THE ASH AND THE RED MATERIAL FROM QUMRAN

ZOHAR AMAR
Bar-Ilan University

A. *Introduction*

In the excavations carried out at a cave in Qumran by Vendyl Jones in April 1992, a "red material" and a large quantity of ash were found. This finding was dated by a coin found at the site to the period of the Jewish revolt against the Romans in 68-69 BCE. Vendyl Jones, assisted by experts in his employ, identified "the red material" with components of the incense burnt in the Temple. The purpose of this article is to suggest a different explanation for the Qumran finding. In our opinion, the substance in question is a cleaning material known in the ancient Hebrew as "borit" [Lye] which was produced in this region by the inhabitants of Qumran and was one of their industries.

B. *A description of the finding*

A description of the finding is primarily based on the descriptions given by Vendyl Jones,[1] which makes it hard for us to analyze the finding independently. Unfortunately, the excavations on the site were not managed according to standard criteria. These failures have been reflected both technically and methodologically. We have neither documentation nor systematic and methodological record of the conduct of the excavation.[2] Thus, for example, we have no cross-section sketch of the excavation site, and to date, the remains which have been left do not allow us to accurately reconstruct the structure where the red material was found. Similarly, our request for a sample of the ash and the red material went unanswered. Consequently, we are compelled to

* My thanks to Dr. H. Eshel for his comments on this article.

[1] V.M. Jones, *Qumran Excavations, Cave of the Column Complex & Environs*, (Arlington: Vendyl Jones Research Institutes, 1995).

[2] D.C. Browning, "The Strange Search for the Ashes of the Red Heifer," *Biblical Archaeologist* 52 (1996) 74-89.

rely on data supplied by Jones himself and to take issue with it.

According to Jones' report, the material was found in Qumran in a domed cave built of dolomite stones, which he called a "silo." The slabs of dolomite used in building the silo were 50-80 cm. in length and 12-18 cm. in width, and were dry-laid one on top of the other. This structure was built on top of the bedrock which was totally covered by a 30-50 cm. layer of the red substance. Grooves were found in the natural bedrock which created deep channels which were also filled with the material. Near the channels, grinding stones were found as well as five basalt grinding mills. The red substance was covered by a 30 cm. layer of loose gravel and a large boulder had been placed in the center of the silo on top of this layer. The roof of the silo was covered by three large dolomite boulders (ranging in size from 80 × 130 cm. to 90 × 150 cm. each) and approximately 50 cm. thick. They had been placed one on top of the other and surrounded by a series of smaller dolomite slabs. This entire structure was covered by a dome-like structure which was made of layers of soil and gravel. In addition to the red material, a large quantity of salt chips was found in a niche in the wall. Likewise, 23 cubes of ash material were found enclosed in a supporting wall built of stone.

C. *The interpretation of the finding given by Jones and his associates*

Jones identified the finding discovered in the silo at Qumran as the "Piṭum ha-Qeṭoret" (פיטום הקטורת)—i.e., the mixture of spices used in the incense in the Temple worship. The salt chips found in the niche in the wall were identified by him as "Sodom salt," while the ashes were identified as "Karsina Lye." According to Jones, the site where the red material was found corresponds exactly to the description of the "Cave of the Column" referred to in the Copper Scroll. In order to reinforce his claims regarding the identification of the red material with the incense used in the Temple, he cites the opinions of two experts: Rabbi-Dr. Marvin Antelman and Dr. Terry Hutter.

Dr. Antelman carried out various chemical tests including: bulk density, pH determination of suspension, acid reaction, and composition of the incense. His conclusion was that the material in question was a burnt organic substance containing 52.7% ash with a high concentration of alkali. The material had a pH range of suspension of 6.0-6.7. Antelman worked on the basic assumption that he was dealing with the Qeṭoret spices and therefore, his entire discussion of the test results was carried on to corroborate his basic thesis. A spectrometer

test conducted by Antelman and Dr. Y. Mazor revealed a chemical composition of 8 spices.[3] On the basis of this test, Jones wrote that "at least eight of the eleven ingredients comprising Piṭum HaBesamim were present in the spice mixture,"[4] although Antelman himself contended that positive identification of the spices themselves is not possible at this stage.[5]

