

The Economic Transformation of Zoara in Eastern *Palaestina Tertia* from the »Late Antique« to Early Islamic Periods (6th-11th Century)

Throughout history, the development of agriculture, involving the cultivation of plants and nurturing of animals for exploitation, was a key factor in the economic transformation of societies. At certain times, the technological advance, intensification and mechanisation of agronomy led to its industrialisation¹.

During the »Late Antique« and early Islamic periods farmers in the Near East and North Africa utilised Classical-period agricultural systems but brought in new methods from Asia. They maintained dams and reservoirs built during Graeco-Roman and Byzantine times, but also constructed new systems following Sassanian-Persian irrigation techniques (such as *qanats* and *acequias*), in order to advance agricultural efficiency. They also improved ancient types based on hydraulic and hydrostatic principles (such as water-raising machines called *norias*) (figs 1-2). These, combined with the development of a *trimestre* (three-field) system of crop rotation and the mould-board plough greatly augmented agricultural productivity. Meanwhile, new plants and animals coming from Asia were also introduced resulting in an unprecedented agricultural boom, hailed as an »Islamic Agricultural Revolution«².

This paper will review the major agricultural advancements during the 6th to 11th centuries in the Near East, focusing on the south-eastern *Palaestina Tertia* in Bilad ash-Sham, and particularly at Zoara/Zughar (modern Ghor as-Safi in Jordan) where recent excavations have revealed significant new discoveries and evidence for economic development.

The Economic Context of the »Late Antique« Period: Political Transition with Economic Continuity

The early Byzantine or »Late Antique« period was a time of great economic prosperity in the »Classical« Graeco-Roman World. Agriculture reached its acme during the 5th and 6th

centuries in terms of the amount of tillable land that was exploited³. Other important factors which should be taken into consideration as part of this process of intensification include the fact that soldier-settlers were given plots of land to cultivate as well as tax reductions, besides their regular payments⁴. The 5th century was a period of intense state and private investment, explaining the prosperity during the early Byzantine period. Apart from the great investment in the construction of churches and monasteries there was also a significant input of capital from Christian pilgrims⁵.

Rural settlements in the early Byzantine period (5th to early 7th centuries), could broadly be divided into villages fortified by enclosures or built near military installations, agricultural villages and agricultural monasteries where the monks, like the peasants of the nearby villages, lived by exploiting the land⁶. The Nessana papyri documents provide a wealth of information on the variety of crops which were grown, including wheat, barley, grapes, olives, figs and dates. Although these may mostly have been for local consumption, a series of *entagia* for requisitions of wheat and oil by the Arab governor in the late 7th century indicates that a surplus of crops beyond the needs of the local population may have been sometimes produced, though this may have been subject to taxation by the Byzantine State⁷.

The general picture perhaps confirms the idea that by the later 7th century the new Islamic Umayyad rulers left the peasantry to continue to farm the fertile countryside. Archaeological surveys and excavations carried out in Hawran and al-Balqa demonstrate that farmland continued to be settled into the Umayyad period (7th to 8th centuries), prolonging the occupation of the same areas in early Byzantine, Roman and earlier times⁸. Indeed, this pattern of Umayyad settlement on Byzantine sites is known throughout Bilad ash-Sham⁹.

Archaeological work has highlighted the waves of expansion of agriculture even into the arid desert-like areas of

1 Politis, Agriculture.

2 Watson, Agricultural Innovation.

3 Patrich, Palestine 483.

4 Jones, Later Roman Empire 649-654, 660f.

5 Politis, Sanctuary of Lot 17.

6 Piccirillo, Rural Settlements 258.

7 Kraemer Nessana 175-179. – Glucker, Gaza.

8 King, Distribution.

9 King, Re-assessment.



Fig. 1 *Noria* water-lifting wheels, originally constructed in early Islamic times. Hama on-the-Orontes River. – (Photo K. D. Politis).



