The Origin and Expansion of Sugar Production in the Islamic World

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1. The Origin of Sugar Production and its Expansion to West Asia

The Origin of Sugarcane Cultivation

Wild sugarcane plants, indigenous to India and Southeast Asia, were hybridized in New Guinea to create a domesticated plant variety called *Saccharum Officinarum* in Latin (denoting “sugar of a druggist”). Sugarcane is a perennial large grass, two to four meters high, with its widest stalks up to four centimetres in diameter. Domesticated sugarcane plants hybridized in New Guinea were introduced into Indonesia, Malaysia, India, and South China during the last several centuries B.C. This type of sugarcane, which was previously thought to have first appeared in India and then spread to neighbouring regions, is now thought to have originated in southern New Guinea.

Allow me to quote some viewpoints on this issue. E. O. von Lippmann, who pioneered the historical study of global sugar production, has said that sugarcane clearly originated from Northeast India, specifically from the Bengal province.⁽¹⁾ Yet, Sucheta Mazumdar, an historian of sugar production in modern China, is careful not to identify a point of origin, relating that sugarcane was introduced into South China sometime after the third century B.C. by way of Southeast Asia or East India.⁽²⁾

However, Noel Deerr, the author of *The History of Sugar*, believed that sugarcane originated in New Guinea and spread to Southeast Asia, India, and China.⁽³⁾ Andrew M. Watson also held that early domestication and hybridization may have occurred in the New Guinea region,⁽⁴⁾ while Christian Daniels says that shifting agriculturalists of Southeast Asia, Indonesia, Melanesia, and Polynesia planted sugarcane in mixed gardens in pre-historic times.⁽⁵⁾ Although its true origin is still uncertain, sugarcane cultivation is generally considered to have originated somewhere between New Guinea and Indonesia, a few centuries B.C. From these early times, through long after the systemization of sugar manufacturing, raw sugarcane was chewed and sucked for its sweet taste, or cooked and eaten.⁽⁶⁾

The Origin of Sugar Production

So then, when and where did sugarcane cultivation for sugar production originate? First, Deerr quotes from *The Geography of Strabo*: He (Nearchus – an admiral in Alexander the Great's army) also states, concerning the reeds, that they produce honey, although there are no bees, and in fact that there is a fruit-bearing tree from the fruit of which honey is compounded, but that those who eat the fruit raw become intoxicated.⁽⁷⁾ Kawakita Minoru, based on this description, further explained that Alexander's soldiers were delighted when they discovered this solid honey, not made by bees, in North India.⁽⁸⁾ But it should be noted that Nearchus only states "the reeds that produce honey", not referring to "solid honey" or "sugar candy". Furthermore, Sidney W. Mintz, in his book *Sweetness and Power*, raises serious questions about Deerr's interpretation of this (Nearchus's statement) as a reference to sugar cane, but his citations of Greek and Roman authorities are not entirely convincing.⁽⁹⁾

According to Mintz, *Materia Medica* by Dioscorides (a Roman herbalist in the first century) reads: "There is a kind of concreted honey, called *saccharon*, found in reeds in India and Arabia Felix (now Yemen), like in consistence to salt, and brittle to be broken between the teeth, as salt is. It is good for the belly and the stomach being dissolved in water and so drank, helping the pained bladder and the reins."⁽¹⁰⁾ However, Mintz also notes: "Some students of sugar history suppose that *saccharon* referred to an entirely different substance, the so-called sugar of bamboo, a gum that accumulates in the stems of certain bamboos and has a sweet taste."⁽¹¹⁾ When we re-read this sentence in *Materia Medica*, it describes "a kind of concreted honey, called *saccharon*, found in reeds", not *saccharon* made of reeds. So, this description is not enough to lead to the conclusion that a method for producing granulated sugar crystals from boiled sugar juice originated around the first century A. D.

On the other hand, von Lippmann, based on an account that the Funan Kingdom at the south end of the Ganges river forwarded sugarcane [not sugar] to the Chinese Emperor in the year 286 A.D., speculates that sugar production originated in India after the third century.⁽¹²⁾ However, Funan was not actually located at the south end of the Ganges river in India, but rather at the lower reaches of Mekong in Viet Nam. Daniels does not draw a clear conclusion on this point, stating that sugarcane cultivation for sugar production seems to have initiated in northern India.⁽¹³⁾

Thus, although the precise time when sugar production originated is also still uncertain, we may conclude that a method for manufacturing crystal-form sugar began in north India

sometime after the first century, and after Dioscorides.

The Eastward Route: Expansion from India to China and Okinawa

Sugarcane cultivation for sugar production expanded from North India to both the East and the West. Eastward, sugarcane was centered in southern China, in such regions as Kuangtung, Kuang Xi, and Annan, in the early fourth century B.C. It was during the Tang dynasty that the process for making granulated sugar crystals 沙糖 was introduced from India into China. Previously, solidified molasses 石蜜 had been made by simply setting the boiled juice in direct sunlight.⁽¹⁴⁾ Legend says, "In Samarqand, when a child is born, his parents put solidified molasses in his mouth and glue on his hand. The parents do this so that when the child becomes an adult, he will use sweet words, and will always have coins in his hand."

Daniels relates that this is also extremely important for the light it sheds upon the transmission of sugar production technology from India to China via the medium of Buddhist monks during the Tang Dynasty (9th-10th centuries).⁽¹⁵⁾ Mazumdar has the same view, stating that commercial sugar production for wide circulation started during the Song Dynasty, while in the preceding Tang Dynasty, sugar was used exclusively for medicine and festival goods.⁽¹⁶⁾

It is said that sugar was first introduced to Japan by the Chinese Buddhist priest, Jianzhen 鑑真 (688-763); however, we lack the exact source materials to confirm this fact. Regardless, it is certain that Embassies to Tang Dynasty and Buddhist priests brought some amount of Chinese-produced sugar with them to Japan. During the Muromachi period (14th-15th centuries), sugar imports from Ming China flourished, and as the Japanese tea ceremony gained popularity among the upper classes, sugar usage in confections also increased. However, raising sugarcane for sugar in Okinawa and the Amami Islands only began after the formation of the Tokugawa Shogunate. It is likely that Gima Shinjo 儀間真常, a farmer of royal descent, who had learned how to make sugar in the Fujian province of China, began producing brown sugar (sugar with molasses content) in Ryukyu (now Okinawa) in 1623, using techniques that were brought to the Amami Islands at the end of the 17th century. In any case, white sugar separated from molasses was not produced in Okinawa or the Amami Islands, even after the Meiji Restoration in the latter half of the 19th century.⁽¹⁷⁾