The second test was conducted by Dr. Terry Hutter, in the course of which the material was sent for palynological assessment. On the basis of the test results, Hutter concluded that 9 out of 11 organic ingredients in the material may be identified by comparison with spices the likes of which may be found today. Later, the other two (inorganic) ingredients which were also found in the cave were added to the mixture. Hutter noted that in the course of the assessment, the material released a strong, pleasant aroma.[6]

D. *The difficulties in Jones' thesis*

Sharp criticism of Jones' research methods was recently published by Daniel Browning. In his article, he also relates to the red material finding from Qumran. Beyond his criticism of the handling of the archaeological excavation work, he enumerates his criticisms of Jones' textual analysis and interpretation of the Copper Scroll. Browning brings two additional professional opinions which do not support Jones' definitive conclusion that the material under discussion is the Qeṭoret. Maltsberger is of the opinion that the material is soil with a naturally occurring red hue. Kenneth McMurtrey suggests that the material is soil of calcite or dolomite origin, which is consistent with the geology of the area.[7] Beyond this, Browning expresses doubts as to the reliability of the data presented by Jones, some of which has not been verified by anyone else who participated in the excavation. Thus, for example, none of the other members of the party saw the Sodom salt in situ.[8] As to the discovery of the coin dating to the period of the first Jewish Revolt against the Romans, not one member of the party carrying out excavations in the cave has confirmed its existence. Browning's central conclusion regarding Jones' research is that it is

[3] The results of this study are brought in T. Hutter's article; see Jones, 52.
[4] Jones, 44.
[5] Jones, 52.
[6] Jones, 53.
[7] Browning, 84-85.
[8] Browning, 86.

tendentious and designed to support his religious views (with which he garnishes his writing as an integral part of his research), rather than scientific research.

Furthermore, the data presented by Jones are selective and designed to bolster his perceptions, while data which do not corroborate his views are omitted. Thus for example, he cites two assessments of the material conducted at the Department[s] of Chemistry at Bar-Ilan University which seem to support his claim but does not quote the tests results.[9] A simple evaluation of Jones' report explains why he chose not to quote them. It emerges that the material had indeed been sent for assessment to the Department of Chemistry at Bar-Ilan University (and there is only one department, not two) and the test showed that the material in question contained only a small amount of organic matter (which could not be identified) mixed with soil.[10] This gives rise to the conclusion that Jones chose to "improve upon" his thesis and present only the study results which were consistent with his theory. At the same time, this example raises doubts as to the reliability of the reports by Antelman and Hutter, which Jones presents in evidence of his contention that the material is Qeṭoret. In the case of Antelman, it seems that the figures are accurate, though the gap between the data and the conclusions is great. Certainly, from the data presented by Antelman one would find it hard to prove empirically that the material in question is the ingredients of the Qeṭoret. Antelman's hypothesis that this is the "Piṭum ha-Qeṭoret" may be accepted at best as a possible interpretation, but presenting it as certain borders on being misleading.

The report presented by Hutter, too, raises the strong suspicion that this is research in the service of an idea. A palynological assessment, based on plant pollen, cannot be reconciled with the list of Qeṭoret ingredients referred to in the sources.[11] In effect, there are doubts regarding the identification of most of the Qeṭoret ingredients. However, even for those where identification is almost positive, the flowers were not used but rather the resin (for example: the resin of the Zori, Myrrh, Frankincense, and Galbanum) or the outer bark (Cinnamon). In these spices, the chances of finding pollen is very small. However, even if we accept that very minute pollen samples remained in them,

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[9] Jones, 42.

[10] Y. Feliks, *Trees: Aromatic, Ornamental, and Forest in the Biblical and Rabbinic Literature* (Jerusalem: Rubin Mass Press, 1997) 21-22.

[11] Exod. 30:34; b. Ker. 6a.

as Hutter takes pains to point out, his statement that he has made a positive and absolute identification of the spices (in comparison with the plants familiar to us today) is problematic. The report which Hutter offers us is in no way a professional palynological assessment in accordance with the standard research practice in this field. Hutter contents himself with stating the names of the spices, as defined from an evaluation of the material at Qumran, without our being able to follow up and check the manner by which he has obtained the results he presents to us. It is hard to accept the fact that the palynological finding, particularly one of such a complex nature, would lead to such definitive results. Most of Hutter's report is actually a short historical survey of the spices used in the Temple incense, which he claims relates to the palynological finding which he tested.

