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GLIMPSES OF LOPTUQ FOLK BOTANY: PHYTONYMS AND PLANT KNOWLEDGE IN SVEN HEDIN'S HERBARIUM NOTES FROM THE LOWER TARIM RIVER AREA AS A SOURCE FOR ETHNOBIOLOGICAL RESEARCH

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This interdisciplinary study discusses the vernacular phytonyms and other ethnobiological aspects of vegetation in the Loptuq (Loplik) habitat on the Lower Tarim River. This small Turkic-speaking group lived as fisher-foragers in the Lopnor (Lop Lake) area in East Turkestan, now the Xinjiang Uyghur Autonomous Region in China. Information about this unique group, and especially the folk knowledge of plants in the area, is scant. In 1900, Swedish explorer Sven Hedin collected plant voucher specimens for the Swedish Natural History Museum in Stockholm. He noted local names on herbarium labels, thus providing modern researchers a rare glimpse into the Loptuq world. As the traditional way of life is already lost and the Loptuq language almost extinct, every trace of the former culture is of significance when trying to understand the peculiarities of human habitats and survival in arid areas. The ethnobiological analysis can further contribute to other fields, such as climate change, and define the place of the Loptuq on the linguistic and cultural map of Central Asia.

LANGUAGE AND FOLK BOTANY

Language reflects not only cultural reality and the way of life, but also human habitat and the physical environment.[1] Rich biodiversity-based knowledge about the surrounding landscape and its biota (the living organisms of a specific region) has usually constituted an essential component of traditional and pre-industrial societies across the world (Lévi-Strauss 1962; Svanberg et al. 2011).

Plants are considered to "permeate or represent all aspects of human affairs" (Ford 1994: 29). They have been used for food, fodder, fuel, remedies, dyes, tannins, cosmetics, hygiene, intoxicants, poison, fibres, textiles, raw materials for housing, equipment and tools, toys and children's games. Plants also play a symbolic role in folklore, rituals and religious practice (Balick & Cox 1997). Presently assimilation, urbanization, cultural extinction and the effects of globalization have led to a profound change and loss of local ecological knowledge in many areas (Vandebroek & Balick 2012).

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Phytonyms or plant names can reflect migration, climate change, economic situation, trade and other contacts, as well as the historical and linguistic connections of a group. Often a local name is the only clue that a certain plant has had cultural importance or use of any kind (Ståhlberg & Svanberg 2006; Svanberg 2007). Combining the approaches of multiple scholarly disciplines, such as cultural anthropology, ethnobiology, linguistics, history, and so forth, modern researchers can attempt to reconstruct an important part of Loptuq ethnobotanical knowledge (Strong 2015).

Well-documented historical sources of ethnobotanical information from a given area within a certain time frame are rare. Most ethnographers, explorers and missionaries have contributed only partial knowledge about the use of local biodiversity in the lives of extinct or existing peoples. Available information from many areas and cultures is therefore fragmentary. Furthermore, knowledge is widely dispersed in different kinds of sources and publications, from scientific journals to personal memoirs and diaries, travel narratives and even novels, songs and poetry (Ford 1994: 29).

Herbaria or collections of dried plants were important sources of knowledge from the eighteenth until the mid-twentieth century. Technological development has now replaced much of the laborious process of gathering, drying and identifying plants. For understanding lost cultures, such as the Loptuq, old herbaria are crucial. The data and the specimens of plants gathered by Swedish explorer and geographer Sven Hedin (1865–1952) during his extended stays among the Turkic-speaking Loptuq in the summer of 1900 have not been analysed in depth until now (Ståhlberg & Svanberg 2017).

Besides plants, toponyms and language materials, Hedin gathered large amounts of other data, which until now have never been scholarly explored. Among the materials are, for instance, songs in the Loptuq language, which he noted in his private diaries. They are kept in the Swedish National Archives (see Hedin 1903: 442–452). Hedin's car expedition in the early 1930s also collected artefacts (tools and implements), which today are found at the Museum of Ethnography in Stockholm and awaiting closer analysis.