The Westward Route: Expansion from India to Iran

Westward, sugarcane was grown for sugar beginning in pre-Islamic Iran under the rule of the Sasanid dynasty (226-651). However, the available source materials are not necessarily

sufficient to verify this fact, as von Lippmann supposes that Christians in Gundishapur (an old city in south-west Iran during the Sasanids) expanded sugarcane cultivation and developed sugar production there.⁽¹⁸⁾ But, Berthold Laufer contradicts this sharply, “This is no more than an ingenious speculation, which, however, is not substantiated by any documents.”⁽¹⁹⁾ Yet, al-Muqaddasī, an Arab geographer in the 10th century, states, “Jundisābūr (Gundishapur) was the prosperous, old capital city of the province, but now it has perished. The Kurds overcame it, bringing discrimination and disturbances; as before, there is still abundant sugar (*kathīrat al-sukkar*) in this province.”⁽²⁰⁾ This clearly shows that Gundishapur had a long-standing tradition of making sugar since, at least, the early Islamic period.

Laufer, who criticized von Lippmann, takes the Sui Annals compiled in seventh century China as reliable source material, which attributes *shi-mi* (*hard sugar*, literally ‘stone honey’) and *ban-mi* (‘half honey’) to Sasanian Persia and to Ts’ao.⁽²¹⁾ *Ban-mi* probably means a half-dried, soft sugar. Watson also considers the accounts in the Sui Annals reliable, and concludes that sugarcane was probably grown in Iran for some decades before the Arab conquest in 642.⁽²²⁾ On the other hand, Mintz refers to a report by the Byzantine emperor Heraclius in 627, where sugar is described as an “Indian” luxury. But, Mintz vaguely suggests, “Between the fourth and eighth centuries, the major sugar production centers seem to have been the coast to the west of the Indus delta, and the head of the Persian Gulf, on the Tigris-Euphrates delta.”⁽²³⁾ I note the following account by Abū al-‘Abbās Aḥmad al-Balādhurī (d. ca. 892).

When Caliph ‘Umar b. al-Khaṭṭāb conquered al-Sawād (Iraq) in 16/637, ‘Uthmān b. Ḥunayḥ surveyed the cultivated fields, and levied 10 *dirhams* on each *jarīb* (about 1600m²) of date palms (*nakhl*), 10 *dirhams* on each *jarīb* of grapes (*karm*), 6 *dirhams* on each *jarīb* of sugarcane (*qaṣab*), 4 *dirhams* on each *jarīb* of wheat (*burr*), and 2 *dirhams* on each *jarīb* of barley (*qamḥ*). ‘Uthmān wrote this to ‘Umar, and he approved it.⁽²⁴⁾

This account demonstrates that sugarcane for making sugar had been grown in the province of al-Sawād before the Arab conquest in the first half of the seventh century. As the tax revenue on sugarcane was higher than that on the important crop of wheat, we can infer that sugarcane in Iraq was cultivated not to obtain juice for drinking, but for making sugar.

2 The Expansion of Sugarcane Cultivation from Iran to Egypt

The Expansion from Iran to Iraq

Little is known about sugarcane cultivation during the Sasanid Dynasty period. However, as

the Islamic period began, accounts of sugarcane in Iran and Iraq increased considerably. Legend says that the Muslims of the Arabian Peninsula brought sugarcane to the lands they invaded in the seventh and eighth centuries, introducing the plant in Iraq, Syria, Maghrib, Andalusia, and the Mediterranean islands. However, as Watson notes, though this legend may be true, no part of it seems to be based on established facts.⁽²⁵⁾ Here, based on geographical works compiled in Arabic and Persian from around the 10th century, we will describe the expansion of sugarcane grown for making sugar from Iran to Iraq.

Sugarcane was called *qaṣab al-sukkar*, and also *qaṣab al-fārist*⁽²⁶⁾ in Arabic, which suggests that the Arabs considered sugarcane a plant inherited from Persia. In the early Islamic period, *Tabaṣṣur bil-Tijāra* written by Abū 'Uthmān 'Amr al-Jāḥiẓ (ca. 776-868/9) gives us the first account of sugar production in Iran. He introduces special products in the province of Ahwāz such as sugar (*sukkar*), dates (*tamr*), condensed juice (*dibs*), and raw sugar (*qand*).⁽²⁷⁾ Ahwāz in the district of Khūzistān was favored with ample irrigation water from the Dujayl river for sugarcane cultivation, and a suitable climate with high temperatures and high humidity.⁽²⁸⁾ Abū al-Ṭayyib Aḥmad al-Mutanabbī (915-965), a famous Arab poet born in al-Kūfa, praises the hard sugar crystal produced in Ahwāz.

Even though our enemies could crush coal and iron,

They can never crush sugar crystal made in Ahwāz.⁽²⁹⁾

Abū 'Abd Allāh Muḥammad al-Jahshiyārī (d. 942), a politician who played a role in the Abbasid administration, reports in his *Kitāb al-Wuzarā' wal-Kuttāb* the annual state income of each province during the reign of Hārūn al-Rashīd (786-809).⁽³⁰⁾ According to that source, two Persian provinces paid sugar in kind: 30,000 *raṭl* (68,250 kilograms) of sugar (*sukkar*) from Ahwāz, and 20,000 *raṭl* (45,500 kilograms) of white sugar (*fānīdh*) from Sijistān.⁽³¹⁾ In addition, *Kitāb Sūrat al-Arḍ* by Ibn Ḥawqal (10th century) and *Aḥsan al-Taqāsīm* by al-Muqaddasī both relate that sugarcane cultivation was particularly vigorous in Jubba and Sūs in the province of Khūzistān, as well as in the province of Fārs.⁽³²⁾ *Hudūd al-'Ālam* (compiled in 982), an anonymous work in Persian, states that 'Askar Mukram is a prosperous town, where enough red and white sugar (*shakar*) and raw sugar (*qand*) are produced to meet the demands of the entire world.⁽³³⁾ According to Yāqūt al-Rūmī al-Ḥamawī (d. 1229), an ex-slave geographer born in Byzantine territory, "'Māsakān white sugar' (*al-fānīdh al-māsakānī*) was named after the province of Māsakān adjacent to Mukrān behind Sijistān. This is praised as the highest quality white sugar, and *fānīdh* is a type of sugar not produced outside Mukrān, from where this sugar is distributed throughout the country."⁽³⁴⁾

Thus, sugar production in Iran from the 9th to the 12th centuries was concentrated in Khūzistān, Sijistān, Fārs, Māsakān, and Mukrān from south-western Iran to southern and south-eastern Iran.