A close study of this "report" reveals Hutter's actual proclivity: to determine at all cost that the Qumran finding is the Temple incense. This he accomplishes in a way which is methodologically flawed and arouses strong suspicions regarding the reliability of the data which he presents. This can be demonstrated using several examples.

A. The Zori – According to Hutter, it is to be identified as Balsam (Commiphora opobalsamum), and he brings a picture with a sample of the pollen as proof. How can he know that the plant in question is actually this one, since to prove it, we must bring a sample for comparison from the Balsam bush which at present grows only in the Hijaz region. There is moreover, no evidence that he has done so in this instance or in the other identifications which he proposes (such as Myrrh, Frankincense, and Galbanum).
B. According to Hutter, the three parts of the Cinnamomum zeylanicum plant were found in Qumran and they are identified as "Cinnamon," "Kilupa," and "Kosht" [Costus]. How does he know that these are the three ingredients? Perhaps the finding only relates to "Cinnamon" and "Kilupa." Particularly odd is his statement that one of the parts of the Cinnamon is the "Kosht," for there is no support for this in the entire body of historical and exegetical literature on the ingredients of the qeṭoret.
C. Tziporen (Onycha) – Hutter identifies it on the basis of the finding at Qumran with Styrax officinalis. In this case, Hutter's propensity to improve upon reality is exposed, since this tree has neither resin nor fragrance. While there are researchers who refer to the resin of this plant in the literature, to date it has been proven beyond all doubt that this was a mistake and an erroneous interpretation of

the classical sources which referred to a different plant. The example of finding medicinal Frankincense within the Qeṭoret ingredients completely undermines the credibility of Hutter's "report." The electron microscope pictures of pollen samples embellishing his report are of absolutely no significance and some of the incense ingredients can easily be obtained in the markets today.

Y. Feliks, who evaluated the reports published by Jones writes: "The reliability of the article in all areas is dubious, but apparently the conclusion that the finding dates back to the Jewish revolt is correct." Further on, he writes: "My conclusion is that the whole subject of 'Piṭum ha-Qeṭoret' is a fantasy." He goes on to add that if the news of finding such a large quantity of ashes at the site is true, then one may hypothesize that it represents the remaining of a plant for producing soap based on alkaline plants to which oil was added (and sometimes local fragrant spices).[12]

Jones proposed that the cave served as a storehouse for the Temple incense and apparently belonged to the Avtinas family. This is a strange hypothesis, for why would Qumran have been selected of all places for this purpose? Insofar as we know, the Avtinas family lived in a special office in the Temple, which was known as "the upper chamber of the House of Avtinas."[13] Moreover, we have proof positive that at that period the Temple incense was stored in the city of Jerusalem itself. Yosef Ben-Matityahu (Josephus) recounts that when Titus laid siege to Jerusalem, the guard of the Temple Treasury revealed to him the location where the Temple incense was stored and where there was much Cinnamon and Cassia [War 6:390].[14]

E. *An alternate proposal for identifying the red material found at Qumran*

The writer of this article suggests that the structure of the silo served for the storage of "borit" (lye) and might have been part of an industrial complex devoted to the extraction of "borit" and thus bears no connection to the "Piṭum ha-Qeṭoret." In this section, we shall try to corroborate this thesis and connect it directly to the Qumran region, the vegetation which grows there, and the economic activity of the inhabitants of the region in the past.

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[12] Feliks, 21.

[13] m. Sheq. 5:1; m. Tam. 1:1; m. Mid. 1:1; b. Yoma 19a; y. Yoma 39a.

[14] Josephus, *The Jewish War* (trans. H.J. Thackeray; London: William Heineman Ltd. and Harvard University Press, 1967) 489.