The available sources provide several possibilities to become further acquainted with this specific ethnocultural group. The significance of studying the survival strategies of a group and their plant use in an arid area goes beyond the fields of cultural and linguistic studies. The combination of climate change and human impact is causing deserts to grow faster now than a mere fifty years ago. Peoples living at the fringe of a desert must move away or remain and adapt, and the experience and knowledge from other arid areas can be useful in the adaptation process (Ståhlberg 2004).

This interdisciplinary study analyses a hitherto overlooked source of materials about Loptuq culture, an old herbarium, prepared by Sven Hedin. We focus here on plant names, knowledge and use, but also discuss the sources and their interpretation, as well as the possible utilization of plant knowledge and phytonyms for other fields of study. We gather for the first time together the available Loptuq phytonyms and discuss the folk botanical knowledge and use of plants, trying to reconstruct a part of the lost Loptuq world. On another level, we present ethnobiological data as the basis for analysis and understanding a specific group, its adaptation and survival strategies, lifestyle, historical and linguistic connections. We also discuss possibilities for new approaches in regional studies, showing how ethnobiological data can be used in a larger context, and we provide a few future research questions. This study crosses the borders of several scientific topics, but it can be specifically classified as ethnobiological research with focus on the region of eastern Central Asia.

HISTORICAL BACKGROUND

Until the mid-twentieth century, the Loptuq still lived as fishers and foragers in the Lower Tarim River area at the Lopnor (Lop Lake) in East Turkestan. Today this area is located in the south-eastern part of Xinjiang Uyghur Autonomous Region in China. The Loptuq are known in travel and research literature by their exonyms Loplik or Loplyk (Standard Uyghur *Lopluq*). Their language is characterized by some scholars as belonging to the Kipchak (northwestern) Turkic language group, but Chinese scholars regard them as speakers of an Uyghur dialect (Dwyer 2016). A recently published analysis of the Loptuq language asserts that it is related to Kirghiz (Nugteren 2017). An ethnographic analysis indicates a Turkic nomadic background but also influence from the nearby oases cultures (Ståhlberg & Svanberg 2017). The question of where to place the Loptuq language linguistically is still under discussion and requires further research.

The origins of this group have also not been conclusively explored. There are several theories about their arrival to the Lopnor area and their historical connections. A main topic for debate has been whether they have Turkic or Mongol origins (Ståhlberg & Svanberg 2010), as their own tradition suggests both. The Loptuq were divided into several groups: *Qara Qoshulluqtar*, who moved downstream along the Tarim River to the Lopnor area; *Yallar*, who came as traders and missionaries from towns such as Turfan, Qomul and Kashgar; *Qalmaqtar*, who had Kalmyk (Western Mongol) origins; *Judaqtar*, who also had Mongol origins and possibly came from the nearby provinces of Gansu and Qinghai; *Qaluchilar*, who were related to Judaqtar; and *Kirghizzar*, who believed that their ancestors were Kirghiz (Abdurehim 2014: 20–23).

The numbers of Loptuq remain difficult to estimate. In an eighteenth-century Chinese document quoted by Esmael Abdurehim (2014: 18), they numbered around 5,000. The Loptuq made their living from fishing and gathering activities. According to Polish-Russian explorer Nikolay Przhevalsky (also spelled Prejevalsky), there were about 70 Loptuq households (or 300 individuals) in 1870, distributed over eleven settlements. Some twenty years earlier there had been as many as 550 households, but a smallpox epidemic had caused a sharp decline in the population (Prejevalsky 1879: 104–105). In 1885, Przhevalsky noted that the Loptuq numbered "400 souls of both sexes" which were "engaged in fishing and snaring wild duck, some in tending cattle and a few in agriculture" (Prejevalsky 1885: 807).