And as for sugar production in Iraq? As mentioned above, sugar production had already begun in the province of al-Sawād at the end of the Sasanid Dynasty. Ibn Ḥawqal in the 10th century states that there is no village in Iraq without sugarcane crops⁽³⁵⁾, and al-Muqaddasī in the same period also reports that Sinjār produces commercial goods such as almonds (*lawz*), pomegranates (*rummān*), sugarcane (*qaṣab*), and sumac (*summāq*).⁽³⁶⁾ As Sinjār is near Mosul, that area may be the northern limit for sugarcane growth in Iraq. *Al-Filāḥat al-Nabaa'iya* by Ibn Wahshiya (10th century) gives no account of sugarcane crops in Iraq, but does state various ways that sugar is used in cooking and medical treatment. For example, Ibn Wahshiya explains that the green seeds of terebinth (*buṭm*) are crushed and drunk together with sugar and wine to extremely increase sexual desire.⁽³⁷⁾

According to Zakariyā' al-Qazwīnī (ca. 1203-83), an Arab geographer in the 13th century, Ṭīzanabād (west to al-Kūfa) was surrounded by grape and fruit tree orchards, caravansaries (*khān*), and sugar pressing factories (*ma'ṣara*).⁽³⁸⁾ Further, Ibn Sa'īd al-Maghribī (d. 1274 or 86), born in Granada, compiled accounts of his travels in the Eastern world, in which he describes dates from al-Baṣra, and rice (*aruzz*) and sugarcane from al-Batā'ih (The Great Swamp) as being particularly cheap in Baghdād (before the Mongol invasion).⁽³⁹⁾ To sum up, in Iraqi plains irrigated by the Tigris and the Euphrates, sugarcane cultivation expanded considerably from the seventh century, centering on the fertile regions of al-Sawād.

Expansion to Syria (Bilād al-Shām)

In historical Syria (Bilād al-Shām), sugarcane cultivation expanded not to the Orontes valley, which included the provinces of Ḥimṣ and Ḥamā, but to the coastal regions (*al-Sāḥil*) and to the Jordan valley (*al-Ghawr*). Helmut Blume notes erroneously that this type of agricultural-industrial enterprise (sugar production) developed neither in Khūzistān, nor in the other regions of medieval Arab sugar cane agriculture, but in the medieval Levant only after its conquest by the Crusaders.⁽⁴⁰⁾ Since both the coastal regions and the Jordan valley were irrigated by small rivers, fountains, and wells, we can see, contrary to Blume's view⁽⁴¹⁾, that sugarcane was also grown in Syria, although on a smaller scale than in Iran, Iraq, and Egypt.

It is reasonable to speculate that sugarcane cultivation was brought from Iraq into southern Syria sometime before the 10th century, and subsequently expanded into other areas. Arabic

sources list a number of cities as centers of sugarcane production, such as Akkā, Sūr, Bayrūt, Ṭarābulus, Markab, and Bāniyās in the coastal regions, Ariḥā and Baysān in the Jordan valley, and Ṭabariya at the source of the river Jordan.⁽⁴²⁾ According to R. Ellenblum, in the Latin Kingdom of Jerusalem, the Franks learned how to cultivate food products, such as sugarcane, which were unknown in their countries of origin.⁽⁴³⁾ Further, he refers, based on historical documents, to the economic importance of sugar production in the Frankish Kingdom during the 12th century.⁽⁴⁴⁾

Among these centers in Syria, Ṭarābulus and its environs were the most important for sugarcane harvesting and sugar production from the 10th to the 14th centuries. Al-İṣṭakhrī (10th century geographer), predecessor of Ibn Ḥawqal, relates that Ṭarābulus was a prosperous town, with date trees and sugarcane in its environs.⁽⁴⁵⁾ This may be the oldest account of sugarcane in the district of Ṭarābulus, where the river Qadīsha provided fertile lands for the crops. Ibn Shaddād (d. 1285) also states that sugarcane was grown in abundance in the low lands of Ṭarābulus.⁽⁴⁶⁾

Shihāb al-Dīn Aḥmad al-Nuwayrī (d. 1333), who was posted in Ṭarābulus as the head of the military (*nāẓir al-jaysh*), precisely reported the results of the cadastral survey (*rawk*) of Ṭarābulus in 717/1317. At the conclusion of the survey, the *kharāj* year changed from 716 to 717 and miscellaneous taxes on certain items (nine in total) were abolished according to the *rawk*'s standing tradition. The sultan's decree regarding this tax exemption for sugarcane growers in Ṭarābulus is cited by al-Nuwayrī as follows:

Sultan al-Malik al-Nāṣir (reigned 1293-94, 1299-1309, 1310-41) ordered that the following miscellaneous taxes (*mu'āmalā*) be abolished in the region of Ṭarābulus.

*The peasants (*fallāḥ*) in the region of Ṭarābulus were exempted from forced labor in the sugarcane fields belonging to the government. Instead, a tax in kind equal to 2,000 *dirhams* was levied on them.