The discovery of such a large quantity of ash material attests to the fact that the material in question is a product which required burning or heating in the production process. The fuel used in such quantity must have been of vegetable origin. In the Qumran region, which is arid, the dominant vegetation is desert scrub bushes. The relatively sparse vegetation and the scarcity of trees for fuel which are found in abundance in the Mediterranean region forced the inhabitants to make do with the local vegetation and to gather it in relatively large quantities. Among the plants common in this region we will note the Anabasis articulata, Anabasis setifera, and Zygophyllum dumosum. In addition one may find in the Qumran region, and in the Dead Sea region in general, the following kinds in particular: Salsoda, Salicornia, Suaeda, Hammada, and Atriplex. These and other plants growing in the region, most of them from the family of Chenopodiaceae, contain in their tissues a high content of alkaline salts. This refers to potassium chloride (KCl) and related potassiums, such as potassium carbonate (K_2CO_3) and potassium hydroxide (KOH). These minerals served in ancient times as an essential component in the soap and glass industries. The alkaline materials are well-known in Arabic literature as "Qily," "Ushnan" or "Ghassul" (the cleaning, washing agent).[15] Some of the commentators of the Middle Ages use these terms to identify the cleaning materials mentioned in the Bible and Mishna.[16] The alkaline materials produced from these plants were not only a component in the production of soap, but people used to use them without the addition of any other materials to clean their hands, wash themselves, and launder their clothes. The laundry or cleaning powder which came into contact with oily materials together formed a kind of liquid soap which was active and effective.

We therefore think that the natural vegetation in the Qumran region was used in the "borit" industry that existed there, both as raw material and as fuel, as part of the production process. This assumption is based on the fact, among others, that a relatively high

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[15] M. Meyerhof, "Un Glossaire de Matiere Medicale Compose par Maimonide," *Memoires Presentes a L'Institut d'Egypte* 41 (1940) no. 24.

The term "Ushnan" is apparently identical to the Aramaic term "Shuana" (b. Shab. 90a). The saliferous plants which contain alkaline substances are mentioned in the Talmud also as "yarka d'kaliya" (b. 'Eruv. 28b).

[16] For example, Ibn Ganah, *Sepher Haschorashim* (ed. A. Neubauer; Oxford: Clarendon Press, 1875) 107 the root BRT ... "which in Arabic means 'ushnan' and it is a plant used in laundering"; Maimonides, on m. Shab. 9:5 and in m. Nid. 9: 6, commented: borit—alghassoul, cimmonia—an alkaline salt, and potassium—al-saboun [soap].

concentration of alkaline material was found in the substance discovered in Qumran.[17]

In order to substantiate this assumption, we shall describe the way "borit" is produced as the process appears in the written sources. We have evidence of such from the early Middle Ages, and it seems that it relates to a technique which had been in practice for hundreds of years previously. The potassium minerals were extracted from soda plants by various techniques. In one technique, these plants were gathered in great quantities, dried, and ground. The resultant material was used to wash hands soiled by oily substances.

Another technique for producing Qily from the Ushnan plants was by burning them in large kilns. This is apparently the method which was practiced in Qumran. A description of this technique appears in the writing of the Jerusalem physician al-Tamimi, who lived in the second half of the tenth century. He writes that they would gather large quantities of the Ushnan plant which grew in the area of Amman. While it was still wet, they would burn the Ushnan plant at very high temperatures in the kilns:

> And they would put "Ghassul" into the same kiln and would light a fire underneath using firewood, so that it would burn and become rushing water that would surge into those threshing floors and when it reached them, the [ghassul] would remain there until it congealed and when it had congealed and cooled, it would turn into a kind of hard stone, black in hue, and sometimes it is **dark brown**, and it is a strong salt, astringent and caustic.[18]

Extracting the Qily salts by a similar technique was also standard in Yemen as recently as the first half of the twentieth century. Rabbi J. Kafih notes several types of soap that were used in Yemen. One of the detergent materials is a type of caustic salt of which there are two varieties: "one variety is white and it is caustic and it is the finest. The second variety is black and is of inferior quality. Its action is similar to that of 'soda' ... and this is how it is produced: they build large kilns and fill them with these sticks, while they are still wet; in the floor of the kiln they make a groove or a kind of small channel, and outside the kiln they make a small round hole. The kiln is heated up and the sticks are burnt; the liquid in them spills down through the channel into the hole; it is left to congeal and harden into a stone and

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[17] Cf. Antelman's report in Jones, 48-49. Remains of Salsoda were found in the Qumran excavations. See D. Segal & I. Caruni, "Rehovot Radiocarbon date list V," *Atiqot* 29 (1996) 90.