Fig. 2 Water-lifting wheel depicted on ca. 5th century mosaic pavement. Hama Archaeological Museum. – (Photo K. D. Politis).

the Negev during the Byzantine period followed by a second wave during the Umayyad period¹⁰. This has been attributed to the following factors: state policy deliberately encouraging agricultural settlements on the frontier, as well as the gradual shift of semi-nomads from nomadic to spontaneous

settlements, culminating in state-sponsored settlement. An examination of the archaeological evidence for early Islamic occupation in the southern Negev and the Arabah suggests that new settlements were established and flourished throughout the region during the 8th to 10th/11th centuries. Their economic base included large-scale agriculture using sophisticated irrigation systems and the introduction of new crops, as well as copper and gold mining and production, stone quarrying and the development of a road network used by traders and pilgrims¹¹. In further support of this hypothesis of economic continuity from the early Byzantine to Islamic periods, excavations at modern Aqaba have uncovered significant portions of the Nabataean, Roman and Byzantine city of Aila, which flourished from the 1st century B.C. to the Islamic conquest¹². Here it is clear that part of the Byzantine settlement continued to be occupied even after construction of the new Islamic-period walled town in the mid-7th century.

The New Early Islamic Agricultural Regime

During the early Islamic period, an important change was the opening of a virtually new agricultural season. The traditional growing season of the »Classical World« in the Near East and the Mediterranean had been winter, the crops being sown around the time of the autumn rains and harvested in the spring; in the long hot, dry summer the land almost always lay fallow, usually even in irrigated regions where at least some of the crops available to the ancients could, with special care, have given satisfactory yields. The so-called »summer crops« of the Graeco-Roman period such as trimestre wheat, millet, sesame, various legumes and some garden crops played a minor role in parts of the northern Mediterranean where summer was relatively cool. But in the southern and eastern parts they were virtually never grown.

Since many of the new crops originated in the tropical regions of India, south-east Asia and central Africa, they could be grown only in hot climates. In particular, rice, cotton, sugarcane, aubergine, melons and sorghum were all new »summer crops« in the Islamic World. Other important new cash crops included indigo, henna, safflower and the green gram. The introduction of such »summer crops« on a wide-scale, radically changed the rhythm of the agricultural year as land and labour which had previously been inactive were made productive.

Furthermore, the opening of a significant summer agricultural season was one of several factors allowing rotation systems which made land-use much more intensive. Although Classical sources, chiefly the *Geoponika*¹³, reveal sophisticated agricultural systems, in reality traditional practice was to crop the ground only once every two years or in exceptional

¹⁰ Haiman 1995.

¹¹ Avner/Magness, Negev.

¹² Parker, Aqaba.

¹³ *Geoponika*.

circumstances once a year. Even in Byzantine Egypt where the flooding of the Nile would seem to make prolonged resting of the land unnecessary, fields were often sown only once in every two years; they sometimes bore a legume crop in intervening years but never grain crops in successive years. In the Islamic World however, these periods of rest for the land were often done away with. Fallowing was not recommended or even discussed in most agricultural manuals. Instead, most land seems to have been cropped at least once a year and given no period of rest. Still more intensive cropping of the land became common in places that were fertile and well-watered because in these areas a summer crop could be planted immediately after the spring harvest. Ibn al-'Awwam even seems to suggest that summer cropping was preferable to summer fallowing¹⁴. In certain areas three or more harvests per year could be had from the same plot of land. Although the new crops were of fundamental importance in opening up the summer season, the »summer crops« which were known, but little-used in antiquity also played a role, in particular *trimestre* wheat, barley and cash crops were used much more by Muslims than by the ancients.

The possible combinations were countless as new crops could be combined in rotation with old ones. An irrigated season could follow a dry one. Like most of the new crops, the system of multiple cropping seems to have reached the Islamic World from India. But naturally, such heavy cropping depleted the soils of their fertility. One solution was fertilizing using animal dung, blood, urine and even pulverized bones. Vegetal by-products from olive oil, lees, seeds, straw, husks, leaves, shavings and ashes were also used. Minerals added included different type of soil, sand, gravel, chalk, marl, lime and even crushed pottery. Frequent and much ploughing was employed and the choice of the sequence of crops was important in order not to deplete the nutrients in the soil.