*Tax on the sugarcane of amirs (*aqṣāb al-umarā'*). Some amirs overseeing districts where sugarcane was grown had demanded labor from their peasants in lieu of taxes, or had imposed a 3,000 *dirhams* labor rental tax (*ujrat al-'amal*).⁽⁴⁷⁾

That is, the 2,000 *dirhams* levied on peasants who were forced to work in sugarcane fields belonging to the government, and the 3,000 *dirhams* levied on peasants who worked in the fields of *iqṭā'*s held by amirs, were both abolished by Sultan al-Nāṣir's decree in 1317.⁽⁴⁸⁾ The total exemption for the nine items listed came to 109,000 *dirhams* annually, or roughly the 110,000 *dirhams* that al-Nuwayrī mentioned elsewhere.⁽⁴⁹⁾ The 5,000 *dirhams* tax exemption for

sugarcane cultivation in Ṭarābulus was around 4.5% of the 110,000 *dirhams* total. According to E. Ashtor, in the latter half of the 14th century, sugar production in Syria, including Ṭarābulus, gradually declined for a variety of reasons: the exploitation of peasants by the Mamluks in power, repeated outbreaks of plague, technological stagnation, and other factors.⁽⁵⁰⁾

Expansion to Lower Egypt

As mentioned above, the emergence of sugarcane in Syria cannot be traced back beyond the 10th century. But, papyrus documents show sugarcane in Egypt during the half of the eighth century.⁽⁵¹⁾ However, the scale of this sugarcane cultivation must have been limited, and it would have been mostly restricted to Lower Egypt. For example, al-Muqaddasī states that in the province of al-Fayyūm in Upper Egypt, rice (*aruzz*) and flax (*kattān*) were the main crops⁽⁵²⁾, excluding the sugarcane that would later flourish there.

Furthermore, the sugarcane districts mentioned by such geographers as al-Mas'ūdī (d. 956) and Ibn Ḥawqal were Alexandria, Sanhūr, al-Sāfiya, and Dumā Jumūl, which were all located in Lower Egypt. Nāṣir Khusraw (d. 1061) also refers to the outskirts of al-Fuṣṭāṭ as Egypt's only sugar producing district⁽⁵⁴⁾, and al-Idrīsī (d. 1165) relates that sugarcane in Egypt was grown in Ḥimā al-Kabīr at the outskirts of al-Fuṣṭāṭ, Minya Badr adjacent to Tinnīs, and Minya al-'Ulūq near Damietta.⁽⁵⁵⁾ Also, Ibn Mammātī (d. 1209), who regarded sugarcane as the most profitable crop, tells us that it was planted in the province of al-Buḥayra in Lower Egypt.⁽⁵⁶⁾ But, 'Abd Allāh al-Bakrī (d. 1094) was probably the first to mention sugarcane cultivation in such districts as Asyūṭ and Qūṣ in Upper Egypt.⁽⁵⁷⁾

In other words, the main sugarcane producing districts documented in Arabic source materials up to the end of the 11th century were mostly restricted to the outskirts of al-Fuṣṭāṭ and the villages of Lower Egypt. This may show that conditions were better in Lower Egypt than in Upper Egypt, both for digging new canals and for setting up the water wheels required for sugarcane.⁽⁵⁸⁾ We may therefore conclude that sugarcane spread to Upper Egypt on a large scale around the 11th or 12th century. Both al-Makhzūmī (12th century) and Ibn Mammātī give detailed accounts of how sugarcane was cultivated in Egypt,⁽⁵⁹⁾ which indicate that sugarcane had come to people's attention as a new commercial product at the time.

3 The Expansion of Sugar Production to Upper Egypt, Maghrib, and Andalusia

Expansion from Lower Egypt to Upper Egypt

Both Muḥammad al-Musabbiḥī (d. 1029) and Ibn al-Ma'mūn al-Baṭā'ihī (d. 1192) repeatedly refer to sugar consumption in the Fatimid court of Cairo,⁽⁶⁰⁾ but do not identify the districts in Egypt where sugarcane was grown. As mentioned above, al-Bakrī in the 11th century is probably the first person to give a reliable account of sugarcane cultivation in Upper Egypt. His main work, *Kitāb al-Masālik wal-Mamālik*, relates that Asyūṭ is a district of Upper Egypt with plentiful sugarcane, and that Qūṣ has bazaars (*sūq*), public baths (*ḥammām*), and sugarcane pressing factories (*ma'šara lil-sukkar*), each with about one hundred workers (*rajl*).⁽⁶¹⁾ This account shows that sugar production thrived in the various districts of Upper Egypt during the 11th century. We should also note the fact that the workers in the factories were referred to only as 'men' (*rajl*), not 'slaves' (*'abd*). European scholars have generally believed the main workforce in sugar production in the Islamic world to have been slaves, just as on sugar plantations in the New World.⁽⁶²⁾

Thereafter, sugarcane expanded from Lower Egypt into Upper Egypt as a new commercial crop. Here, we take up the case of al-Fayyūm, a fertile province in Upper Egypt irrigated by the Yusuf Canal. In 1243, 'Uthmān al-Nābulusī (d. 1261), under an order from the Ayyubid Sultan al-Ṣāliḥ (reigned 1240-49), visited the province of al-Fayyūm to survey the entire area over two years. After he finished his survey, al-Nābulusī compiled a book entitled *Ta'rikh al-Fayyūm*, and dedicated it to Sultan al-Ṣāliḥ. This *Ta'rikh al-Fayyūm* vividly details the expansion of sugarcane crops into the province of al-Fayyūm:

(1) The village of Dahmā (*iqṭā'*)

In this village, cotton (*quṭn*) was grown until irrigation water was diverted to sugarcane. As sugarcane spread, all the water was devoted to its irrigation, which led to [the village] ceasing cotton cultivation.⁽⁶³⁾

(2) The village of Dhāt al-Ṣafā' (*iqṭā'*)

In this village, sesame (*simsim*) was grown, and then, as soil fertility declined, rice (*aruzz*) was introduced. But rice was also eventually abandoned, and water diverted, in favor of the village's new sugarcane crops.⁽⁶⁴⁾

(3) The village of Shāna (*iqṭā'*)

As the population of this village increased, many residents relocated to the village of Lawāsī to cultivate crops there. But, because Lawāsī was quite far, others relocated to

closer places. However, it is also said that this migration (*intiqāl*) was caused by a lack of irrigation water, due to the increase of sugarcane plantations in the province of al-Fayyūm.⁽⁶⁵⁾

(4) The village of Shadamūh (*iqṭā'*)

This village had fruit orchards with dates, grapes, and sycamore. Mainly winter crops were grown there. Summer crops were also grown, until sugarcane took over.⁽⁶⁶⁾