[18] al-Tamimi, "al-Murshd ila jawahir al aghdiya waquwa l'mufradat min al-adwiya," MS no. 2870, Bibliotheque Nationale, Paris, 60.

then the hardened material is removed and broken up into crystals, which is sold in the shops by weight."[19]

From the descriptions given by al-Tamimi and Rabbi Kafih one may try to reconstruct the structure of the Ushnan kiln. It seems to have been a device very similar in function to the lime kiln, more familiar to the material culture in the land of Israel. It is not impossible that some of the relics of the hundreds of kilns scattered throughout the land of Israel, particularly in the Jordan valley area, are actually "borit" kilns.

According to our proposal, the structure built of rock which was found in Qumran and called "the silo" by Jones was part of an apparatus to produce "borit." The "red material" found on the bedrock of the device was apparently ash from the soda plants which had been burnt at high heat while the charred material was a residue of the fuel materials. As we have seen, al-Tamimi notes that the hue of the material which was obtained was black and sometimes dark brown, and this recalls the hue of the material found at Qumran.

Jones described channels overflowing with the material which were on the floor of the apparatus. These channels were apparently used for draining off the molten liquid, as Rabbi Kafih describes. In light of this, it is appropriate to quote the words of Francesco Suriano, who wrote at the end of the fifteenth century, incidental to a description of the plants of the land of Israel and Egypt: They also have grass which they fill up in large pits [fosse] and from its burnt ashes, they prepare soap and crystal glass.[20] The term "fosse" in Italian also means channel or trench.

Jones also mentions finding grinding stones near these channels. It would appear that the function of these stones was to pound the alkaline mineral chunks that were created from burning the salt marsh plants into a fine powder. Such handheld grinding stones were apparently sufficient for the local "borit" industry at Qumran, but in places of larger industrial scope, larger grinding mills were used. Charles Warren, who described the soap industry in Jerusalem, pointed out that every factory had grindstones for grinding "borit":

> The first process is to prepare the lye. The barilla is reduced to powder in the mill by a stone 3 feet in diameter and 18 inches thick revolving on a circular

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[19] J. Kafih, *Halikhot Teiman* [Daily Life in Yemen] (Jerusalem: Kiryat-Sefer, 1987) 185. (in Hebrew)

[20] *Il Trattato di Terra Santa e Dell'Oriente de Frate Francesco Suriano* (ed. P. Girolamo Golubovice; Milan: Tipografia Editrice Artigianelli, 1900) 225.

> platform raised 2 feet from the floor and 5 feet in diameter; the mill is worked by a donkey attached to the stone by means of a long pole.[21]

In concluding this section, we would like to relate to the possibility that in the "red material" which has been identified by the author as "borit" there are also aromatic substances. It seems that this assumption cannot be totally dismissed. In one of the Arabic cook books written during the late Middle Ages, there are several recipes of how to prepare "Ushnan" which is scented with various aromatic substances, among them even some of those used in the Temple incense.[22]

F. *Evidence of "borit" production in the land of Israel*

If the apparatus found at Qumran is indeed part of a facility for "borit" production, then it should not be considered unique to this region. This industry was common throughout the Dead Sea basin and Jordan Valley area and even on the coastal plain. In fact, it was common in the areas connected directly to the dispersion of salt marsh plants in the land of Israel and even outside of it.