In 1907, Swedish missionary Gustaf Raquette put the figure at an unlikely 90,000 "Turcs nomades" living in the Lopnor area (Bourgeois 1909: 13). Sven Hedin (1905a: 608) estimated them to be as many as 10,000 in the early twentieth century. The Loptuq were still relying on fishing and gathering, although a few more prosperous households also practised animal husbandry. Epidemics of infectious diseases followed, which reduced their numbers (Ståhlberg & Svanberg 2010). Thomas Hoppe (2006: 189) estimated that the Loptuq population in the early 1950s reached about 8,000–9,000 individuals. In 1957, Uyghur linguist Mirsultan Osmanov estimated the population in the Lopnor region (Loptuq and Uyghur) to be as high as 14,151. In addition there were 200 inhabitants in the oasis settlements of Charqilik/Chaqliq and Miran (Osmanov 1999: 2; Abdurehim 2014: 19; Ståhlberg & Svanberg 2017).

For census purposes, the Loptuq in Xinjiang are today included in the Uyghur nationality, together with the Dolan. They are considered to be Muslims (Svanberg 1996; 2005). The villages are abandoned, as the Loptuq have been removed from the Lower Tarim River region. Their distinct culture has disappeared, along with the language, which is presently on the brink of extinction (Johanson 2001: 20; Hoppe 2006: 184; Ståhlberg & Svanberg 2010; Trebinjac 2017). The group is linguistically almost completely assimilated into the Uyghur dialects of

southern Xinjiang. Only a few elderly people are still proficient in the language, which has otherwise been replaced by Standard Uyghur and Mandarin Chinese (Abdurehim 2014: 33).

According to Sven Hedin, the Lopnor or "Wandering Lake" (his name) shifted its position every few decades (Figure 1). The lake does not exist anymore. The Tarim River was redirected to other areas for irrigation of farmlands and a dam was built in 1972, which completely dried up the lower reaches. The influx of Chinese settlers in Xinjiang from the 1950s onwards has caused serious stress on the environment and on the non-Chinese population. The desert has been expanding with increasing speed during the past decades and the consequences of climate change are challenging humans, animals and plants. Poverty remains an unsolved issue in eastern Xinjiang. In addition, the previous site of the Lopnor was used during several decades for nuclear tests (see Chen et al. 2006; Ståhlberg 2004; Ståhlberg & Svanberg 2010).

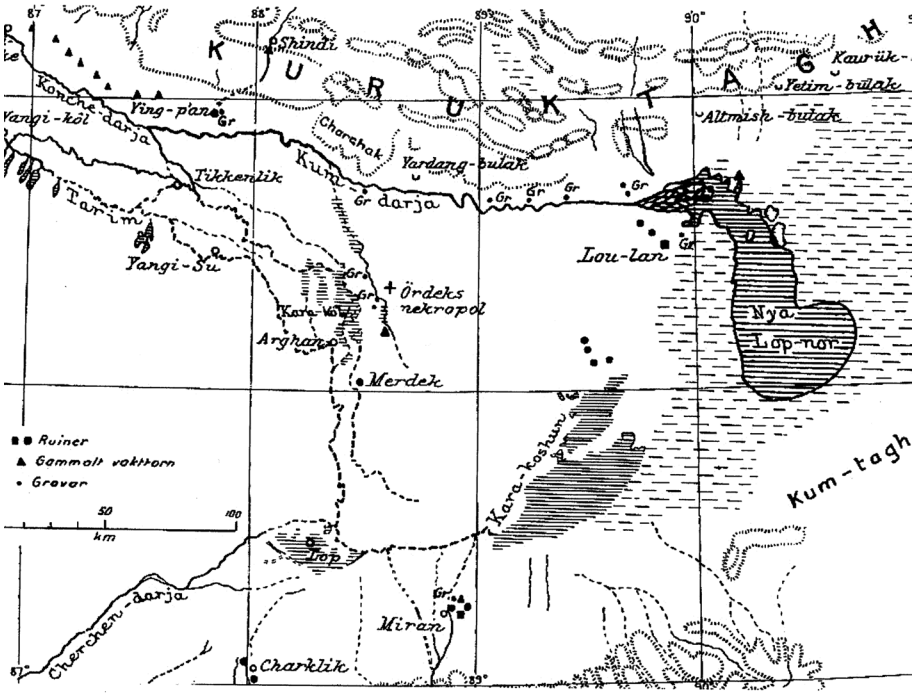

Figure 1 Map of the Lopnor region by Folke Bergman, 1935. Sven Hedin Foundation, Stockholm