These instances show that sugarcane plantations expanded to the extent of replacing such summer crops as rice, cotton, and sesame, because cultivation required a great deal of water even after the Nile had receded. All the cases mentioned above were villages granted as *iqṭā'* to amirs and soldiers. However, sugarcane was also grown in the sultan's domain, including such villages as al-'Udwa, Sinnūris, Fānū, and Maṭar Ṭāris. According to a survey in 1243, the total land area used for sugarcane crops in the province of al-Fayyūm amounted to 1,468 *faddāns* (about 881 hectares), while the land area for wheat, for example, was 29,000 *faddāns* (about 17,400 hectares) in total.⁽⁶⁷⁾

The following accounts confirm that sugarcane plantations were already popular in districts of Upper Egypt besides the province of al-Fayyūm in the first half of the Mamluk period. We find an account of the year 697/1298 in *Kitāb al-Sulūk* by Taqī al-Dīn Aḥmad al-Maqrīzī (d. 1442), an Egyptian historian in the Mamluk period:

[After the Ḥusāmī cadastral survey (*al-Rawḥ al-Ḥusāmī*) in 1298] Mankūtāmūr, *nā'ib al-salṭna*, was granted vast *iqṭā'*s in Upper Egypt; that is to say, Marj Banū Humaym and its surroundings, Samhūd and its surroundings, Ḥarajat Qūṣ, Madīnat Udfū, and water wheels (*dūlāb*) in these districts. The revenues consisted of over 110,000 *ardabbs* of crops, raw sugar (*qand*), molasses ('*asal*'), dates, sheep, and firewood. He owned 27 sugarcane pressing factories (*ma'ṣara li-qaṣab al-sukkar*) in these areas.⁽⁶⁸⁾

Al-Maqrīzī gives another account of Mallawī in Upper Egypt:

During the reign of Sultan al-Nāṣir, the land area for sugarcane crops increased to 2,500 *faddāns* (about 1,592 hectares) annually in this district. Al-Nashw, superintendent of the sultan's treasury (*nāẓir al-khāṣṣ*), seized all the sugar produced there in 738/1337-8 to send 14,000 *qintārs* (1,260,000 kilograms) of raw sugar, not including molasses, to *Dār al-Qand* (raw sugar storehouse) at al-Fustāṭ. Later, he forced the people in the district to deliver an additional 8,000 *qintārs* (720,000 kilograms) of raw sugar.⁽⁶⁹⁾

Ibn Baṭṭūṭa, who visited Mallawī at the beginning of the 14th century, states:

The town has 11 sugarcane pressing factories where even beggars (*faqīr*) can enter freely.

They come to the factories with warm bread, put it into pots boiling pressed juice, and go out with bread steeped plentifully in sugar juice.⁽⁷⁰⁾

According to Abū al-Fidā' (d. 1331), Qamūla, a village located south of Qūṣ in Upper Egypt, also had many sugarcane fields.⁽⁷¹⁾ Abū al-Faḍl al-Udfuwī (d. 1347) further relates that he found forty sugar factories (*maṭbakh li-sukkar*) and six sugarcane pressing factories (*ma'sara li-qaṣab al-sukkar*) in Qift, and in Samhūd he found many such factories with a total of seventeen stone mills (*hajar*).⁽⁷²⁾ Al-Udfuwī's description shows that during the 13th and 14th centuries, Qift was a particularly important center for sugar production in Egypt. *Al-sukkar al-qiftī* was famous in the Islamic world for its purity.⁽⁷³⁾ These accounts show that sugarcane had come to be cultivated on a large scale in the districts of Upper Egypt by around the 13th or 14th century.

Expansion to the Mediterranean Islands, Maghrib and Andalusia

In 647, Mu'āwiya, governor of Syria, sent his Arab fleet to Cyprus and, after severe plunder by the Arab Muslims, assumed rule over the island together with the Byzantine emperor. Further, in 655, with the aid of the Arab-Muslim army stationed in Egypt, Mu'āwiya secured nearly complete control of the Eastern Mediterranean Sea by defeating the Byzantine fleet in the Battle of the Masts (Dhū al-Ṣawārī). At the beginning of the ninth century, the Arabs sent from Andalusia set out to rule Crete, and in 878, the Aghlabids in Tunisia exerted rule over Sicily, which remained under Muslim rule until the Norman conquest in the latter half of the 11th century.

The influence of Arab-Muslim culture gradually infiltrated the Mediterranean islands under the rule of these Arabs, with sugar production being an important example of this. However, there are few accounts in Arabic on sugarcane in the Mediterranean islands. For example, Ibn Hawqal in the 10th century, states briefly that sugarcane (*qaṣab fārisī*) was raised in the marshlands near Palermo in Sicily.⁽⁷⁴⁾ Abū 'Abd Allāh Muḥammad al-Idrīsī (d. 1165) relates that both Lafqasīya (Lefkosa, or Nicosia) and Karīniya (Kyrenia) in Cyprus were beautiful towns with bazaars and sugarcane,⁽⁷⁵⁾ but gives no account of sugarcane crops in Sicily where he stayed for quite a while.

According to Deerr, by the end of the ninth century, Sicily was exporting sugar to Africa, but after the Norman conquest, the industry suffered, and its recovery was slowed by taxes and duties.⁽⁷⁶⁾ Watson also says that during around the 10th century, sugar produced in the districts, including Palermo, was exported to North Africa. However, when the island was

captured by the Normans, the sugar industry still existed, but its fortunes fluctuated.⁽⁷⁷⁾

Regarding the districts in Maghrib, Ibn Ḥawqal states that in al-Sūs al-Aqṣā there are citron (*utrujj*), walnut (*jawz*), almond (*lawz*), and date trees (*nakhl*), sugarcane (*qaṣab al-sukkar*), sesame (*simsim*), hemp (*qunnab*) and many other kinds of herbs.⁽⁷⁸⁾ This description shows that already in the 10th century, sugarcane was grown in districts as remote as al-Sūs al-Aqṣā near Aghadir. Ibn Ḥawqal gives no account of sugarcane in other districts of Maghrib, where wheat, barley, cotton, and flax were abundant. Thus, we should further research whether or not al-Sūs al-Aqṣā was the first example of reclaimed land used for sugarcane crops in the Maghrib countries.