The so-called »Islamic Agricultural Revolution«¹⁵ was not exclusive to well-irrigated fertile soils with multiple-crop Indian methods. Although this was the model, all regions were tilled by peasant farmers and state-sponsored farming. Furthermore, increased land-use was compounded by broadening the variety of available crops and by an emergent awareness of individual requirements and possibilities. Islamic agriculturalists seemed to better understand choosing crops to suit particular conditions than their predecessors¹⁶. They also expanded agriculture even on lands not deemed appropriate in antiquity.

These new farmers had flexible cropping patterns based on new irrigation systems such as the Sasanian-Persian *qanat* (fig. 3) and *acequias* relying on perennial rivers, man-made

wells and accessing aquifers, unlike those of antiquity which usually had rigid and limited rotations determined by varied rain-fall; the underground Gadara¹⁷ and Samos¹⁸ aqueducts were exceptions.

As a consequence, they were able to successfully farm in arid conditions with poorer soils; sorghum and sugarcane being two good examples. The outcome was higher productivity which was more financially-rewarding with a long-term stability. This allowed further investments in major projects such as irrigation constructions, ploughing and fertilising. This kind of state-sponsored ventures was a feature of the following Ayyubid-Mamluk period.

The fact that processed sugarcane, *durum* («hard wheat») and sorghum could be stored over very long periods allowed speculators and governments to build-up surpluses in years of high production and low prices which could be released onto the market in years when production was low and prices high¹⁹. This relative price and income stability was not only good economic policy, but also politically savvy as it won the favour of the peasantry (excessive taxing was a major source of political discontent during »Late Antiquity«).

»Late Antique« Zoara in south-eastern Palaestina Tertia

Roman and early Byzantine sources indicate that Zoara (modern Ghor as-Safi) was a city based on an agricultural economy that roughly paralleled that of 'Ain Gedi and Jericho with date palm groves and balsam plants²⁰. Of these two crops, the production of the latter was more specialised and centered in the Dead Sea region and was the source of financial profit²¹.

In the 2nd century Zoara is also mentioned as a farming centre²². It is depicted on the 6th-century mosaic map in Madaba surrounded by date palms (fig. 4) and labelled *Zoora*, a name derived from Old Testament *Zoar* (Gen 19) which has been identified as Tuleilat Qasr Musa Hamid, a major Iron Age site based on agriculture²³.

Within the district of Zoara also lies Deir 'Ain 'Abata, an important early Byzantine site that continued to be occupied into the early Islamic period. Recent archaeological excavations there and consequent scientific research have verified agricultural production in the region²⁴.

The site consists of an early Christian (5th-7th century) monastic complex complete with a basilical church dedicated to St Lot, flanked by a large reservoir to the south and a refectory and pilgrim's hospice to the north. On the eastern slopes agricultural terraces formed a substantial garden ir-

14 Watson, *Agricultural Innovation* 127.

15 Watson, *Agricultural Innovation*.

16 Watson, *Agricultural Innovation* 126.

17 Döring, *Qanat Fir'un*.

18 Kienast, *Eupalinos*.

19 Lapidus, *Cities* 51-55.

20 Jerome, *Letters* 108,11 (200 tr. Freemantle).

21 Amar/Iluz, *Balsam*.

22 Bowersock, *Arabia* 76f.

23 Politis, *Ghawr as-Safi* 546.

24 Politis, *Sanctuary of Lot* 518-522.



Fig. 3 Sassanian-Persian water system, Shooshtar. – (Photo K. D. Politis).

rigated by water channels from the reservoir (fig. 5)²⁵. This garden would have helped the monastic community to be self-sustaining in fruits and vegetables, the mainstay of their vegetarian diet.

Studies conducted on the plant remains and animal bones from the archaeological excavations²⁶ provided the first scientific evidence regarding the dietary practices of monks and pilgrims, as well as the wider early Byzantine community during the 5th to 7th centuries.