Halophytes in the Dead Sea environs had already been used in very ancient times as a source of producing potassium ash. Large-scale potassium-burning kilns were found at the site of Teleilat al-Ghassul which is on the eastern bank of the Jordan River, approximately 5 kilometers northeast of the Dead Sea. Findings at the site date to the Chalcolithic period and the body of pottery found there has been named "the Ghassul culture." The name of the site was derived from the heaps of ash of the ghassul plant which was burnt on that spot, apparently already in the ancient period and up to the modern age. Potassium-burning kilns of this type were also extant at other sites in the Dead Sea region. Several nineteenth century researchers explained the phenomenon of smoke constantly billowing above the area known for the overturning of Sodom and Amorra, as it appeared to the eyes of the early wayfarers, with reference to the smoke from the potassium-burning kilns operated by the local Bedouin.[23] An unusual piece of information is cited by R.Y. Edelstein incidental to a description of

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[21] C. Warren, *Underground Jerusalem* (London: Richrad Bentley and Sun Press, 1876) 505.

[22] M. Marin & D. Waines, *Kanz al-Fawa'id fi Tanwi al-Mawa'id* (Beirut: In Kommisson Bei Steiner Verlag Stuttgart; 1993) 227-30, 284.

[23] Y. Breslavi, *Hayadata et Haaretz, Yam Hamelech Saviv Saviv* [Do You Know the Land, All Around the Dead Sea] (Tel-Aviv: Hakibbutz Hameuhad, 1956) III.179-80; 297-98. (in Hebrew)

plants in the Dead Sea region: A Dead Sea plant . . . Salicornia—previously it had been used to prepare medicinal drugs and now it is burnt for the ash it produces which is rich in salt. Salsola qily—this plant, too, is also sowed only to be burnt, in order to produce its salt-rich ash."[24] According to this source, it seems that this was not just a random gathering of salt marsh plants but rather the deliberate sowing of a crop for the express purpose of feeding this industry.

In 1775 Volney noted the soap factories which operated in the land of Israel, in Hebron and Gaza. These two centers of production were the destination for qily brought by the Bedouin who burnt the plants in desert areas. The price of qily and soap were a monopoly of the regime and it was the regime which fixed their price.[25] C. Warren gave more precise information:

> The alkali for the soap is purchased in August and September in the form of barilla, and is kept in an ordinary vaulted store room. It is brought from many places; namely, Damascus, East of Jordan, Gaza, the Ghôr, also Egypt, and the Red Sea. The worst comes from the Ghôr, the best from Gaza. This alkali appears to be extracted by the natives of the desert parts from the saliferous plants growing around. The ice plant there is stunted and dwarfed; and the fact of obtaining stone from it is not a whit more wonderful to the natives than any of the other curious phenomena existing around the Dead Sea. The Arabs call the plant from which the soda or barilla is extracted, Zaizab, or Shînan, or Uthûh. It arrives in the state of a carbonate . . .[26]

Additional information about the appearance of the Ushnan is provided by Rauwolf who paid a visit to our area in 1573. According to him, after the Ushnan bushes were burned, two kinds of products were created: the hard stony qily which was considered to be of choice quality, and the qily powder which did not harden, of lesser quality.[27]

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[24] R.Y. Edelstein, "Tzimhei Eretz Yisrael," [The plants of the land of Israel] *Heasif* 4 (1888) 103. (in Hebrew)

The agronomist Ohagen notes the widespread distribution of these plants and adds: "that is what the Bedouins burn to produce the qily used in making soap." See A. Sapir (trans.) *Eretz Yisrael v'Suria* [The Land of Israel and Syria] (Atin Press: Jaffa, 1912) 39, 69 (in Hebrew). On the agricultural cultivation of saliferous plants for ash in Spain, see N. Shapira, "Le'toldot hasoda ve'darkei hafakata," [A contribution on the history of soda and its production] *Korot* 2 (1959) 231. (in Hebrew)

[25] M.C.V. Volney, *Voyage en Syrie et en Egypte pendant les annees 1783, 1784, & 1785* (Paris: Volland and Desenne, 1787) II. 299, 313-314.

[26] Waren, 503-04.