The same applies to the districts of Andalusia. *Le Calendrier de Cordoue*, compiled in 961, relates, "On 31 January, an early-ripening variety of purslain (*rijla kabīra*) is seeded, and sugarcane is harvested."⁽⁷⁹⁾ *Le Calendrier de Cordoue* was originally entitled *Kitāb al-Anwā'* in Arabic, which was a combination of both the traditional calendar of the Arabs and the social customs in Andalusia. This account seems to suggest that sugarcane was already being grown in the suburbs of Cordova in the half of the 10th century. However, as *Le Calendrier de Cordoue* was compiled based on the books of *Anwā'* in the eastern Islamic world, the included accounts of sugarcane cultivation might be borrowed from these Arabic books.

The half of the 11th century brought us reliable information on sugarcane and sugar production in Maghrib and Andalusia. According to al-Bakrī, an Arab geographer in the 11th century, fruit trees and sugarcane were grown in Sūs, and sugar from there was exported to all the Maghrib countries.⁽⁸⁰⁾ During the 12th and 13th centuries, sugarcane expanded from al-Sūs al-Aqṣā to Aghmāt, Sabta, Qābis in Maghrib, and Albīra in Andalusia.⁽⁸¹⁾ Al-Idrīsī commented that the refined sugar produced in al-Sūs al-Aqṣā was the same as Sulaymānī white sugar (*al-sukkar al-sulaymānī*) and rock sugar (*tabarzad*).⁽⁸²⁾ Ibn al-'Awwām (12th-13th centuries) explained the growing cycle of sugarcane in detail, from planting in the spring, to periodic irrigation, to harvesting in winter,⁽⁸³⁾ which shows that sugarcane crops had already become commonplace in Andalusia.

During the half of the 15th century, the Portuguese, who had learned about sugarcane and sugar production from the Muslims in Andalusia, began to grow sugarcane in the Madeira islands and the Acores islands. And then, the Spanish followed suit in the Canary Islands. In 1493, emulating these examples, Christopher Columbus (1451?-1506) is said to have brought sugarcane to the New World on his second voyage, which led to large scale sugarcane plantations in the Caribbean islands and Brazil, beginning in the early 16th century.⁽⁸⁴⁾

Notes

- (1) E. O. von Lippmann, *Geschichte des Zuckers*, Leipzig, 1890, p. 39.
- (2) Sucheta Mazumdar, *Sugar and Society in China: Peasants, Technology, and the World Market*, Harvard University Press, 1998, p. 15.
- (3) Noel Deerr, *The History of Sugar*, vol. 1, London, 1949, p. 16.
- (4) Andrew M. Watson, *Agricultural Innovation in the Early Islamic Period*, Cambridge, 1983, p. 24.
- (5) Christian Daniels, *Science and Civilization in China* Joseph Needham, vol. 6-III, *Agro-Industries: Sugarcane Technology*, Cambridge University Press, Cambridge, 1996, p. 191.
- (6) Watson, *Agricultural Innovation*, p. 24.
- (7) Deerr, *The History of Sugar*, vol. 1, p. 63. On the English translation of the geographical book by Strabo (64 or 63 B.C.-ca.23 A.D.), see *The Geography of Strabo*, ed. & tr. H. L. Jones, London and New York, 1917-32, vol. 7, p. 33.
- (8) Kawakita Minoru, *A World History of Sugar* (*Sato no Sekaishi* in Japanese), Iwanami Shoten, Tokyo, 1996, p. 14.
- (9) Sidney W. Mintz, *Sweetness and Power: The Place of Sugar in Modern History*, New York, 1985, p. 20.
- (10) Mintz, *Sweetness and Power*, p. 20. See also English translation by R. T. Gunther, *The Greek Herbal of Dioscorides*, London, 1968, p. 125.
- (11) Mintz, *Sweetness and Power*, p. 20.
- (12) Lippmann, *Geschichte des Zuckers*, p. 49.
- (13) Daniels, *Agro-Industries: Sugarcane Technology*, p. 191.
- (14) Tai Kokki, *The Evolution of Sugar Production in China* (*Chugoku Kanshotogyo no Tenkai* in Japanese), Tokyo, 1967, pp. 9-23.
- (15) Daniels, *Agro-Industries: Sugarcane Technology*, p. 288.
- (16) Mazumdar, *Sugar and Society*, pp. 15-33.
- (17) As to the history of sugar in Japan, see the following works. Matura Toyotoshi, *Wind and Earthenware* (*Kaze to Kame* in Japanese), Ashi-Shobo, Hukuoka, 1987; Naga Shohachiro, *A History of Black Sugar as Seen from the Source Materials in Okinawa and Amami* (*Okinawa-Amami no Bunken karamita Kurozato no Rekishi* in Japanese), Okinawa, 2003; Hashimoto Hitoshi and Takada Akikazu eds., *Science of Sugar* (*Sato no Kagaku* in Japanese), Asakura-shoten, Tokyo, 2006.
- (18) Lippmann, *Geschichte des Zuckers*, p. 93.
- (19) Berthold Laufer, *Sino-Iranica: Chinese Contribution to the History of Civilization in Ancient Iran*, Chicago, 1919; repr. Taipei, 1973, p. 376.
- (20) Al-Muqaddasī, *Kitāb Aḥsan al-Taḳāsim fī Maʿrifat al-Aḳālīm*, Leiden, 1967, p. 408.
- (21) Laufer, *Sino-Iranica*, p. 376. Ts'ao was a union of states formed in Samarqand by the Sogdians.
- (22) Watson, *Agricultural Innovation*, p. 160.
- (23) Mintz, *Sweetness and Power*, p. 23.
- (24) Al-Balādhurī, *Futūḥ al-Buldān*, Beirut, 1957, p. 376.
- (25) Watson, *Agricultural Innovation*, p. 160.
- (26) For example, see al-Muqaddasī, *Aḥsan al-Taḳāsim*, p. 188.
- (27) Al-Jāḥiẓ, *Tabṣṣur bil-Tijāra*, pp. 32-33.
- (28) As to the sugar production in Ahwāz, see also P. Schwarz, "Die Zuckerpressen von Ahwāz," *Der Islam*, 6 (1916), pp. 269-279.
- (29) Al-Mutanabbī, *Diwān Abī al-Ṭayyib al-Mutanabbī*, Cairo, 1944, p. 189.