The identified botanical finds include olives, dates, bitter vetch, grapes, lentils, barley, bread wheat, fava beans and most telling, peach and watermelon, which indicate Asian connections at an early date. Other identified edible plants include vegetables such as mallow (*Malva*) and common goosefoot (*Chenopodium*), dock (*Rumex*) for salads, bulbs and roots as storksbill (*Erodium*), wild fruits and nuts as hawthorn (*Crataegus*), fig (*Ficus*) and olive (*Olea*), and mustard (*Brassica*) spice. Fig (*Ficus*), common peganum (*Peganum*) and knotweed (*Polygonum*) were used for medicinal purposes. For fodder and forage there were brome grass (*Bromus*), common goosefoot (*Chenopodium*), storksbill

(*Erodium*), wild rye grass (*Lolium*), canary grass (*Phalaris*) and medick (*Medicago*).

Other monastic sites in Palaestina Tertia have also revealed evidence of figs, grapes, carob, dates, peaches and watermelon, which would have similarly been produced under irrigated cultivation in monastery gardens or in small plots adjacent to the monastery, in order to supplement the production of bread, their staple foodstuff²⁷.

Plenty of sheep/goat and fowl bones were recovered, which are a strong indicator of pilgrims, although it may alternatively reveal that the monks were not always vegetarian²⁸. Fish (grouper, *Serranidae*), emperor (*Lethrinidae*) and parrotfish (*Scaridae*) were evident whose consumption, along with plant products, is more aligned with monastic diets.

The »Late Antique« communities of Zoara on the Dead Sea littoral also exploited other valuable natural resources such as salt, bitumen and sulphur. The city was known to have profited considerably from their trade in the Roman, early Byzantine and early Islamic periods²⁹. In part, this can help explain the relative sophistication of Zoara, reflected by its literate society³⁰.

25 Politis, Sanctuary of Lot 121 f. fig. 193.

26 Politis, Sanctuary of Lot 449-522.

27 Hirschfeld, Desert Monasteries 1996.

28 Politis, Sanctuary of Lot 436.

29 Amar/Iluz, Balsam 5-7.

30 Politis, Zoara.



Fig. 4 Zoara surrounded by date palms and Monastery of St Lot above, depicted on late 6th century mosaic map at Madaba. – (Photo K. D. Politis).

Early Islamic Zughar in the Bilad ash-Sham

During the Abbasid and Fatimid periods (late 8th-12th centuries) Zughar was described as a busy market town and classified as the capital of the al-Sharāt District³¹ in the Bilad ash-Sham. It was renowned for its indigo and date production³². Ayyubid-Mamluk Zughar has been also described as a flourishing commercial town by Walmsley³³ with its economy based on sugar production³⁴. Indigo, which was known to have grown in Zughar³⁵, was an important agricultural precursor to sugarcane with close similarities in its processing requirements³⁶ comparable to processing techniques in later centuries³⁷.

Yaqut, the 11th century geographer, reported: »The little Jordan is a river that begins from Lake Tabariyah and passed



Fig. 5 Reconstruction of Monastery of St Lot with water catchment, irrigation system and agricultural terraces at Deir 'Ain 'Abata. – (Drawing J. M. Farrant).

towards the south through the valley (*ghor*) where it irrigates the villages of the valley, and most of their harvest is sugar, which is carried from there to the other countries of the East³⁸. The well-watered Jordan valley, and specifically the spring at Zughar which »the people used to irrigate the land« are mentioned in the Hadith report of Fatimah Bint Qays³⁹ highlighting its importance. The Islamic period name of *Zughar* derives from the Roman-Byzantine town of *Zoara*, alluding to a long period of uninterrupted occupation in Zughar which is also testified by recent archaeological excavations.

During the Crusader period two chroniclers of Baldwin of Jerusalem's winter campaign of 1100/1101, refer to the Ghor as-Safi. William of Tyre mentions that the town was on the route east leading from Hebron and the Dead Sea, and notes that it was then named Palmer⁴⁰. Fulcher of Chartres, who accompanied Baldwin on this campaign, was both more detailed and more impressed: »... we came upon a most pleasing village they call *Segor*, of the fruit of the palms, which are called dates, exceedingly abundant, for which for provisions all day we took our fill. We came upon other rare things in the same place«⁴¹. Indigo was presumably one such product.

