The Chinese envoy Zhang Qian was probably the first official who brought back reliable information about the economic and social conditions of Central Asia to the Han dynasty imperial court. Zhang visited the Ferghana valley—which he calls Dayuan—around the 2nd century BC, and gave the following description:

“Dayuan lies southwest of the territory of the Xiongnu, some 10,000 li directly west of China. The people are settled on the land, plowing the fields and growing rice and wheat. They also make wine out of grapes. The people live in houses in fortified cities, there being some seventy or more cities of various sizes in the region.”

Zhang Qian is certainly one of the oldest preserved eyewitness reports we have on rice cultivation in Central Asia.

Today rice is an important food product used both as a daily dish as well as in more elaborate festival dishes in Central Asia and adjacent regions including Iran, Afghanistan, Azerbaijan, and Turkey. Various kinds of pilovs are an integral part of the local food culture of the Turkic- and Iranian-speaking oasis and town-dwellers of the region. In addition former nomads today eat rice as an important part of their meals. During Svanberg’s rather extensive travels in Central Asia in the 1980s, he was usually served dishes based on rice and meat—i.e. various kinds of pilovs—when visiting Kazak, Kirghiz, Uzbek and Uighur homes. A variety of pilovs constituted festival dishes and treats in most Turkic homes, no matter if they were nomads, farmers or urban people. Pilov is actually
today regarded as a kind of standard dish among these people and rice must be seen as an important contemporary staple food for many households in the region.

SCOPE

The region covered in our survey is vast, stretching from Istanbul to Chinese Turkestan (Xinjiang). Although dominated for centuries by two cultures, Turkic and Persian, countless regional culinary histories and traditions exist, in part surveyed in important papers by Zubaida and Fragner.\textsuperscript{2} The rice cultures of western and central Asia are far less well-known than those of south and east Asia, but the literature is nonetheless immense. Our coverage is of necessity selective: detailed for the earliest history and archaeological record of rice, for medieval Arabic culinary texts (valuable evidence of Persian influence on cuisine), and for the recent history and culture of rice cultivation and consumption in central Asia. We have been able to give too little attention to the fascinating history of the irrigation technology associated with rice paddies, or to the rich literature on rice in the Ottoman Empire.

GEOGRAPHY

Rice is a highly adaptable crop. The main limiting factor for rice cultivation is its water requirement, estimated at 9000 m\textsuperscript{3} per hectare of paddy in Iran.\textsuperscript{3} This is all the more so in temperate areas, such as Western Asia, where rice is grown during the dry summer period in order to meet rice's temperature requirement. As abundant, standing, water is required throughout the growing season, a relatively sophisticated system of irrigation channels and bounded fields is required. The combination of abundant water, low altitude (for summer temperature) and flat land limits large-scale rice cultivation to three regions in our study area (Fig. 10.1):

- Mesopotamia—lowland Iraq and southwestern Iran.
- Southern shores of the Caspian—Iran.
- Desert oases of Turkestan—Turkmenistan, Uzbekistan.

Rice is also cultivated, on a smaller scale, in Turkey:

- Cilicia—southern Turkey. Seyhan river delta.
- İzmir—western Turkey. Büyük Menderes River (ancient Maeander).
- Marmara—northwestern Turkey.
- Black Sea—northern Turkey. Valleys to the south of the Pontic mountains, and scattered locations in eastern Turkey.

Other small areas of rice cultivation exist on the southern slopes of the Zagros mountains (accounting for about 15% of the nation’s crop), in southern Iran, and in scattered small oases in Xinjiang. In all the areas listed cultivation has increased in the last 40 years, thanks to the availability of modern technology for irrigation, and increased access to farmer credit.

In Western and Central Asia rice is usually planted in the spring and then transplanted into fields in May or June, with the harvest from August to November.

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Fig. 10.1. Map showing areas of rice cultivation in southwest and central Asia. Solid shading: introduction before 0 AD; cross-hatching: after 0 AD; vertical hatching: after 1500 AD. Dates are those proposed by Bertin et al. and are in agreement with the views expressed in this paper. Adapted from Atlas of World Food Crops. Map 4, Rice. By J. Bertin, J.-J. Hémardinquer, M. Keul and W.G.L. Randles, 1971, Paris: Mouton.
FOOD CULTURES OF RICE

Medieval Mesopotamia

Early medieval Islamic cookbooks give a rich insight into dishes consumed by the middle and upper classes in parts of Western Asia. These have just begun to attract serious attention from food historians but are barely known outside a handful of specialists of this period in this region. The following extracts relate to the uses of rice which are documented in these sources.

The earliest of these cookbooks was compiled by ibn Sayyār al-Warrāq in about the 940s or 950s and details 615 recipes drawn from over twenty cookbooks often written by or for caliphs, princes, physicians and leading political and literary figures. A small number of these recipes involved rice. This was typically husked white rice (aruzz abyad maqshūr), which is often referred to as being washed, sometimes several times, “until it is clean." Rice-bread (khūbz al-aruzz) is described by al-Warrāq as “less bloating than wheat bread.” Among the recipes for alcohol-free beer (fuqqā’) is one where rice was substituted for bread: the type of rice is described as ja’fari (literally “river”) which may refer to its origin in the marshes of southern Iraq.

Many of these recipes were for rice porridge. These included smooth thick rice porridges with pounded meat (harīsat al-aruzz), chicken breasts and optional wheat (harīsa kānūniyya) or shredded fatty meat and wheat, spiced with cassia and galangal (khaytiyya). Several varieties of coarse rice porridge are also described which were spiced with cassia and galangal, sometimes sweetened either with sugar “the way the Persians used to do” or with honey, and served in a bowl (aruzziyyat). Another type of coarse rice porridge involved the addition of thin slices of seasoned fried meat. A lentil, bean, chickpea and rice porridge with meat, chard roots and stalks, olive oil, and the standard early medieval spice mix of ground coriander, cumin and black pepper is described as best served in a bowl over olive oil drenched white bread and described as the tafshīl of Sālih bin ‘Alī, a grandson of the caliph Hārūn al-Raṣḥīd. A dish of rice porridge with shredded boiled leeks (which substituted for the meat), safflower seeds, and ground sesame and almonds is described as a Christian recipe used during Lent.

A recipe for stuffed tripe (qībba) is described as containing a small amount of rice. Three recipes are characterized by the combination of three types of grain and pulse, namely rice, wheat and lentils, chickpeas or beans, and either with meat or without (muthalathāt). Other recipes involve
boiled meat and spinach (*isbanākhīyyāt*) or meat and cabbage (*kurunbiyyāt*) with onion, galangal, cassia, seasoning and a little rice; boiled turnip (*shaljamiyyāt*) with meatballs, onion, seasoning, spices and small quantities of chickpeas and rice; meat medleys with onions, milk, beans and rice, “the amount of which is one and a half times more than the beans [or lentils]” (*makhīlūtāt*). Three thin grain stews recommended for those with upset stomachs, indigestion, gastric ailments and “good for liver, fevers, and pain in the upper gate of the stomach” relied on dry toasted rice as the key ingredient. A spicy poultry dish served with eggs and cheese, was cooked with an optional added “handful of rice and smoked strips of meat [which] would be a good thing to do, delicious and scrumptious” (*Nibātiyya* of Ishāq bin Ibrāhīm al-Mawsili). A rack of lamb steamed in a modified chlorite cooking pot with rice and milk cooked separately in the resulting juices has the Iranian name of *dākibriyān*. Another oven-baked meat dish was characterised by the addition of beans and “a similar quantity of good quality [or Mutawakkili] rice” (*tannūriyya*).