- (30) Al-Jahshiyārī, *Kitāb al-Wuzarā' wal-Kuttāb*, Cairo, 1938, pp. 281-288.
- (31) Al-Jahshiyārī, *Kitāb al-Wuzarā'*, pp. 282-283.
- (32) Ibn Ḥawqal, *Kitāb Ṣūrat al-Arḍ*, Leiden, 1967, pp. 254, 257; al-Muqaddasī, *Aḥsan al-Taqāsīm*, pp. 402, 405, 424.
- (33) Anon., *Hudūd al-Ālam*, Tehran, 1962, p. 138; English translation and commentary V. Minorsky, *Hudūd al-Ālam: The Regions of the World*, London, 1970, p. 130. Here Minorsky mistranslates the Arabic and Persian term 'qand' into 'refined sugar.'
- (34) Yāqūt, *Mu'jam al-Buldān*, vol. 5, Beirut, 1957, p. 42.
- (35) Ibn Ḥawqal, *Kitāb Ṣūrat al-Arḍ*, p. 254.
- (36) Al-Muqaddasī, *Aḥsan al-Taqāsīm*, p. 145.
- (37) Ibn Wahshīya, *al-Filāḥat al-Nabaṭīya*, vol. 1, Damascus, 1993, p. 162.
- (38) Al-Qazwīnī, *Āthār al-Bilād*, Beirut, 1960, pp. 417-8.
- (39) Ibn Sa'īd, *Kitāb al-Jughrāfiyā*, Beirut, 1970, p. 158.
- (40) H. Blume, *Geography of Sugar Cane*, Berlin, 1985, p. 164.
- (41) Blume, *Geography of Sugar Cane*, p. 164.
- (42) Al-Muqaddasī, *Aḥsan al-Taqāsīm*, pp. 161, 176, 180-181; Ibn Ḥawqal, *Kitāb Ṣūrat al-Arḍ*, p. 176; al-Iṣṭakhri, *Kitāb Masālik al-Mamālik*, Leiden, 1967, p. 46; Banyāmīn al-Tuṭīlā, *Rihlat Banyāmīn* (1165-1173), Arabic tr. by I. Ḥaddād, Baghdad, 1945, p. 92; Ibn Shaddād, *al-A'lāq al-Khaṭīra fī Dhikr Umarā' al-Shām wal-Jazīra: Lubnān*, Damascus, 1963, pp. 92, 104; al-Idrisī, *Kitāb Nuzhat al-Mushtāq fī Ikhtirāq al-Āfāq*, vol. 4, Napoli, 1974, pp. 372, 374; Ibn Sa'īd, *Kitāb al-Jughrāfiyā*, p. 152; al-Qazwīnī, *Āthār al-Bilād*, p. 142; Yāqūt, *Mu'jam al-Buldān*, vol. 4, p. 217; Abū al-Fidā', *Taqwīm al-Buldān*, Paris, 1840, p. 255.
- (43) Ronnie Ellenblum, *Frankish Rural Settlement in the Latin Kingdom of Jerusalem*, Cambridge, 1998, p. 213.
- (44) Ellenblum, *Frankish Rural Settlement*, p. 176.
- (45) Al-Iṣṭakhri, *Kitāb Masālik al-Mamālik*, p. 46.
- (46) Ibn Shaddād, *al-A'lāq al-Khaṭīra: Lubnān*, p. 104.
- (47) Al-Nuwayrī, *Nihāyat al-Arab fī Funūn al-Adab*, vol. 32, p. 260.
- (48) Sato Tsugitaka, "Fiscal Administration in Syria during the Reign of Sultan al-Nāṣir Muḥammad," *Mamlūk Studies Review*, 11-1 (2007), pp. 31-33.
- (49) Al-Nuwayrī, *Nihāyat al-Arab*, vol. 32, pp. 255-56.
- (50) Eliyahu Ashtor, "Levantine Sugar Industry in the Late Middle Ages: A Case of Technological Decline," A. L. Udovitch ed., *The Islamic Middle East, 700-1900*, Princeton, 1981, pp. 112-120.
- (51) D. Müller-Wodarg, "Die Landwirtschaft Ägyptens in der frühen Abbasidenzeit," *Der Islam*, 32 (1956), pp. 47-48; Watson, *Agricultural Innovation*, p. 28; al-Sayyid Ṭaha al-Sayyid Abū Mudīra, *al-Hiraf wal-Ṣinā'āt fī Miṣr al-Islāmīya*, Cairo, 1991, pp. 354-55.
- (52) Al-Muqaddasī, *Aḥsan al-Taqāsīm*, pp. 201, 208.
- (53) Al-Mas'ūdī, *al-Tanbih wal-Ashrāf*, Cairo, 1938; repr. Baghdad, n.d., p. 20; Ibn Ḥawqal, *Kitāb Ṣūrat al-Arḍ*, pp. 131, 134.
- (54) Nāṣir Khusraw, *Safar Nāma*, Berlin, 1922, pp. 79.
- (55) Idrisī, *Kitāb Nuzhat al-Mushtāq*, vol. 3, pp. 329, 335, 339.
- (56) Ibn Mammātī, *Kitāb Qawānīn al-Dawāwīn*, Damascus, Maktbat al-Asad, MS. Microfilm No. 672, fols. 30, 221.
- (57) Al-Bakrī, *Kitāb al-Masālik wal-Mamālik*, Wien, Österreichische Nationalbibliothek, MS. Cod Mixt 779,

fols. 30, 221.