31 Al-Muqaddasi, Kitab 11.

32 Ibn Hawqal, Kitab Surat al-Ard 184,17-185,3. – Al-Muqaddasi, Kitab 178,5. Al-Muqaddasi, Regions 149.

33 Walmsley, Jordan 518.

34 Walmsley, Jordan 542.

35 Walmsley, Early Islamic Syria 116. – Schick, Southern Jordan 75.

36 Whitcomb, Islamic Period 117.

37 Kelly, French Caribbean 7.

38 Yaqut al-Hamawi, Mu'jam al-Buldan 1,147.

39 Ibn Majah, Sunan Ibn Majah 438 no. 4074.

40 William of Tyre, History 412.

41 Fulcher, History 146.



Fig. 6 Ikat textile fragment with strips of brownish-red, yellow and green alternating with indigo blue from Deir 'Ain 'Abata. – (Photo T. Springett).

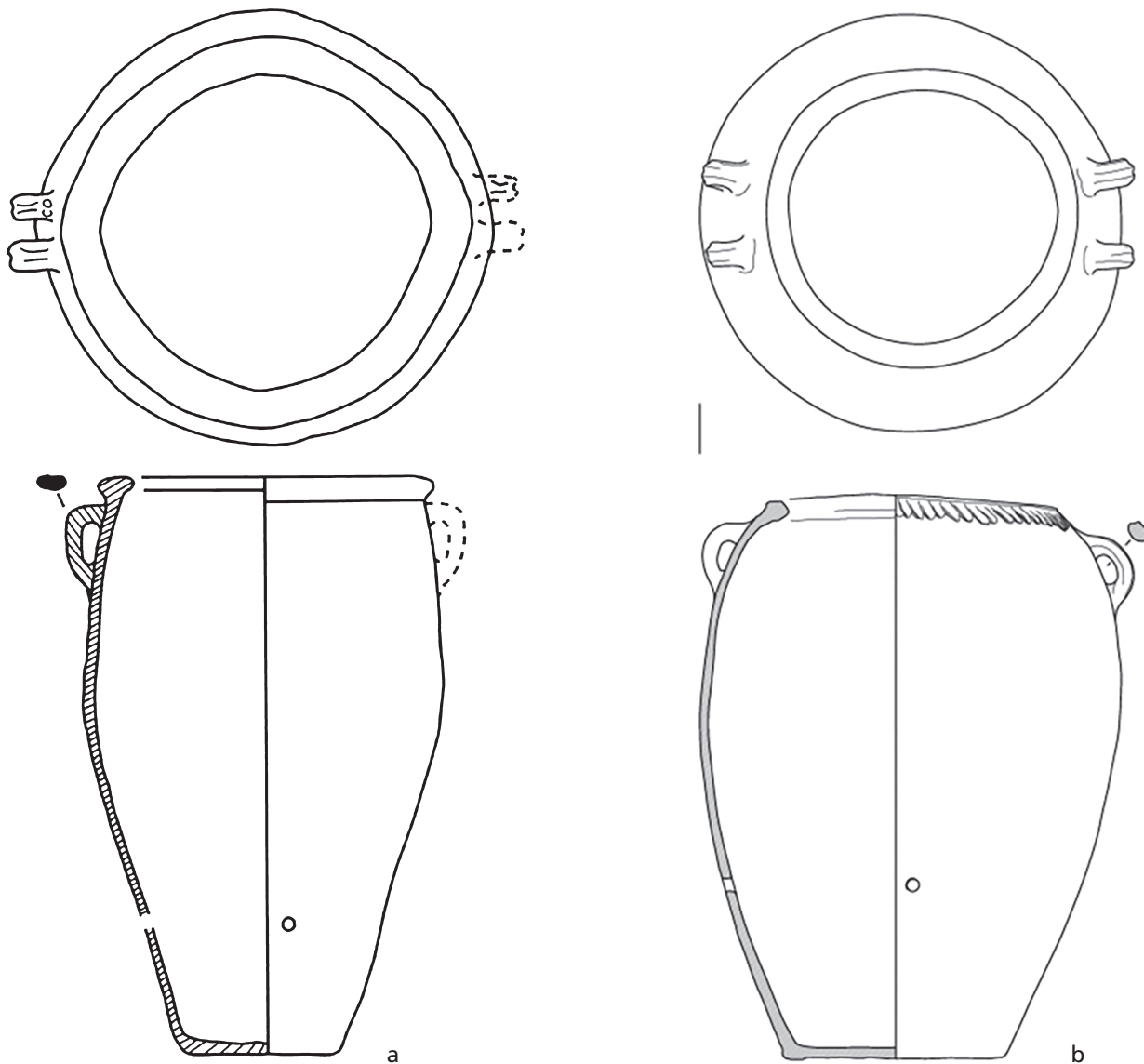


Fig. 7 a-b Abbasid-period perforated pots for indigo production. – (Drawing a C. Schofield, b A. Ariotti). – Scale 1:10.

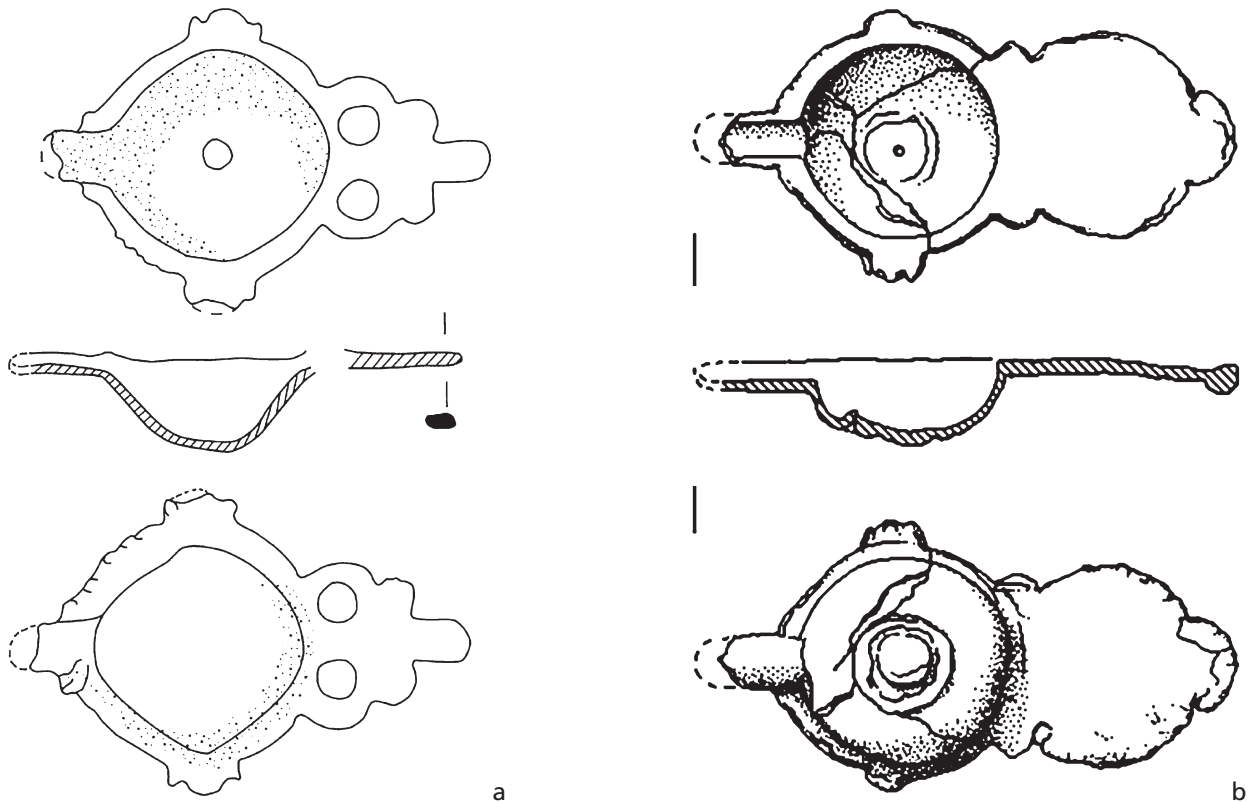


Fig. 8 Two cast copper-alloy indigo crucibles: **a** GS.KSI.IX.103.2016.7; **b** GS.KSI.II.120. – (Drawing a A. Ariotti, b C. Schofield).