There were also sweet desserts. These included a recipe for moist condensed pudding (**Khabisa**) of sugar, honey, saffron, sesame oil and rice flour (**daqīq al-aruzz**) which was attributed to the Abbasid vizier Hāmid bin al’Abbas and specified as “non-Arab” (**muwallaá**); a variety of oven-baked rice pudding was cooked with duck dripping (**jūdhāba**). A smooth rice pudding made with rice-flour, milk, sugar and fat (**bahatta**) is better known today as *muhallabiyya*, and two other versions of this are described, including one with chicken lightly seasoned with coriander, cumin, cassia and saffron, served with honey and rosewater: “the beauty of the dish is when the rice grains show through the honey”. Two recipes for golden condensed pudding (**fālūdhaj**, from the Middle Persian **pālūdag**, literally “purified”) refer to the use of thoroughly washed, dried and pounded rice which was sifted through silk or linen, mixed with honey, ground camphor and butter, cooked and served with crushed white cane sugar; one of these recipes also specifies that the cook should “choose Levantine rice (**ruzz Shāmī**) or Yemenite (**ruzz Zabīdī**). These are the best and whitest rice varieties available”.

Many of these recipes are therefore porridges or desserts, only small quantities of rice are specified for most dishes and in these cases it is mainly employed as a thickening agent, and there are no references to serving meals on a thick bed of rice whereas, by contrast, many of the recipes refer to serving dishes with bread. Some of the recipes are vegetable or pulse-based and therefore probably represent common dishes elevated in status through the addition of spices: the references to adding rice may reflect courtly associations rather than common cooking traditions and it
may be significant that only two of these dishes are attributed to named individuals. This is particularly clear in the case of the golden condensed puddings, where the ingredients include expensive long-distance imports (the main source of camphor was Japan and even the rice is specified as preferably coming from Syro-Palestine or Yemen, in both cases far removed from the kitchens of Baghdad), the process was labor intensive and there is gratuitous reference to straining through costly silk or linen cloth. The implication of these references is that rice was still regarded as a speciality ingredient rather than a staple. Several of these recipes are referred to in connection with Iranians or have Iranian names, and the fact that many other Abbasid court dishes also have Iranian names suggest a strong legacy from earlier Sasanian cuisine. This is made explicit in a poem quoted by al-Warrāq and recited to him by Abū al-ʿAbbās al-Adīb, a resident of the middle Euphrates city of al-Anbār,\(^5\) as it associates the invention and popularity of a variety of rice porridge with members of the Sasanian royal house:

“The most delicious food one may ever eat when April the arrival of summer heralds,
And when kids and lamb are at their best, is harīsa made by niswān [women].
With skilled hands, tastiest harīsa they make, birds and lamb combining.
Fats and oils are added to pot, and meat and tail fat and tallow.
Then geese and quails and fair wheat and grass pea follow.
Next, milk and rice, which the miller perfectly ground,
And salt and galangal. It wearied the hands that beat and stirred it.
Like the shining constellations in the sky, it puts all other dishes to shame,
As it comes carried by the slave boys, embraced by bowl and tray,
Above it is a bamboo vault, which roof and walls support,
Domed and rounded. The slave boys did uncover it and offer.
Its radiance dazzles the eyes. With murri [liquid fermented sauce akin to soy] brought, just what it needed.
Coveted by the hungry and the full, craved by host and guest alike.
Among its peers it reigns, mind and intellect clearing,
Eating it does the body good. Sāsān in his days invented it,
And Kisrā Anū Shirwān loved it.
If the famished catch sight of it, they will scramble for it.”\(^6\)
In a chapter on “Humoral properties of grains and bread made from wheat and rice”, al-Warrāq states that:

“Rice is closer to moderation with regard to heat and cold. It is not recommended for people suffering from colic because it constipates. It is very nourishing and cooking it with lots of fat will facilitate its digestion. When cooked with milk and sweetened with sugar, rice is wonderfully nourishing, healthful, and helps increase blood, so know this.”

Al-Warrāq’s cookbook is a major mine of culinary information but it is not the only one. There are four important 13th century cookbooks. One was compiled in Baghdad in the first half of the century by Muhammad ibn al-Karīm al-Kātib al-Baghdādī.8 The second is known as *Kitāb al-Wusla ilā l-habīb fi wasf al-tayyibat wa-l-tib* (“Book of the elation with the Beloved in the Description of the Best Dishes and Spices”) and is usually attributed to Ibn al-ʿAdīm of Aleppo who emigrated to Gaza and thence to Egypt; it includes a number of North African dishes as well as recipes identified with particular regions. The third is known as *Kanz al-Faṣwāʾid fī tanwīʿ al-mawāʾid* (“The Treasury of Useful Advice for the Composition of a Varied Table”) and was compiled in Egypt under the Mamluks; the fourth was almost certainly compiled by ibn Raẓīn at Murcia in Andalucia and is titled *Kitāb Fadālat al-khwān fī tayyibāt al-taʿām wa-l-alwān* (“Book of the Excellent Table Composed of the Best Foods and the Best Dishes”).9 Together they add a number of references to the use of rice as a culinary ingredient. These include the addition of roasted cumin and cinnamon to rice with yoghurt, and adding boiled spinach to a garlic-flavored stew of meat, rice and chickpeas. *Kitāb al-Wusla* is the most important for our purposes as it expressly refers to certain dishes which resemble what we recognize as pilaf: one is described as “Indian rice” which is described as being cooked in a copper pot with two and a half times the quantity of water compared to the rice; others refer to the addition of meat, fat, chickpeas or pistachios, and sweetened at the final stage with sugar and rose water.

In summary, these cookbooks describe a number of specific dishes involving rice. One has an Indian association and many have Iranian affinities or names which suggest that these may belong to a longer pre-Islamic culinary tradition centered in Iran and Mesopotamia (the latter was the seat of the political capital and at the cultural heart of Iranian empires for over seven centuries before the Islamic conquest). The care expressly taken to prepare the rice by washing and occasional references to steaming suggest that the principles of pilaf—namely a non-mushy dish
whereby the individual grains remain separate (mufalfal)—were already well understood by the medieval period and possibly earlier.