[27] L. Rauwolf, Aigentliche Beschreibung der Raiss inn die Morglenlaender (Graz, 1971) 37-8. (Facsimile photocopy of the 1583 edition)

G. *The "borit" industry as a branch of economic activity*

In the ancient period "borit" production was an important branch of the economy and a considerable share of the "borit" produced in the land of Israel was exported. We have evidence of this from the Middle Ages, but it is clear that this was also the reality back in the more ancient periods. The earliest source which cites this is al-Tamimi in the tenth century. He describes the qily produced in the region of "Amman and its rivers and brought to Palestine and Egypt and other countries."[28] Another source from that same period cited "Ushnan" as one of export products of the city Aleppo.[29]

The extensive trade in Ushnan from our region to the countries of Europe has been written of in the important research work of Ashtor and Cevidalli.[30] This is an interdisciplinary study which examines the issue through its historical aspects and chemical processes. From this study we will bring only the data which relate to the Ushnan trade in our region, as well as additional sources which were not included in it. Trade in Ushnan from the Levant in the Middle Ages was largely controlled by the Italian merchants, primarily by the Venetians. Documents from the years 1296 and 1300 refer to the transport of qily ash in ships from Syria and Egypt to Crete.[31] In an Italian commercial guide written by Pegolotti circa 1340 which reflects the commercial reality in our region from the end of the thirteenth century, the trade in ashes of the Syrian qily plant is described in detail. According to Pegolotti, the Syrian qily was sold as large rocks, not as powder, and it was of better quality than the Egyptian material whose monetary value was less by a third.[32]

There is an especially large body of evidence concerning trade in this material from the fifteenth century. Most of the purchases were made in the following large cities of Syria: Aleppo, Latikia, Tripoli, Beirut, and Ramla. The Ushnan which was purchased in Ramla was

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[28] Tamimi, 60b.

[29] al-Muqaddasi, *Ahsan al-taqasim fi Marifat al-Aqalim* (ed. M.G. De Goeje; Leiden: Brill, 1906) 181.

[30] E. Ashtor & G. Cevidalli, "Levantine Alkali Ashes and European Industries," *The Journal of European Economic History* 12 (1983) 493-500.

[31] Ashtor & Cevidalli, 489. For a summary, see E. Ashtor, "The Economic Decline of The Middle East During the Later Middle Ages: an Outline," *Asian and African Studies* 15 (1981) 269-70.

[32] F.B. Pegolloti, *La Practica Della Mercatura* (ed. A. Evans; Cambridge, MA: Medieval Academy of America, 1936) 380.

transported to Jaffa and from there, transported by boats.[33] A document from 1571 refers to the customs excise in Tripoli on Ushnan designated for the soap industry. The Ushnan was brought there every year on camels by the Bedouin from the Humas and Hamma deserts.[34] At approximately the same time, Rauwolf (1573) also noted the chunks of qily which were transported by camel to the port of Tripoli. From there, the material was loaded onto ships which set sail for Venice. He also notes that this trade was carried out on a wide scale and its product was designated for the soap industry of Europe.[35]

In any case, at the end of the nineteenth century with the shift to using caustic soda in the production of soap, the use of Ushnan nearly ceased completely, due to difficulties in its preparation and its low profitability.[36]

H. *The "borit" industry in Qumran and the possible connection with the Essenes*

Many researchers think that Qumran was the habitat of a religious group, one of the Essene sects. Many details about the lives of the members of this sect are known from the Scrolls, while others are still shrouded in mystery. One of the most interesting questions relates to the work of the sect members and the economic system they conducted. On the premise that the silo found in Qumran was the place used for storing the "borit" after it was produced in the kiln, we are confronted with evidence of one of the economic activities of the inhabitants of the region who were wise enough to utilize the local vegetation to earn profits. One may not rule out the possibility that the apparatus discovered at Qumran is only one of many "borit" kilns which were operant in the region. While Yosef Ben-Matityahu [Josephus] noted of the Essenes that "riches they despise and their community of goods is truly admirable," they did at the same time maintain a strong economic cooperative system. Yosef Ben-Matityahu describes

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[33] Ashtor & Cevidalli, 507 n. 121.

[34] R. Mantran & J. Sauvaget, *Reglements Fiscaux Ottomans Les Provinces Syriennes* (Beyrouth: Institut Francais de Damas, 1951) 69.

[35] Rauwolf, 37-38.