Date Cultivation

Although dates were cultivated on a large scale during classical and medieval times in Zoara/Zughar, for the purposes of this paper they will not be discussed as they did not require sophisticated processing beyond collecting nor involved industrial development. The importance of the produce though should not be underestimated as is manifest by the depiction of date palms surrounding the city on the late 6th-century mosaic map in Madaba (fig. 4).

Indigo Production

Indigo dye was derived from processing the plant *Indigofera tinctoria* indigenous to south-eastern Asia. Its method of production is evident in the eastern Mediterranean as early as the Greco-Roman period. The association of India with indigo is reflected in the Greek word for the dye, which was *indikón* (ἰνδικόν). The Romans used the term *indicum*, which passed into Italian dialect and eventually into English as the word indigo. Greek dye recipes are mentioned in Graecus Holmiensis from Egypt and an indigo dyer's workshop was identified

at Athribis near Sohag in Egypt⁴². Indigo-dyed textiles were found in Qumran and the Cave of Letters by the Dead Sea shore. These may have been produced at neighbouring 'Ain Feshkha where Roman-period dyeing vats were discovered⁴³. The earliest evidence for fine ikat textiles dyed with indigo is in the early 7th century from the Sanctuary of Lot at Deir 'Ain 'Abata near the shores of the Dead Sea (fig. 6).

But it was not until the early Islamic period that indigo production reached an industrial scale. During the Fatimid period the Egyptian indigo-dyed textile trade is well-documented. At Damietta (in the Nile Delta) the Cairo Geniza documents mention that the best-quality indigo (*tekhelet*) to dye the tassels (*tzitzit*) was bought in Zughar and brought from there. These documents reveal that Zughar was trading between northern Arabia and the Mediterranean during the 11th century⁴⁴. A letter written in 1065 records that indigo was brought from Zughar, but that the road was dangerous; one Jewish merchant from North Africa who had considered going from Hebron to Zughar changed his mind⁴⁵. One Geniza document from 1044 mentions grain from Ghor al-Safi in connection with determining the Jewish leap year⁴⁶. Other documents record Jewish merchants living in Zughar in the 10th and 11th centuries⁴⁷. Recent excavations in the Ghor as-Safi⁴⁸ have

42 Balfour-Paul, Indigo 12.

43 Humbert/Chambon, Khirbet Qumrân.

44 Goitein, Society 45 n. 228.

45 Gil, Palestine 203. 206.

46 Gil, Palestine 797.

47 Gil, Palestine 202 f.

48 Politis, Zoara.



Fig. 9 Indigo-dyed threads embroidering Kufic letters on a 10th century cloth from Dayr al-Qattar. – (Photo K. D. Politis).

uncovered in situ two large perforated pots in 9th/10th century contexts comparable to the Khabiyah traditionally used in Bahla, Oman for indigo processing (fig. 7a-b)⁴⁹. Two copper alloy indigo crucibles were also found (fig. 8a-b) similar to 11th-century ones from Khurasan (Iran)⁵⁰.

Large stone-built plastered tanks at Birkat located just outside the urban centre have been interpreted as dyeing vats for processing indigo⁵¹. This would make sense as the initial fermentation stage of indigo production is a difficult and bad-smelling task best done in peripheral settled areas. The addition of potash (of which there is ample supply in the Dead Sea) needed as an agent for fixing the dye would have intensified the toxic odour. From these archaeological discoveries it is apparent that there was an indigo workshop present. It is likely that this is where the historically-known superior indigo was produced. At Dayr al-Qattar al-Byzanti on the Lisan Peninsula of the Dead Sea, the threads embroidering Kufic letters on a 10th century cloth⁵², similar to other Fatimid tiraz, were also dyed with indigo (fig. 9).

These archaeological finds which corroborate historical accounts, demonstrate that indigo was being produced on a significant scale in Zoara/Zughar for local use as well as for export. Although the demand for dyeing indigo in finer textiles is apparent, its use for colouring daily clothing is also probable. Such a recent paradigm can be seen in traditional Arab clothing which were often dyed in indigo blue⁵³.