SOURCES OF LOPTUQ ECOLOGICAL KNOWLEDGE

What kind of clues can a herbarium aged more than a century offer? Today it is more important than ever to patch together the fragmentary pieces of knowledge we possess about this unique culture of fisher-foragers, who once lived in the heart of Asia (Hoppe 2006; Ståhlberg & Svanberg 2010; Abdurehim 2014: 33).

Our knowledge of the living conditions, habits, cultural expressions and local familiarity with the land- and waterscape surrounding the Loptuq will remain limited due to the destruction of the culture. In addition, the sources are limited, as merely a handful of travellers, during a short period spanning about fifty years, visited the group when still residing at the Lopnor and the Lower Tarim River area. Only if new sources for information are discovered or old sources are analysed or reinterpreted can we weave more details into the overall picture of the Loptuq.

Sven Hedin's materials are an example of old sources resurfacing and becoming more easily available through digitalization. There is an abundance of linguistic expressions in Hedin's documentation, which reflect the Loptuq understanding and view of the environment. The materials also provide a wealth of previously unknown data about the collective local ecological knowledge inherited and developed by the inhabitants in the region.

Swedish Turkologist Gunnar Jarring has analysed a multitude of toponyms gathered by Hedin in the Lopnor and Tarim River areas. Several phytonyms and zoonyms are included among these toponyms. Jarring's works provide valuable insights into Loptuq knowledge and how they utilized the surrounding landscape and its resources. In particular, hydronyms provide greater understanding of their life as fishers on the Tarim River and in the marshlands around the Lopnor (Jarring 1997).

Published word collections in the Loptuq language usually include just a few phytonyms (see Malov 1956), and dialectal variations are not taken into account. For instance, Russian Turkologist Sergey Malov's data was recorded in the summer and autumn of 1914 during his visit only to Charqiliq (Chaqliq) and Miran. According to a more recent study by Esmael Abdurehim (2016: 360), this region was very much influenced by the neighbouring Khotan dialect of Eastern Turki.

In the available Loptuq documentation, other biological taxa except plants are scarce. One important reason could be that the aridity of the area does not encourage broad biodiversity (see Chen et al. 2006). Other reasons could be that the Loptuq predominantly used plant resources or that they were fairly recent newcomers in the area. Some birds, as well as fish species, are mentioned (Hedin 1904: 288; for birds, see, e.g., Malov 1956: 115, 126, 191; Jarring 1992; 1997: 108, 355, 356, 357, 487). We should note that although fish played an important role in the Loptuq economy, only a few species are known in the sources (some ichthyonyms were recorded by Pevtsov 1949: 234; see Malov 1956: 105, 115, 144, 152, 166; see also Jarring 1998: 63–64). Ståhlberg & Svanberg (2017) have tried to identify these species in an earlier publication (Table 1). However, some fish species, such as *tuinačuk*, a kind of 'small fish' (Malov 1956: 176), defy identification.

Table 1 Loptuq ichthyonyms

egej balïq = Ili marinka, *Schizothorax eurystomus* Kessler, 1872
otur balïq = Tarim schizothoracin, *Schizothorax biddulphi* Günther, 1876
tazek balïq = Kashgarian loach, *Hedinichthys yarkandensis* Day, 1877
it balïq = scaly osman, *Diptychus maculatus* Steindachner, 1866
laqu (*loqo*) = bigheaded carp, *Aspiorhynchus laticeps* Day, 1877

Sources: Ståhlberg & Svanberg 2017: 28; Jarring 1997: 276; Malov 1956: 176; Pevtsov 1949: 232.