Central Asia

A common dish—made in various ways among the Turkic and Iranian peoples of Central Asia—is the so-called pilov (Uighur pelaw; Uzbek palov; Karakalpak palua; Kazak palau; Kirghiz paloo, Tajik palov). The essence of all these dishes is a slow-cooked recipe beginning with the melting or rendering of fat from a fat-tailed sheep in a heavy cauldron, followed by the sautéing of onions and carrots, the addition of the meat and spices, and cooked on a slow simmer to blend the flavors before carefully adding the rice (or barley) on top and then carefully filled with water; the pot is then tightly lidded and allowed to slow cook until all the water has boiled away. Great care is taken to ensure that the layers of ingredients are not disturbed either through the addition of each set of ingredients, careless slopping of the water or during the cooking cycle. After cooking the rice is then ladled out and some of the spices spooned on top. An American traveler to Tashkent in the 1870s describes its preparation:

“a quantity of mutton tallow or fat is melted in a pot, and the mutton, after being cut into pieces, is stewed in this; when the meat is cooked it is taken out, and the rice, which has been properly washed and cleaned, is put in and stewed until done; with this are mixed usually small thin slices of carrot, and the whole is turned out on a large platter, the pieces of meat and bones being placed artistically on the top.”

Pilov therefore has been prepared in essentially the same manner for at least 130 years in Central Asia. The name of the dish is originally borrowed from Persian (pilav) but is probably an early borrowing into the Turkic languages. Pilov is considered to be derived from Sanskrit pilaaka’ ‘millet’. The dish most certainly reached Central Asia from Iran but probably originated in India. Pilov has been known since medieval times and is mentioned in 13th century Arabic sources from western Asia (see above), thus considerably earlier than in some previous statements that it originated in the Qajar period in Iran. Today it is regarded as “the flagship of Central Asian cookery,” as a couple of authors recently phrased it. For the people of Central Asia and adjacent regions such as Afghanistan and Iran pilov has a central place in their food culture, so it can be regarded as what nutritionists sometimes call a cultural superfood.
Pilov has since spread to other parts of the world. Nowadays pilov in various shapes and forms are found throughout many parts of Eurasia. Pilov thus is part of an international food culture. It entered the Russian empire at a relatively early date and is nowadays a common dish, known as plov, among people all over the former Soviet Union. Through the Ottoman Empire it also entered the European languages and in English is known as pilaf. An early Swedish encounter with the dish was through the envoy Claes Rålamb, who during his travel to the Sublime Porte in Constantinople in 1658, was served pilou by his Turkish hosts.  

Although the name indicates a long tradition in Central Asia it was until rather recently more commonly made of barley rather than rice among the oasis dwellers. It was only the rich and wealthy that could afford to use rice in their pilov. However, during the approximately last century or more rice has become the most common ingredient.

Nowadays there are many ways of making pilov. There are said to be over four hundred within Uzbek cooking alone and almost endless variants reflect the availability of local seasonal ingredients, and household preference. Any cookbook from the region gives a rich variety of pilov dishes: pilov made of mutton, carrots, rice and topped with cut dried apricots and apples; pilov with rice, mutton, dry peas, raisin and

Fig. 10.2. Plov vendor at New Year festival, Russian Turkestan. Photograph taken 1865-72 by S.M. Prokudin-Gorskii. Courtesy, Library of Congress (LC-DIG-ppmsca-14391).

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pomegranate’s kernels; pilov with chicken (or duck, pheasant or turkey meat), rice, carrots, onions and parsley roots; etc. Every ethnic group is proud of having pilov of their style, especially when it comes to festival dishes, so-called bairam pilov (“festival pilov”). In reality there are many local and individual varieties of these recipes as well.  

Pilov plays an important role as ethnic food in the Central Asian diaspora communities in Turkey and Europe. Pilov has always been an important meal for large feasts, for instance in connection with circumcision, wedding, memorial feasts and other major events. Women now traditionally prepare the pilov in the home, but for public feasts—weddings, etc.—men did and do the cookery and take pride of their skill.

One modern writer states how,

“In the 1960s a member of the Central Committee of the Soviet Communist Party, for whom I was interpreting, shocked his American hosts by stating that as far as he was concerned one of the most significant achievements of the 1917 Revolution was that it finally gave Uzbek women the right to make plov.”

Religious festivals are also celebrated with huge meals including a bairam pilov. Also at important religious shrines pilgrims were provided with pilov, prepared in giant cauldrons. The Swedish explorer Sven Hedin describes in the late 19th century how pilov was prepared at Ordam Pasha tomb—a famous mazar ascribed to Sayid Ali Arsland Khan—in western Taklamakan desert.

Other dishes known in Central Asia are a rice soup, shöilä, mentioned already in the 19th century among the oasis dwellers in Turkestan and the Kazak rice bread, muiz. Among the Uzbeks and Tajiks there is also a kind of porridge eaten with meat, called mashkichiri. The Koreans, who were exiled to Uzbekistan, brought a variety of rice dishes with them as well, such as rice cakes (not sweet). Uzbek urban dwellers would eat these in lieu of non (bread). When they could not get non but rice cakes they would preface it with “now we are being like the Koreans.” The Dungans, a small minority living in Kyrgyzstan, Kazakhstan and Uzbekistan which are still primarily farmers growing rice, wheat and vegetables, are said to eat rice as food, but will seldom offer it to guests.

Most Central Asian peoples are Muslim, and alcoholic beverages have therefore hardly any historical tradition among them, although beer, wine and hard liquor became available with the increasing influence of the dominant Russian and Chinese cultures in the 19th century. Chinese rice wine has traditionally been consumed by the Mongols—known by them as tururgajin ariki—and is of course readily available in contemporary Xinjiang.
Iran and Afghanistan

Rice is an important crop in contemporary Iran, and it is the second main food consumed in the country. It is used in practically every meal. Most rice is produced within the country, especially in the Caspian lowlands in the north, although the urban population to a large extent nowadays consumes imported rice, especially from South East Asia. The main areas of cultivation in Iran are Mazandaran and Gilan provinces, although rice is also produced in Zanjan, Golestan, Khuzestan, Esfahan, Fars and Khorasan. In Iranian food culture, there are, in addition to various forms of polov, numerous other rice dishes such as rice pudding (shir berenj) and rice cookies (kalucheh berenj), and of course the rice-stuffed dolmeh.

As in Iran, rice is a staple eaten several times a day in Afghanistan, and the crop is widely grown in the country. It is cultivated around the central mountains where rivers and larger streams make irrigation possible. Two different kinds of rice have traditionally been grown, lok and mahin. The former is a Turkestan kind of rice, while mahin originates from India and has during the last century been grown in the provinces of

Fig. 10.3. Rice field, Samarkand. Photograph taken 1905-15 by S.M. Prokudin-Gorskii. Courtesy, Library of Congress (LC-P87-8031A).
Laghman and Qataghan. The famous *qabuli palau*, a dish made of mutton, spices and yellow rice, is nowadays a “national dish” in Afghan restaurants all over the world.\(^\text{23}\)

**Turkey**

In Turkey, rice is cultivated especially in northwestern part (Marmara-Thrace) and in the northeastern part of country. Some rice is also produced in southeast Anatolia. The main rice growing provinces are Edirne, Samsun, Çorum, Balikesir, Çanakkale, Sinop, Kastamonu and Diyarbakır. Most of the rice farms are small.