[36] S. Avitzur, *Adam V'amalo: Atlas Letoldot Klei Avoda U'mitkanei Yitzur B'ertez Yisrael* [Man and his labors, an Atlas of Tools and Production Apparatus in the Land of Israel] (Jerusalem: Carta Press, 1976) 184; idem, *Nemal Yafo Be'gaavato U'vshekiato* [The Port of Jaffa at its Height and in its Decline] (Tel-Aviv: Milo Press, 1972) 54. (in Hebrew)

the Essenses as people who conduct an ascetic and modest lifestyle. They possessed vast knowledge of the healing arts and were familiar with the healing properties of plants. [War 2:122-36].[37]

The Essenes undoubtedly recognized the characteristics of the Ushnan as a medicinal material which was widely accepted in the ancient period.[38] But it is more likely that the main use the Essenes made of "borit" was neither for medicinal or profit-making purposes but rather for the community's internal needs. The Essenes, who were scrupulous about purity and cleanliness, made extensive use of "borit." Josephus' comment is well worth quoting:

> Oil they consider defiling, and anyone who accidentally comes in contact with it scours his person. [War 2:123][39]

In the ancient period, Ushnan was known to be an effective cleaning agent, particularly for removing oil. Thus, for example, the Ushnan al-Shami [of the land of Israel and Syria] is also mentioned in the thirteenth century in an essay dealing with the preparation of food, among the materials recommended for cleaning the oils and dirt which form during the preparation of the dishes. In the chapter on this subject, it is written: "the crude ushnan al-Shami attacks dirt, cleans impurities, purifies of the oily sludge, removes oil and fat from the hands, and is useful in [removing] stains."[40] In the modern age, too, the main consumers of ushnan were small shop owners, butter sellers, oil sellers, and anyone who dealt in oily substances, since it had the quality of being able to remove oily stains from clothing and hands—better than soap.[41]

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[37] Josephus, 369.

There are those who maintain that the name "Essenes" was derived from the word "esia"—physician, because they healed by means of medicinal herbs. Also see: N. Klein, "Mesodot harefua shel ha'issi'im," [Some of the medical secrets of the Essenes] *Teva V'aretz* 13 (1971) 22-23. (in Hebrew)

[38] In Mesopotamia during the third dynasty of Ur (circa 2200-2100 BCE) there is mention of compounds made of qily, which was produced from the Salicorna plant. For their medical usage, see M. Levey, *Chemistry and Chemical Technology in Ancient Mesopotamia* (Amsterdam: Elsevier, 1959) 125-29. After Tamimi describes the production of "borit," he enumerates its medicinal uses (60b). This is also mentioned by Edelstein, 103. For more on the uses of soap in ancient medicine, see F. Adams, *The Seven Books of Paulus Aegineta* (London: The Sydenham Society Press, 1847) III.326, M. Levey & N. al-Khaledy, *The Medical Formulary of al-Samarqandi* (Pennsylvania: University of Pennsylvania Press, 1967) 237.

[39] Josephus, 371.

[40] Ibn Sayyar al-Warraq, *Kitab al-Tabikh* (StudOr 60; Helsinki: The Finnish Oriental Society, 1987) 234.

[41] J. al-Qasimi, *Qamus al-Sina'at al-Shamiyya* (Paris: Mouton and Co. La Haye, 1962) II.216.

The "borit" was an essential product for maintaining cleanliness among the Essenes. It is not unlikely that they used "borit" mixed with aromatic spices, as mentioned in the Damascus Document: "אל יקח איש עליו בגדים צואים . . . כי אם כיבסו במים או שופים בלבונה" ("Let no man put on soiled clothes . . . unless they were washed with water or rubbed with frankincense").[42] It is quite evident that this refers to cleansing by means of a material which has been made fragrant with frankincense, and not with the crude resin itself. The expression "שופים" [shofim] means rubbing in order to clean and it recalls the manner in which one of the spices of the temple incense is described in the baraita: "בורית כרשינא תשעה קבין . . . ששפין את הציפורן כדי שתהיה נאה" [Karsina lye—nine kab, which is used to rub the onycha to make it pleasing].[43]

[42] Damascus Document 11, 4; see J.H. Charlesworth (ed.), *The Dead Sea Scrolls, Hebrew, Aramaic, and Greek Texts with English Translations* (Louisville: Westminster John Knox Press, 1993) II.46-47.

[43] b. Ker. 6a; y. Yoma 41b.