THE HERBARIUM SPECIMENS

Among the European travellers in the Tarim River area, Sven Hedin had probably the best opportunity to observe the Loptuq in their settlements. He spoke Eastern Turki and was able to provide many ethnographic details in his reports. In total, Hedin made three visits to the Lopnor and observed the area within a timespan of almost forty years. During his first expedition to Central Asia in 1893–1897, he stayed in the area inhabited by the Loptuq from 21 March to 23 April 1896 (Hedin 1900; 1902). During his next expedition in 1899–1902, he stayed with the Loptuq for well

over a year, from 26 June 1899 to November 1900 (Hedin 1903; 1904; 1905a). His last expedition in 1927–1935 provided him with yet another chance to visit the Loptuq (Hedin 1940).

Herbaria may contribute to a deeper historical understanding of the knowledge of plants and their possible uses in different cultures. Previous studies on historical herbaria have mainly focused on finding type specimens or evidence of early occurrences of certain species in the flora. They seldom take into account how these plants were utilized locally. Sometimes, as in this case, we come across data which is of interest for both historical ethnobiology and regional studies (see Ghorbani et al. 2018).

Today, our knowledge cannot be expanded by field studies for already culturally assimilated groups like the Loptuq. It is therefore crucial that historically oriented ethnobiologists and regional researchers track and analyse sources such as herbaria collections, illustrations, linguistic records, preserved material culture and travel narratives. These are only some of the potentially useful sources. In most cases, the results give but fragmentary insight into a once rich cultural knowledge about biota (Medeiros 2016). Still, certain forgotten archives may offer more information.

Several herbarium sheets containing voucher specimens, which Hedin collected among the Loptuq in 1900, have recently become available on the website of the Swedish Museum of Natural History in Stockholm <herbaria.nrm.se>. A voucher specimen is a pressed plant sample kept in a museum collection. Specimens are vital for the correct scientific identification of a collected plant, and they also permit confirmation of the distribution and occurrence of a species at a certain place and time (Bye 1986; Nesbitt 2014).

Figure 2 Voucher specimen of *Lycium ruthenicum* (scanned by Dennis Strid, Swedish Museum of Natural History, Stockholm)

On some of the herbarium sheets prepared by Sven Hedin, local names of the plants are noted. Although Hedin, according to Gunnar Jarring, had no training in linguistics, he appears to have mastered the vernacular of the Loptuq fairly well during his stay. The phytonyms were recorded by him in Swedish transcription (see Jarring 1997: iv), which is also used here. When referring to Gunnar Jarring's remarks on Hedin's material, we have for reference reasons chosen to use Jarring's original system, which differs significantly from standard and modern transliteration systems used by the majority of Turkologists (see Jarring 1964).

LOPTUQ LIFESTYLE AND HOUSEHOLD

The Loptuq were unique in one important aspect: their lifestyle. In historical times, very few groups in Central Asia and Siberia have lived in and subsisted on marshes. For unknown reasons, the Loptuq and the Barabin Tatars in Western Siberia at some point in history moved into the marshes, possibly due to political turmoil such as wars and conflicts, environmental and climate change, changes in the economic situation, demographic pressure or other large regional processes (Ståhlberg & Svanberg 2010; 2014; 2017).

In Sven Hedin's travel reports, we find many detailed and descriptive observations of Loptuq culture (Ståhlberg & Svanberg 2010; 2017). In the late nineteenth and early twentieth centuries, the Loptuq lived a rather isolated life in the Lower Tarim River area. They had several connections to nearby oasis dwellers and traded with their neighbours or pedlars visiting their settlements (Table 2). The marshes and rivers provided the Loptuq with food resources, such as fish, game, eggs and other edible products. They mastered the waterscape with great skill. The Loptuq fishers were, according to Hedin (1898a: 113), "living half of their lives in the long, narrow canoes, which were hollowed out of a poplar trunk and rowed with broad-leaved, vertically held oars". Although fish was the most significant source of food, wealthier Loptuq hamlets also kept sheep and poultry. A reed (*Phragmites australis* (Cav.) Trin. ex Steud.) growing in the marshes was important for food, but it was also used for other purposes (Ståhlberg & Svanberg 2017; Trebinjac 2017).