Rice is used in various dishes. In many Anatolian villages, yoghurt is regularly eaten with rice as *yogurucumber* ‘yoghurt soup’. *Sade pilaf* is boiled rice which can accompany many dishes (meat, fish, and vegetables). Various kinds of pilafs containing meat from chicken, lamb and other
animals—such as *etli pilav* (rice with pieces of meat)—are popular in Turkish cookery. Green peppers, eggplant, tomatoes and other vegetables are stuffed with a rice mixture, and known as *dolma*. They can also be made of rice-stuffing wrapped with wine blades. Another kind of *dolma* are *midye dolması* (mussels stuffed with rice) known from the coastal areas. Various kinds of rice puddings, *sütlaç*, are popular as dessert and are also served in restaurants. The consumption of rice increases as the living standard rises in contemporary Turkey. To cope with the increasing demand, rice is imported from U.S., Egypt and other countries. Rice consumption in Turkey per person is estimated around 6.5 kilograms annually (2008).

**DOMESTICATION AND EARLY HISTORY**

It is certain that rice was domesticated somewhere in the distribution area of wild rice, which stretches from the eastern Indian subcontinent, through Indo-China to southern China. However, the number of domestication events, area(s) in which domestication took place, and the timing remain controversial.

Several types of genetic evidence point to at least two domestication events in rice. Cultivated rice can be divided into two main forms, *japonica* rices with a broad, thick grain grown in more northerly parts of China and southeast Asia, and *indica* rices with a thin, elongated grain. It has been known for many years that these are not fully interfertile, suggesting that they might arise from separate wild ancestors. Recent studies of several forms of genetic evidence support this hypothesis, although most literature still refers to a single area of origin. Modern populations of *indica* rice are most closely related to wild rice populations south of the Himalayas, in India or Indo-China, and *japonica* rices are most closely related to wild rice in southern China. This may be the result of independent domestication in the two areas, with a subsequent genetic history further complicated by post-domestication introgression between the crop forms of rice and the wild ancestors.

Another complicating factor is the existence of less common forms of rice, which may derive from one of the two major forms, or be of independent origin. These types of rice are *aus* (from Bangladesh), *ashina* (floating rice of India), *rayada* (floating rice of Bangladesh) and *aromatic* (e.g. Basmati rice in the Indian subcontinent and *sadri* from Iran). Rice landraces in Iran, the Indian subcontinent and much of Indo-China are predominantly of *indica* or *aus* races; landraces in southeast Asia are of *indica* or *japonica* races. Broadly speaking, the distribution of the two
main races is consistent with spread from two centers of domestication, and with rice in Iran coming from the India/Indo-China centre of origin. However, more detailed genetic characterization of Central Asian, Iranian and Turkish rice populations is necessary before genetic evidence can be used to trace their routes of spread.

As with genetics, archaeological evidence for domestication is incomplete and controversial. Rice remains are abundant at many archaeological sites in the Yangzi and Huai rivers of southern China, at archaeological sites dating from about 10,000 BC. Wild rice was an important foodstuff for pre-agrarian foragers, hence its abundance. It has been widely suggested that the first appearance of domesticated rice is at about 6000 BC. However, some criteria used to distinguish wild and domesticated grains, such as grain size and shape, are ambiguous, and the most reliable criterion, rachis scars on rachis bases, has not been widely applied. Identification of ancient grains to indica or japonica race is particularly problematic. By 4000 BC, there is unambiguous evidence for rice domestication in southern China.

In the Indian subcontinent early records of rice are characterised by vague identification criteria and indirect dating. Evidence from sites such as Chopani-Mando (6000 BC) and Khairadih (2500 BC) must be set aside. Sporadic early occurrences are likely to be of wild rice. Rice first becomes abundant at the beginning of the second millennium BC, marking its establishment as a summer crop in the subcontinent. The foothills of the Himalayas, in the eastern half of the subcontinent, and the Ganges basin to the south, lie within the distribution of wild rice, and are a potential centre for rice domestication. Rice is found at numerous sites in the Ganges Basin from 2000 BC onwards. To the west of the subcontinent, rice occurs at Harappan sites on the Indus valley, such as Harappa, from 2000 BC, and soon afterwards at the site of Pirak, at the edge of the Indo-Iranian plateau (Fig. 10.6).

In summary, genetic evidence no longer supports the view that rice spread to the Indian subcontinent from a single centre of origin in southern China; the earliest domesticated rice in India may have been domesticated locally. In terms of understanding the spread of rice to the Near East, the most likely starting points are in the Indus Valley, with its coastal connection to shipping routes, or on the eastern edge of the Iranian Plateau. In both areas, rice cultivation was established around 2000 BC.

In the case of Central Asia, a possible route of spread is westwards from northern China. Rice joins the millet-based agriculture of northern and northwest China about 3000 BC, but then spreads slowly eastward,
reaching Korea about 1000 BC and Japan about 400 BC. In the light of this slow eastwards spread, any travel through the desert regions north of the Himalayas is unlikely to have been fast.

**EARLY WRITTEN SOURCES AND ARCHAEOLOGY**

**Iron Age and Achaemenid Periods**

A single rice grain is said to have been recovered from a pit at Hasanlu, in north-west Iran, and provisionally attributed to Hasanlu Period III (ca. 750-590 BC). However, although referred to in a brief preliminary report, this was not mentioned in the more detailed subsequent publication of the excavated plant remains. This slender piece of evidence therefore should be treated with caution until further details become available. However, Potts’ suggestion that this grain could be from wild rice seems unlikely given that the nearest known area of wild rice lay some 2000 kilometers to the east of Hasanlu.

References in Iron Age texts are ambiguous. It has been suggested that rice is included in the list of products in Ezekiel (xxvii. 17), as *minnith*. The book of Ezekiel was written in Babylon in the 6th century BC. However, standard Bible encyclopaedias today consider this text as possibly corrupt, and if valid, referring to a town from which wheat was exported. Thompson translated the Neo-Assyrian term *kurangu*, used in the 7th century BC, as rice. The *Chicago Assyrian Dictionary* does not translate this term beyond cereal.

One author has proposed that rice was introduced to lower Mesopotamia from India during the Achaemenid period, probably on the strength of a 4th century BC description by Diodorus (XIX.13.6) of rice among military provisions at Susa.

Evidence from subsequent Parthian and Sasanian periods is more conclusive yet this has been widely overlooked within the context of the history of rice cultivation in the Near East.