Epilogue

The economic transformation of Zoara from a Greco-Roman agricultural system to a new Islamic regime based on new products and techniques was characteristic of the 6th-11th centuries. These influences came from the Indian subcontinent via the Sasanian realm in Persia. The result was a higher productivity in relatively arid lands.

Profitability from traditional agricultural harvests such as wheat, dates and olives which were lucrative during the »Late Antique« period were augmented by more specialised production of balsam, and later in the early Islamic periods, by »summer crops« such as indigo and sugarcane.

The processing of indigo and its successor sugarcane, required scientific knowledge particularly that of alchemy. Medieval Islamic science continued and advanced classical Greek traditions by translating Greek texts into Arabic at the Bayt al-Hikma during the 8th century onwards in Bagdad. The origins of the chemical industry are inexorably linked with indigo and sugar production as they both required organic alterations of biological components and their compositions. These deliberate modifications were necessary in order to manufacture new products on a larger scale for local consumption as well as trade. Furthermore, making specialised equipment for the processing augmented the industrial nature of the endeavours leading to an increase in complex manufacturing and

49 Balfour-Paul, Indigo 67 pl. 2.

50 Now in the British Museum (1881 7-1 3401; OA+ 1348; 1955 7-6 11) and the Victoria and Albert Museum (M.1321929).

51 Whitcomb, Islamic Period 117.

52 Holmgren/Kaliff, Dayr al-Qattar al-Byzanti 332.

53 Balfour-Paul, Indigo 126-153 pls 13-16.

commerce. From the recent studies at Ghor as-Safi it is apparent that it was a major agricultural centre during the early and middle Islamic periods (8th to 15th centuries) in southern Bilad ash-Sham based on date, indigo and, ultimately most-important, sugarcane cultivation. Furthermore, on-site processing of these products on a large-scale indicates an unprecedented industrial level of production. For sugar, state sponsorship was fundamental to its success as a major international product.

This new agricultural regime was founded on a change of the way in which land was utilised, labour exploited and investment maximised with new products in order to increase food output. Although less arable land was available, there was more labour and capital which was consequently devoted to farming. The outcome was a brisk increase in agriculture which mirrored economic growth in general during this era.

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Zusammenfassung / Summary / Résumé

Die wirtschaftliche Transformation von Zoara im östlichen Palaestina Tertia von der »Spätantike« zur frühislamischen Zeit (6.-11. Jahrhundert)

Dieser Beitrag gibt einen Überblick über die großen landwirtschaftlichen Fortschritte im Nahen Osten während des 6. bis 11. Jahrhunderts, wobei der Schwerpunkt auf das südöstliche *Palaestina Tertia* in Bilad ash-Sham und insbesondere auf Zoara/Zughar (das moderne Ghor as-Safi in Jordanien) gelegt wird, wo jüngste archäologische Ausgrabungen wichtige neue Belege für die wirtschaftliche Entwicklung der Region erbracht haben.

La transformation économique de Zoar en Palaestina Tertia orientale de l'« Antiquité tardive » à la période islamique précoce (6^e- 11^e siècle)

Cette contribution donne un aperçu des progrès agraires importants réalisés au Proche-Orient du 6^e au 11^e siècle, en mettant l'accent sur le Sud-Est de la Palaestina Tertia in Bilad ash-Sham et particulièrement sur Zoar/Ségor (actuellement Ghor as-Safi en Jordanie). De récentes fouilles archéologiques ont fourni de nouveaux éléments importants prouvant le développement économique de la région.

Traduction: Y. Gautier

The Economic Transformation of Zoara in Eastern Palaestina Tertia from the »Late Antique« to Early Islamic Periods (6th-11th Centuries)

This paper reviews the major agricultural advancements during the 6th to 11th centuries in the Near East, focusing on the south-eastern *Palaestina Tertia* in Bilad ash-Sham, and particularly at Zoara/Zughar (modern Ghor as-Safi in Jordan) where recent archaeological excavations and studies of their discoveries have revealed significant new evidence for economic development of the region.