries are smelly, smoky, or grimy besides being ritually polluting. Better to undertake them at a distance from Royal Palaces. She stresses a lack of water at Qumran, but it did not prevent the establishment, unfeasible according to her, of kilns for the manufacture of pottery which also require much water.

Bibliography

- Amar, Z., (1998). ‘The Ash and the Red Material from Qumran’. *DSD 5.1*: 1-15
- Bar-Oz, G., Buchnik, R., Weiss, E., Weissbrod, L., Lernau, O., Mayer, D., and Reich, R., (2007). “‘Holy Garbage:’ A Quantative Study of the City-dump of Early Roman Jerusalem’. *Levant 39*: 1-12.

- Bouchnick, R., (2013). 'From Daily Life to Ritual in the late Second Temple Period: comparing Qumran and Jerusalem city dump assemblages'. Pp 135 -150 in M. Bilig (ed) *Judea and Samaria Research Studies 22* (Hebrew).
- Curtis, R., (2001). *Ancient Food Technology*. Brill.
- De Vaux, R., (1973). *Archaeology and the Dead Sea Scrolls*. (London).
- Frost, F., (2001). 'Sausage and Meat Preservation in Antiquity'. *Greek, Roman and Byzantine Studies 40* (1990): 241-252.
- Golb, N., (1995). *Who Wrote the Dead Sea Scrolls*. New York)
- Grossberg, A., (2007). 'The Mikva'ot (Ritual Baths) at Masada'. *Masada VIII: Final Reports*. IES (Jerusalem).
- Hartman, G., Bar-Oz, G., Bouchnick, R., and Reich, R., (2013). The Pilgrimage Economy of Early Roman Jerusalem (1st century BCE – 70 CE). *Journal of Archaeological Science 40*: 4369-4376.
- Humbert, J-B. and Chambon, A., (1994). *Fouilles de Khirbet Qumran et 'Ain Feshka*. Vol. I. (Fribourg).
- Humbert, J-B. and Chambon, A., (2003). *The Excavations of Khirbet Qumran and Ain Feshka*. Vol. Ib Translated by S.J. Pfann. (Fribourg).
- Kitto, J., (1841). *Palestine: the Bible History of the Holy Land* Vol II (London).
- Kraemer, D., (2010). 'Food, Eating and Meals' in Hezer (ed.) *The Oxford Handbook of Jewish Daily Life*. (Oxford).
- Lapin, H., (2014). Jerusalem the Consumer City: Temple, cult and consumption in the Second Temple Period. Cited with permission, to be published but currently available at https://www.academia.edu/8383916/Jerusalem_the_Consumer_City_Temple_Cult_and_Consumption_in_the_Second_Temple_Period
- Magen, Y. And Peleg, Y., (2007). *The Qumran Excavations 1993-2004; Preliminary Report*. (IAA, Jerusalem).
- Magness, J., (2002). *The Archaeology of Qumran and the Dead Sea Scrolls*. (Michagan).
- Poole, J.B. and Read, R., (1972). 'The Preparation of Leather and Parchment by the Dead Sea Scrolls Community.' Pp. 143-68 in M. Kranzberg and W. Davenport (eds.), *Technology and Culture: An Anthology*. (New York).
- Magness, J., (2007). A Response to D. Stacey, "Some Archaeological Observations on the Aqueducts of Qumran." *Dead Sea Discoveries 14/2*: 244-253.
- Magness, J. (2014). Review of Stacey and Doudna (2013) Pp. 638-646 in *Revue de Qumran 104*; 26:4.

Murphy, B., Cotle, M., Mueller, M., Bella, M., and Gunneweg, J., (2010). 'Degradation of Parchment and Ink of the Dead Sea Scrolls investigated using Synchrotron-based X-Ray and Infrared Microscopy' Pp 77-97 in J. Gunneweg, A. Adriaens and J. Dik *Holistic Qumran: Trans-Disciplinary Research of Qumran and the Dead Sea Scrolls*. Brill

Safrai, Z., (1994). *The Economy of Roman Palestine*. (Routledge, London).

Spon, E., (1903). *American Library Edition of Workshop Receipts Vol I*. (University of Wisconsin).

Stacey, D., (2007). 'Some Archaeological Observations on the Aqueducts of Qumran.' *DSD* 14/2: 222-243.

Stacey, D. and Doudna, G., (2013) *Qumran Revisited: A Reassessment of the Archaeology of the Site and its Texts*. (BAR International Series 2520, Oxford).

Stiebel, G., (2015) 'Military Equipment from the area of the Mausoleum and the Theatre at Herodium.' Pp 432-453 in R. Porat, R. Chachy and Y. Kalman *Herodium: Final Reports of the 1972-2010 Excavations*, Vol I. IES Jerusalem.

Weingarten, S., (2010) Ancient Jewish Sausages in Cured, Fermented and Smoked Food
http://www.researchgate.net/publication/234001066_Ancient_Jewish_Sausages

¹ All photo numbers not otherwise assigned are from this publication.

² Removing these imaginary stairs would give a unique opportunity to excavate an area of the site, however small, untouched by de Vaux.

³ Were photographs taken before the stones were moved; if so do they still exist?

⁴ It certainly did not lead 'up to a step in the northeast corner of L109' (thus Magness 2014: 640)

⁵ Reich wrote his PhD thesis on "Miqwa'ot (Jewish Ritual Baths) in Eretz-Israel, in the Second Temple, Mishnah and Talmud Periods" (in Hebrew) in 1990.

⁶ Thus Safrai: 'meat was usually eaten only on festivals or on special occasions' (Safrai 1994: 169). Although Kraemer thinks it is time to "re-examine the 'meat as luxury food is the ancient world' hypothesis" (Kraemer 2010: 406-7) it seems unlikely that meat was a regular feature of the poor man's diet.

⁷ Magness exaggerates the distance between Qumran and Jericho, which I measure at c. 14km from Wadi Qelt, the heart of the Royal Estate. The estate, however, certainly continued south of the wadi. Not only is Birqet Musa on the south bank and must have irrigated land there but the Herodian aqueduct that drew water from Ein Farah, some 20km west of Jericho, and from Ein el Fawwar further down the Wadi Qelt debouched over the rift to deliver water south of Birqet Musa. I should draw attention to the fact that the remains of two Herodian villas – identified by painted plaster and hypocaust tiles – were noted by the author and Netzer in a trench being dug by a JCB for laying a water pipe, sometime in the late 1970's, east of Birqet Musa and between the wadi and the Roman road going up to Jerusalem. Netzer almost certainly took photographs and would have placed the villas roughly on a map, but, since his untimely death, this is the only record of these villas ever likely to be published. It is possible that more villas were built on the south side of the road, and certain that irrigated plantations continuing further south an unknown distance towards Qumran.