**Parthian Period**

The earliest reliable Near Eastern archaeobotanical evidence for rice consumption derives from Susa and dates to the 1st century AD. This consists of 373 carbonised grains of short-grained rice sealed beneath roof collapse on a floor in Level 3A at Ville Royale II; associated jars suggest the means of storage. Results from the 1973 Susiana Survey suggest that rice may have been cultivated during this period in the South Dez plain.
Fig. 10.5. The Persian Empire in 490 BC. With acknowledgements to the Department of History, United States Military Academy, West Point.
Fig. 10.6. Location of archaeological sites mentioned in the text.
This evidence is in the form of rice-hull impressions that were provisionally identified in fired bricks found on the surface of several sites here dating between *ca.* 25 BC and 250 AD.45

**Classical and Byzantine Evidence**

It is clear that rice was not grown in Mediterranean Europe in the classical period.46 However, opinions vary as to how much of it was eaten. Dalby suggests that rice was uncommon in classical Europe, and was mainly used as a medicinal plant.47 Rice is mentioned in medical texts by Dioscorides and Galen. Writing in about 180 AD, Galen says that “This grain is universally administered to check the stomach. It is cooked using a method similar to that employed with groats, although it is harder to digest than groats, contains less nutrition, and generally falls short of groats in culinary terms.”48 Rice was a sufficiently well-known food to be mentioned alongside barley and broad beans in the Greek manuscript *Peri Trophon Dynameos* (“On the power of food”), written in the 2nd century AD; the *Apicius* mentions the use of water in which rice has been cooked as an ingredient, suggesting that rice cannot have been too exotic in the better-off households of Rome in the 1st centuries AD.49

Archaeobotanical finds from the classical period are rare. Small quantities of grain are found at the Red Sea ports of Quseir al-Qadim and Berenike, in Egypt.50 The *Periplus Maris Erythraei*, a survey of trading and sailing conditions in the Red Sea and Indian Ocean written between AD 40 and 70, refers to the export of rice from the west coast of the Indian subcontinent, by ship to Socotra and the northern coast of Socotra. From here, rice was traded to Roman Egypt. It has been suggested that the rice exported from India to the Red Sea coast was for consumption by Indian merchants resident there. Elsewhere, small quantities of rice have been found at the Roman sites of Zurzach in Switzerland, and Novaesium in Germany.51

Travelers with Alexander the Great, who reached the Indus in 326 BC, are quoted in Strabo’s *Geography*:

“The rice, according to Aristobolus, stands in water in an enclosure. It is sowed in beds. The plant is four cubits in height, with many ears, and yields a large produce. The harvest is about the time of the setting of the Pleiades, and the grain is beaten out like barley. It grows in Bactriana, Babylonia, Susis, and in the Lower Syria. Megillus says that it is sowed before the rains, but does not require irrigation or transplantation, being supplied with water from tanks.”52
Aristobolus’s observations appear to be of the Punjab, in the extreme northwest of the Indian subcontinent. It is unclear whether the observations regarding the other areas—Bactria (northern Afghanistan), Babylonia (southern Iraq), Susiana (southern Iran) and Lower Syria (possibly Lake Huleh, Israel)—are from Aristobolus or from Strabo himself, writing in the 1st century AD. Megasthenes is further quoted on the consumption of rice beverage and pottage, again in the Indian subcontinent.\(^{53}\)

Jewish textual sources suggest that rice was a significant crop in ancient Israel by 70 AD, for example in the valley of Dan; they also refer to the cultivation of red rice in the Orontes Valley, near Antioch.\(^{54}\)

**Sasanian Period**

Literary and historical sources suggest that rice cultivation continued in areas near the head of the Gulf during the Sasanian period. Rice-bread appears to have been consumed in Hozai (Khuzistan) at the head of the Persian Gulf and elsewhere in the alluvial plains of Mesopotamia, judging by sporadic references in the Babylonian Talmud, which was largely composed in central Mesopotamia between the 3rd and 5th centuries AD.\(^{55}\) According to Jarir al-Tabari, rice was a local crop subject to taxation during the Late Sasanian period.\(^{56}\) An Arab conquest anecdote of al-Hamadani refers to the transport of rice in Meshan during the second quarter of the 7th century.\(^{57}\) In addition, rice (Middle Persian *brinj*) was listed as a primary ingredient of certain Sasanian desserts, including a rice-jelly served among other items as the “Dish of the King” and a type of rice-pudding known as a “Greek Dish.”\(^{58}\)

However, according to the *Zhou shu* (History of the Northern Zhou Dynasty, AD 557-581), compiled by Linghu Defen (583-666) and presented to the Chinese throne in 636, the kingdom of Bosi [Persia] lacked rice:

> “Their five cereals, fauna, and other things are about the same as those in China, except that they have no rice or millet.”\(^{59}\)

In the light of the sources cited above, this statement suggests that rice was considered a sweetmeat rather than a staple, except possibly among peasants in areas of southern Mesopotamia and south-west Iran where larger-scale rice cultivation was feasible.\(^{60}\) The additional possibility remains that a certain proportion of rice consumed within the Sasanian Empire may have been imported by sea via the Persian Gulf from the Indian subcontinent and there is archaeological evidence from the site of Kush for the import of Indian goods—including cooking pots and glass
Archaeological (including archaeobotanical) evidence for rice during this period is surprisingly scanty. Adams and Nissen have proposed a Sasanian date for a dense network of irrigation channels to the north of Warka Survey site 265 but the date of this field-system may be considerably later than the nearby settlements and the suggested function as evidence for rice-cultivation is questionable. No phytolith work has yet been done for this period and systematic flotation recovery of carbonised plant remains has only been conducted at two Sasanian sites, namely the city of Merv in Turkmenistan and the much smaller Persian Gulf site of Kush in Ras al-Khaimah. A large number of samples have been analyzed from nine seasons of excavations at Merv. These include two areas dating from the 4th to 7th centuries and consisting of Sasanian private houses, located within the citadel of Erk-Kala and the adjacent lower city of Gyaur-Kala. These results clearly demonstrate that the dominant irrigated summer crop in the oasis during this period was cotton. In contrast, millet was rare and rice was completely absent.

The evidence cited above therefore suggests that rice cultivation did play a role in Partho-Sasanian agriculture but that it was limited to suitable lowland areas of southern Mesopotamia and south-west Iran. The economic significance of rice therefore is likely to have been over-emphasised in earlier studies. The same may be also said for the alleged “uniformity of mode of production” and degree of centralization of Sasanian agriculture as there was undoubtedly considerable variation in the agricultural economy between different ecozones.

Early Islamic and Later Medieval Evidence

There is more evidence for the range of foodstuffs produced and consumed across southwestern Asia as we enter the early Islamic period, although evidence is scanty for Central Asia. The increase in the number of lengthy written accounts, especially cookery books compiled in Baghdad, directly reflects the wider availability of paper and the creation of libraries.

The written sources of this period suggest that there was somewhat more widespread rice cultivation than previously, and that this was undertaken in humid and/or well-watered areas of north-west Afghanistan, Iran (Dailaman, Gilan, Tabaristan, Fars, Khuzistan provinces), Azerbaijan, lowland Iraq, southern Turkey (Cilicia), north-east Syria (the Nusaybin area), Palestine (the Jordan valley), Egypt (Nile valley, Faiyum), Yemen (the Tihama) and al-Andalus. In addition to these
regions, recent archaeobotanical evidence in the form of carbonized grains and chaff recovered from discrete samples from small rural sites along the Syrian middle Euphrates confirms rice cultivation in that region between the 9th and 12th centuries (Fig. 10.7). One charred and one silicified rice glume were found in a 12th century context at Gritille, further upstream along the Euphrates in present-day Turkey.