- (58) Ibn Iyās says, "Most of the large canals (*khalīj*), small canals (*tur'a*), irrigation dikes (*jīsr*), and inlets (*khawr*) are found in Lower Egypt, while they are scarce in Upper Egypt" (*Kitāb Nuzhat al-Umam fi 'Ajā'ib wal-Ḥikam*, Istanbul, Süleymaniye Kütüphanesi, MS. Ayasofya 3500, fol. 95 r-v).
- (59) Al-Makhzūmī, *Minhāj fi 'Ilm Kharāj Miṣr*, British Library, MS. Add. 23483, fols. 32r-33v; Ibn Mammātī, *Kitāb Qawānīn al-Dawāwīn*, pp. 366-67.
- (60) Al-Musabbihī, *Akhbār Miṣr*, vol. 1, Cairo, 1978, pp. 65, 79-80; Ibn al-Ma'mūn, *Akhbār Miṣr*, Cairo, 1983, pp. 26, 31, 35-36, 42, 63.
- (61) Al-Bakrī, *Kitāb al-Masālik wal-Mamālik*, Kuwayt, 1980, pp. 81, 83.
- (62) For example, Mintz relates, "Slavery played a part in the Moroccan sugar industry and probably elsewhere" (*Sweetness and Power*, p. 27). Based on such an account, Kawakita Minoru furthered the misunderstanding that the cursed relationship between sugar and slavery had already started in the ages when the Muslims had a hegemony over sugar production in the world (*A World History of Sugar* in Japanese, p. 16).
- (63) Al-Nābulusī, *Ta'rikh al-Fayyūm*, Cairo, 1898, pp. 100-101.
- (64) Al-Nābulusī, *Ta'rikh al-Fayyūm*, p. 102.
- (65) Al-Nābulusī, *Ta'rikh al-Fayyūm*, pp. 122-123.
- (66) Al-Nābulusī, *Ta'rikh al-Fayyūm*, pp. 125-126.
- (67) Al-Nābulusī, *Ta'rikh al-Fayyūm*, p. 23. See also Cl. Cahen, "Le régime des impôts dans le Fayyūm ayyūbide," *Arabica*, 3 (1956), p. 15; Sato Tsugitaka, *State and Rural Society in Medieval Islam: Sultans, Muqta's and Fallahun*, Leiden, 1997, p. 213.
- (68) Al-Maqrīzī, *Kitāb al-Sulūk li-Ma'rifat Duwal wal-Mulūk*, vol. 1, Cairo, 1939, pp. 843-844.
- (69) Al-Maqrīzī, *Kitāb al-Mawā'iz wal-I'tibār bi-Dhikr al-Khiṭaṭ wal-Āthār*, vol. 1, Bulaq, 1270H.; repr. Baghdad, 1970, p. 204. Ibn Iyās says that after al-Nashw's seizures (*hawṭa*), sugarcane plantations declined in this district (*Nashq al-Azhār fi 'Ajā'ib al-Aqtār*, Istanbul, Süleymaniye Kütüphanesi, MS. Hacı Beşir Ağa 497-498, fol. 114r-v; id., *Nuzhat al-Umam*, fols. 177v-178r). See also Ashtor, "Levantine Sugar Industry," p. 99; A. Levanoni, *A Turning Point in Mamluk History: The Third Reign of al-Nāṣir Muḥammad Ibn Qalāwūn*, Leiden, 1995, p. 150; Sato, *State and Rural Society*, pp. 214-215.
- (70) Ibn Baṭṭūṭa, *Tuhfat al-Nuẓẓār*, vol. 1, pp. 100-101. Ibn Baṭṭūṭa calls the town 'Manlawī'. It was also called 'Mallawī' or 'Maltawī' (M. Ramzī, *al-Qāmūs al-Jughrāfī lil-Bilād al-Miṣriya*, 6 vols., Cairo, 1953-68, II-4, pp. 68-69).
- (71) Abū al-Fidā', *Taqwīm al-Buldān*, pp. 103-104. Yāqūt says that Qāmūla had many date trees and vegetables (*Mu'jam al-Buldān*, vol. 4, pp. 398-399).
- (72) Al-Udfuwī, *al-Tālī al-Sa'id al-Jāmi' li-Asmā' al-Fudalā' wal-Ruwāt*, Cairo, 1914, pp. 7-8, 9, 18; Yāqūt relates also that sugarcane cultivation was popular at Bahjūra in Upper Egypt (*Mu'jam al-Buldān*, vol. 1, p. 514). In 742/1341-42 Amir Qūṣūn was able to make numerous grants to his mamluks, partly because he held 500 *faddāns* of privately owned land in Upper Egypt for sugarcane cultivation (al-Maqrīzī, *Kitāb al-Sulūk*, vol. 2, p. 561; al-Yūsufī, *Nuzhat al-Nāṣir fi Sirat al-Malik al-Nāṣir*, Beirut, 1986, pp. 370-371). See also S. D. Goitein, *A Mediterranean Society*, Berkeley and Los Angeles, 1967-93, vol. 1, pp. 125-126.
- (73) Ibn al-Ḥājj, *al-Madkhal*, 4vols., Beirut, 1981, vol. 4, p. 154; Subhi Y. Labib, *Handels-geschichte Ägyptens im Spätmittelalter* (1171-1517), Wiesbaden, 1965, p. 320; E. Ashtor, *A Social and Economic History of the Near East in the Middle Ages*, Berkeley and Los Angeles, 1976, p. 243.
- (74) Ibn Ḥawqal, *Kitāb Ṣūrat al-Ard*, p. 122.

- (75) Al-Idrīsī, *Kitāb Nuzhat al-Mushtāq*, vol. 6, p. 644.
- (76) Deerr, *The History of Sugar*, vol. 1, pp. 76-79.
- (77) Watson, *Agricultural Innovation*, p. 29.
- (78) Ibn Ḥawqal, *Kitāb Ṣūrat al-Arḍ*, p. 91.
- (79) *Le calendrier de Cordoue*, new ed. by Ch. Pella, Leiden, 1961, pp. 36-37.
- (80) Al-Bakrī, *Kitāb al-Mamālik*, p. 853.
- (81) Al-Idrīsī, *Kitāb Nuzhat al-Mushtāq*, vol. 3, p. 230; vol. 5, p. 528; Ibn Saʿīd, *Kitāb al-Jughrāfiyā*, p. 123; Yāqūt, *Muʿjam al-Buldān*, vol. 4, p. 289; al-Qazwīnī, *Āthār al-Bilād*, p. 502.
- (82) Al-Idrīsī, *Kitāb Nuzhat al-Mushtāq*, vol. 3, p. 227.
- (83) Ibn al-ʿAwwām, *Kitāb al-Filāḥat al-Muslimīn al-Andalusīn*, Paris, Bibliothèque Nationale, MS. Arabe 2804, fols. 164b-165b.
- (84) Mintz, *Sweetness and Power*, p. 32.