This increase in cultivation in Mesopotamia has been attributed to rising demand owing to an influx of Iranians “from Khuzistan and from the Caspian provinces [who] were accustomed to rice.” Rice merchants (ar-razzaz) are also attested from the later 9th century onwards, raising the possibility of long-distance trade to areas of consumption, beyond those of cultivation. Importantly, rice appears to have been considered a luxury outside areas of production and rice-bread (khubbz al-aruzz) was a staple among the poorer classes, notably in lower Mesopotamia, during the Abbasid period. Indeed, rice-bread was only customary within Iran in rice-growing areas such as the southern shores of the Caspian, and has been more recently replaced even here owing to the use of imported wheat flour.

Fig. 10.7. Rice remains from 11-12th century phases at Tell Guftân, southeast Syria. a: grain; b: pedicel with lemma and palea stubs. Page 444, Peuplement rural et aménagements hydroagricoles dans la moyenne vallée de l’Euphrate fin VIIe-XIXe siècle. Edited by S. Berthier. 2001. Institut français d’études arabes de Damas, Damascus.
Across other parts of the Western Asia, rice became increasingly available during the Ottoman period following wider cultivation not only on state-owned lands but also in private agriculture.\textsuperscript{73} However it is telling that detailed analysis of 18\textsuperscript{th} century Ottoman court records for Damascus reveals that although rice had a high reputation comparable to wheat, it was mostly imported from Egypt and thus reserved for feasts and special occasions, whereas barley was the most commonly consumed grain (Table 10.1).\textsuperscript{74}

### Table 10.1. Amounts of grain and fodder in Damascus estates, ca. 1750-1767

<table>
<thead>
<tr>
<th>(Grain/fodder quantity)</th>
<th>(in ghirara)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley</td>
<td>238.4</td>
</tr>
<tr>
<td>Wheat</td>
<td>180.2</td>
</tr>
<tr>
<td>Rice</td>
<td>56.51</td>
</tr>
<tr>
<td>Vetch</td>
<td>5.99</td>
</tr>
<tr>
<td>Sorghum</td>
<td>4.8</td>
</tr>
</tbody>
</table>

*Source: Greehan, J. (2007:59).*

**Ottoman Turkey**

Rice could be bought in quantity in Byzantine Trebizond in 1292, although it is unknown whether it was grown locally, or imported from the Caspian.\textsuperscript{75} It became available as a local crop in Anatolia and Rumelia during the next centuries.\textsuperscript{76} During the 16\textsuperscript{th} century rice was grown in Anatolia, especially around Boyabad (in the sub-province of Kastamonu) and at Beypazari. Also the area around Philippopol (contemporary Edirne) had a reputation for its rice farming. It was, according to Faroqhi, usually not practiced by ordinary peasants. Therefore rice farming was in the hand of the central administration that employed share-croppers. The sources mention a considerable division of labour, with people responsible for watering (\textit{saka}), the cultivators (\textit{kürekçi, rençbi}) and a foreman (\textit{reis}). Some rice was also produced by pious foundations. The rice which was sold on the market became popular as a food item among the wealthy, while it probably was seldom consumed by peasants outside the producing areas in the 16\textsuperscript{th} century Ottoman society.\textsuperscript{77}

Still in the early 20\textsuperscript{th} century, rice production was not adequate to the local demand. Marshes in which it was grown were so unhealthy, due to the malaria situation, that the government at one time forbade its cultivation.\textsuperscript{78}
Former Soviet Central Asia and Chinese Central Asia

Although the Chinese to the east, and the Indo-Iranian peoples in the south, have a long tradition of rice cultivation, we have no information about when rice culture first reached Central Asia. We have no Neolithic record of cultivated rice from Central and Western Asia.

The recent report of rice dated to 3000 BC from the Xishangping sites in the Gansu province, northwest China, raises again the question as to whether the cultivation of rice spread westwards into Central Asia via ancient trade routes.\textsuperscript{79} Written documents are much younger. When Zhang Qing arrived in Dayuan in the 2\textsuperscript{nd} century BC—located in a region that nowadays belongs to Uzbekistan—rice cultivation was already well-developed. Zhang is probably describing agriculture with dry-land rice. The lack of data makes it difficult to speculate about an unbroken rice culture until today. During the Sasanian period, Chinese annals tell us that rice was plentiful in places like Kucha, Kashgar and Khotan.\textsuperscript{80}

Large-scale cultivation of rice must be regarded as a relative newcomer in the Central Asian area. Travelers during medieval time have very little to say about rice cultivation although when the Franciscan friar William of Rubruck passed the Mongolian-controlled areas in 1253-1255 on his journey to the great khan Möngke he encountered a drink which was probably rice wine.\textsuperscript{81}

Lacking archaeological evidence for Central Asian rice agriculture, linguistic evidence may provide useful insights into the background of this grain. However, the words used for rice in the various Turkic languages do not give us any proof about the origin of rice culture in western or central Asia. In the western Turkic languages, such as Turkish, Gagavuz and Azeri, the common word for rice is \textit{pirinch}, which is of Iranian origin (< \textit{berenj}). A variant is also found among the Turkmen in Central Asia rendered as \textit{bürinch}. It clearly indicates that rice was introduced to the western Turkic peoples from their Iranian neighbors, i.e. from the south. Originally it is probably a loan-word from Sanskrit \textit{vṛīhi}.\textsuperscript{82}

However, there are also Turkic words for rice that are indigenous, and they at least indicate that rice has been present in the area for a long time. The common word in Central Asian Turkic is \textit{gürish} (Karakalpak), \textit{kürish} (Kazak), \textit{kürüch} (Kirghiz), \textit{kürüch} (Tobol Tatar), \textit{gürich} (Uzbek) and \textit{görüch} or \textit{gurunj} (Uighur). These words date back at least to medieval Turkic, but are probably older. Nevertheless the glosses do not give any indications as to when rice was introduced into the area. Other words for rice grain in Uzbek and Uighur are \textit{sholi} and \textit{shali} respectively and are also Iranian loan words (< \textit{shālī}). Iranian influence has been very strong in Central
Asia since antiquity and continued up to modern times, especially among the farmers in the oases.83

TOWARDS A SYNTHESIS

Rice cultivation was well established in northern China by 3000 BC and in the Indian subcontinent, including the edge of the Iranian plateau, by 2000 BC. There is no secure record of rice in the abundant archaeobotanical record for the Iron Age Near East, or in the sparser record for Central Asia. Textual references in the Iron Age are ambiguous.

Reliable records of rice cultivation in the Near East and adjacent areas occur in classical antiquity, fairly frequently from the 1st century AD. Diodorus reports rice as a military ration at Susa in 318/317 BC. A large 1st century AD archaeobotanical find of rice at Susa, combined with evidence of rice hull impressions in contemporary Parthian bricks, points to well-established cultivation of rice in southern Mesopotamia (current-day southwest Iran). Also in the 1st century AD, Strabo mentions the cultivation of rice in Susiana (around Susa), Lower Syria (perhaps the lower Orontes), Babylonia (southern Mesopotamia) and Bactria (Afghanistan). Rice was traded extensively to areas in which it was not grown: probably from the Indian subcontinent to the Red Sea in the 1st century AD, and as a medicinal plant and a luxury food in the wider Roman Empire of the 2nd century AD.

In the Sasanian period there continue to be regular references in the Talmud, Arab and Chinese sources to cultivation in southern Mesopotamia. However—as in the preceding periods—it is possible that use was mainly in sweet desserts and elsewhere on a highly localized scale rather than being widely consumed as a staple food. Textual and archaeological data for crop cultivation in general is very scanty in the period between the fall of the Roman Empire and the time—the 10th century onwards—from which Arabic texts become abundant.

The occurrence of archaeobotanical studies and ancient texts in western Asia is highly sporadic for the many centuries between the end of the Iron Age and the coming of Islam. Nonetheless, there is sufficient negative evidence to suggest that rice cultivation was localized in the first millennium AD.

After the Islamic conquests “Rice early came to be grown in the Islamic world almost wherever there was water enough to irrigate it.”84 Rice cultivation is well documented further north in Mesopotamia, in Cilicia, the Jordan and Nile valleys, the southern shores of the Caspian, and
north-central Anatolia, all before 1500. The two phase model of rice establishment, with a first phase in southern Mesopotamia starting in the period 400 BC-100 AD, and a second phase linked to the expansion of Islam after 1000 AD, seems reasonable.

Rice of unknown origin was available in Trebizond (Trabzon) in northern Anatolia in 1292; it might well be, as suggested by Venzke that rice cultivation did not reach Anatolia until the Turkish conquests of the 11th century AD. By the 14th century rice cultivation was well established in the Ottoman Empire.

Most surveys of rice introduction to the Near East and adjacent regions broadly agree, although this might in part be because all such studies are based on a small number of mainly classical texts. There are two aspects that are still controversial; one is the reliability of Iron Age texts and the weight to be given to the possible Iron Age find of rice at Hasanlu; the other is the emphasis given to Islamic cultivation of rice. To us, it appears that rice cultivation was well established in southern Mesopotamia for more than 1000 years before the coming of Islam; however, it then spread far wider in the Islamic world. We would identify a third area that is problematic: dating the first cultivation of rice in areas adjacent to Mesopotamia, for which textual and archaeological data are particularly scarce. As Bazin and his colleagues point out, it would be odd if rice cultivation was established in Bactria and in southern Mesopotamia in Parthian times, but absent from the southern Caspian, a major area of rice production. However, the Caspian shores were heavily forested, making the implementation of sophisticated irrigation systems complex. The beginnings of rice cultivation elsewhere in Central Asia also remain mysterious.

Ultimately the textual sources—those in which rice can be securely identified—are too laconic: they are useful for establishing presence, not absence. Only archaeobotanical research at sites dating to the period between 500 BC and 1000 AD will give the desired level of detail.

**ROUTES OF SPREAD**

The clear relationship between Iranian berenj, Turkish pirinç and Sanskrit vṛhi is consistent with the westward spread of rice and rice cultivation from India to Iran and then Turkey. Although sea trade was certainly responsible for distributing rice grain for consumption in the Roman Empire, to Egypt and beyond, it was not necessarily the route by which rice cultivation spread. Rice has traditionally been cultivated in irrigated areas of the Arabian Gulf, including Bahrain, but is absent from the (now
relatively rich) archaeobotanical record. However the absence of rice in antiquity is not necessarily significant: most of the crops transferred by sea from Africa to India are similarly absent from the ancient Arabian Gulf. However, the presence of rice in Afghanistan by the 1st century AD (fide Strabo), in the context of early rice cultivation on the eastern edge of the Indo-Iranian plateau, suggests that rice cultivation may indeed have spread overland from India to Iran.

Why did this take some two millennia? Rice is not an unusual case; after the initial dispersal of Neolithic founder crops from the Fertile Crescent, the movement of crops into the Near East was erratic. A group of woody crops—almond, date, and grape—became established in the early Bronze Age, around 3000 BC. Crops from outside the Fertile Crescent arrived later and erratically. Dates of arrival in the Near East include sesame (2500 BC), common and foxtail millet (1000-700 BC), pistachio nut (classical period?) and sorghum (Islamic period?). It could be argued that rice requires special agricultural conditions, as an irrigated crop and a summer crop. However another summer crop, millet, spread quickly in the Near East, and sophisticated irrigation techniques had been used in southern Mesopotamia since at least 3000 BC. Perhaps it was simply the high, difficult relief between India and Iran that delayed the spread of rice and other Indian and Central Asian crops.

What of the thinly scattered cultivation in Central Asia? Eastern Turkestan is not an obvious route of spread from northern China, as cultivation of any kind—let alone irrigation agriculture—is so sparse. The Himalayas are a real barrier to the south. Western Turkestan, in contrast, has a long history of political and economic integration with Iran, for example during the Parthian and Sasanian Empires. Turkmenistan and Uzbekistan also contain major oases, used for large-scale irrigation agriculture since at least 3000 BC. It is likely that rice spread into western Turkestan either from Iran, or at least via the Indo-Iranian plateau, at the same time that rice spread in parts of Iran and Mesopotamia.

FROM CZAR TO COMMISSAR

The Chinese pilgrim Xuanzang, who travelled across Chinese Turkestan in the 7th century, mentions rice culture. Evidence from more early modern times is scant. The vast arid areas of Chinese Turkestan were unsuited to most types of agriculture but despite this the region has been able to grow an abundance of food through extensive irrigation. Thanks to the water supply and the irrigation system, local Turki (now called Uighur) farmers also sow some rice. Local farmers have relied on melting snow during
spring to swell streams coming down from the mountains, thus providing adequate supplies of water to feed their irrigation channels. In areas of extreme heat, where rivers run underground, the local farmers have used the *kariz* or underground wells, to tap this water supply.

Travelers in the 19th and early 20th centuries report rice cultivation from various oases in Chinese Turkestan. Although wheat, barley, maize, sorghum and millet were more important, some rice was grown in oases like Yarkand and Kashgar. Travellers reported from Yarkand, the largest oasis in southern Chinese Turkestan, that it is well watered by irrigation channels and had an extensive cultivation of rice, which was exported to other cities, like Khotan and Kashgar. The small isolated oasis of Kalpin had for instance, owing to the excellent water supply, an above average harvest of rice for the region in the early 20th century. The Manchu-speaking Xibe minority in the Ili valley has also raised wet rice with the aid of irrigation. Many rice cultivars exist in Xinjiang and at least 16 landraces are known. Despite this, rice has never been an important food crop in Xinjiang.99

Wet rice is incompatible with the climate and soil of northern Xinjiang. However, during the Communist take-over wet rice production was introduced with the influx of Han Chinese immigrants. They changed pastures into agricultural fields, but it was not until the 1970s they tried to cultivate rice. The production has increased manifold since then, but still local production only reaches 25% of the total and the remainder must be imported from other provinces in the northeast of China and Jiangsu province to the east.100 In recent years, some Han Chinese rice farmers have begun rearing fish in the rice fields, an old practice in proper China that now has been transferred into Xinjiang.101

Rice cultivation existed in Western Turkestan during the pre-modern time, but it was a luxury product. Bread cereals were more important. Rice continued to be a minor crop in the oasis of Central Asia. Other grains, such as wheat and barley continued to be of greater importance for centuries along with fruit crops such as grapes. With the increasing impact of the Russian imperial power in the region rice began to be more important. In the 1860s, the remaining Central Asian principalities were conquered by Russia. The final integration came in 1895. According to a traveler’s report from Bokhara in the late 1890s, rice thrived only in the level areas. A Bokharan proverb said that the rice must have water three times; it grows in water, boils in water and is washed down with water. Because of the problems with malaria, rice cultivation was restricted in densely populated areas. The local Bokharan rice was small and not as white as the Persian, but it was plentiful and the country could therefore
export the surplus to Persia and elsewhere.  

Refugees and deportees have played an important role in developing and changing the mode of agriculture in Central Asia during the history. This is particularly true for rice. After a Muslim rebellion in Kashgaria in the 1870s, a few thousand Chinese-speaking Muslims, so-called Dungans, arrived in Russian Central Asia. They settled in the Osh, Przheval’sk and Tokmak areas. Further Chinese Muslims came to Turkestan after the signing of the Sino-Russian treaty of Saint Petersburg in February 1881. They settled north of present-day Bishkek in Kyrgyzstan. The Dungan refugees settled as farmers and beside various grains such as wheat, barley, oats and sorghum, they also sowed rice, which in fact was already their main crop in the pre-Soviet period. They actually introduced the cultivation of rice to many places of Central Asia. Rice agriculture was especially a conduct for the rich Dungans. After the Dungans settled in Russian Turkestan, rice became much cheaper in many parts of the region, underlining the importance of their production.

However, the Russian authorities favored the production of another plant, and they decided to use the conquered areas of Central Asia for cultivation of cotton. This had an immense impact on Central Asian agriculture and was intensified when the Soviet regime was established in the 1920s. Massive irrigation efforts were launched that diverted a considerable percentage of the annual inflow to the Aral Sea, causing it to shrink steadily. Traditional agricultural practices were destroyed by collectivization and the new crop increased in importance.

While rice production was thriving in the neighboring Caspian areas of Iran and in Afghanistan, it decreased within the Soviet Union. During the 1930s the impact of Stalinist politics of deportation increased the rice production in Central Asia. Between 1937 and 1939, Stalin deported over 170,000 Koreans to Kazakstan, Kyrgyzstan, and Uzbekistan. Most of them were sent to what was then uninhabited land, land yet to be cultivated, or to former collective farms depopulated by the Kazak famine of the 1930s. Others were settled on existing Kazak kolkhozes. As a result of the relocation, seventy new Korean rice and fish collective farms were created. The deportees cooperated to build irrigation works and start rice farms. Thanks to these Korean deportees, rice became an important crop in Central Asia, especially in Kazakstan. The rice grown in Central Asia belongs mainly to the sub-species *japonica* and many cultivars exist.

The presence of rice fields has, following independence and the introduction of market economy to Central Asia, increased the potential for the spread of malaria and during the last few years several cases of malaria have been reported in Kyrgyzstan. According to one report the
rice-growing plots close to private dwellings, especially in the Batken, Osh, and Zhalalabad regions, lack any effective mosquito control measures and are therefore viewed as dangerous breeding grounds for mosquitoes.106

Rice is considered one of the most labor-intensive crop production enterprises and machinery is rarely used.

CONCLUSION

The pre-Islamic history of major Western and Central Asian summer crops—namely rice, cotton, sesame and millet—remains generally obscure. Recent research has traced the introduction and diffusion of broomcorn millet across the Near East and India during the Iron Age but the remaining crops are more heavily dependent upon irrigation.107 The potential ecological range of these crops thus is more restricted and susceptible to changes in centralized agricultural policies. For instance, although rice has been grown earlier to this century in upland valleys of Iraq, it has been traditionally cultivated in Mesopotamia only by a small proportion of the local population in areas of the southern marshes.108 The favored location and season was close to the lower water channels after the spring floods had receded.109

Although wheat continues to be the main grain crop in countries like Kazakhstan, Kyrgyzstan and Uzbekistan, rice plays an important role in the economy and food culture in Central Asia. The production of rice in 2003 was estimated at 200,000 tons in Kazakhstan, 18,342 tons in Kyrgyzstan, 59,415 tons in Tajikistan, 109,500 tons in Turkmenistan, and 311,200 tons in Uzbekistan. Also in neighboring Azerbaijan rice is an important crop with a production of 15,651 tons in 2003. Other countries, like Turkey, have a production of 372,000 tons and Iran produces as much as 3,300,000 tons. No reliable figures were available from Afghanistan (FAO).

Rice continues to be of great importance for the new nations in Central Asia, both for local consumption and for trade. When the UN General Assembly declared the year 2004 as the International Year of the Rice, this declaration was sponsored also by Kazakhstan, Kyrgyzstan and Tajikistan, together with many of the large rice producing countries in Africa, Asia and America, which is a proof of the importance given to the rice crop in the national economies of Central Asian countries. In the light of world food shortages, particularly of rice, in the early 21st century, local cultivation of this much-appreciated grain can only increase in importance.
References

5. This was an early Arab garrison city after the conquest. This was founded close to the pre-existing Sasanian city of Peroz-Shapur (referred to as Pirisabora by the Roman historian, Ammianus Marcellinus) and was the seat of the rabbinical academy of Pumbadita. It is referred to as Pallughtha in Syriac documents and survives today as the important Euphrates crossing point of Fallujah.
10. Schuyler (1876:125).
26. e.g. Glover and Higham (1996), Smith (1998).
30. Londo, Chiang, Hung, Chiang and Schaal (2006, Supplementary Table 4).
32. Fuller, Harvey and Qin (2006).
37. Xiao, Xin, Hong, Jie, Xue and Dodson (2007).
40. Tosi (1975). The plant remains from this site were studied by Costantini but no final report was published, see Harris (1989).
45. Wenke (1975/76, figs. 3-13, cf. pp. 41, 87-88, 106-108, 120, 144-146). Note that these survey dates, as with those of Adams and others, are tentative (cf. Miroshchedji, Desse-Berset and Kervran (1987:43, n. 85).
52. Strabo 15.1.18.
53. Strabo 15.1.53.
60. A different view was expressed by Laufer (1919:372-373).
61. Simpson et al. (forthcoming).
62. Adams and Nissen (1975:62), contrast Adams (1965, fig. 10). However, a considerably later date is more likely for these remains: traces of “recent” (i.e. probably 18th century or later) occupation have been observed at this site, Adams and Nissen (1975:231).
64. This renders dubious an earlier report of “very large quantities” of short and long-grain rice said to have been found in Parthian mudbricks, bonding and later infilling of Room 14 of the so-called “castle” on the southern circuit of the fortifications at Erk-Kala, see Usmanova (1963:80). This construction is now regarded as being Sasanian rather than Parthian in date yet the reliability of the archaeobotanical identifications is questionable and is more likely to reflect a miss-identification of barley chaff, for which there is substantial evidence in these very bricks (Sheila Boardman pers. comm. 1998).


Ahsan (1979:89-90).


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Bazin, Bromberger, Balland and Bázargân (1990).

Bazin, Bromberger, Balland and Bázargân (1990).


Chang (1949:68).


Olufsen (1911:495).


108. Johnson (1940).