Table 2 Loptuq settlements and villages around 1900

Abdal or Abdallïq	Qumčapγan
Alqattïk-čeke	Qumčeqe
Arγan	Širgečapγan
Dilpar	Tikenlik
Dural	Tiken
Jäkänöj	Toqum
Jäkänlik	Toquz ata
Jurt čapγan	Toquz atam
Lajlïq	Čaqliq
Lop	Čegeliq-uj

Source: Hedin 1904, 1905a, 1905b. Other lists of villages are given in Prejevalsky 1879: 68; Hoppe 2006: 184–185.

In April 1896, Hedin found three households with a total of seven individuals living in small reed huts in Qumčeke 'the sandy promontory'. They originated from Čegeliq-uj 'the *Apocynum*-place inn' and had arrived in the area three years earlier. The inhabitants consisted of an elderly couple with their two married sons and one child. Each family had their own hut and owned a few sheep and chickens.

The daily food consisted mainly of fish, with an addition of eggs from wild geese and wild ducks, as well as tasteless reed shoots and salt. During winter they did not engage in fishing. In the autumn, the Loptuq fished, gathered and stored large supplies of food for the coming cold season, when food supplies were scarce. The fish were tied up in pairs on ropes hanging from the ceiling inside the huts. For making canoes (*kemi*), carefully selected poplar trunks were utilized. The poplars for this purpose had to grow on dry land, since trees close to water were considered to be of inferior quality. A good dugout canoe would usually last for eight to ten years. Fish nets were made of *Apocynum* fibres, which were boiled until completely soft and then twined into threads. The Loptuq used the limited resources at their disposal in a creative fashion; for example, they made other tools for fishing, such as fishing net floats, from reeds (Hedin 1902: 40–41).

At a small settlement with 14 inhabitants, Hedin noted that the villagers consumed on average 15–20 medium-sized fishes per day. These villagers also kept a few sheep, but no dogs (Hedin 1902: 52). Hedin's list of household items in this little village is very detailed. The Loptuq owned three old and three new dugout canoes, a couple of buckets (*sogul*) carved out of a poplar trunk, a big cauldron (*qasan*) for cooking fish, a couple of iron jugs (*čugun*) and several wooden bowls (*ajaq*), as well as hand bailers for the canoes, big plaited willow baskets for storing wool and *Apocynum* fibre, spinning wheels (*čarq*), and tools for twining ropes (*čarq-ighi*), which consisted of a string with a stick and a round stone at the lower end. They also had axes (*kečі*), grindstones (*bilej*), several knives (*bičaq*) of different sizes, scissors (*qaiči*), awls (*derepči*) for making holes for string in simple footwear and other similar items, snares (*sugan*) hung in the reeds of narrow canals in order to catch duck, and oars (*gudjek*) for the canoes.

Each house also contained a loom or a simple frame on which the women wove linen and nets (*toj*). The floor consisted of crude felt carpets (*kigis*) laid directly on the earth. Furs and a cloth (*dastarkhan*) to put on the table during meal time were also present. The cloth was made of *Apocynum* fibre. Most of these tools were prepared in the village and only a few were purchased through traders from Charkhliq or Dural (Hedin 1902: 52–53).

THE VOUCHER SPECIMENS

In 1922, Danish botanists Carl Hansen Ostenfeldt and Ove Paulsen identified the plants gathered by Sven Hedin during his early Central Asian expeditions. They also provided each voucher specimen with the applicable scientific name of the plant. The orthography of the places where the voucher specimens were gathered follows Sven Hedin (1922) and also Ostenfeldt and Paulsen (1922). For current scientific names, we follow GBIF 2019.

Acc. No. S05-8501. *Alhagi kirghisorum* Schrenk. Locality: Camp I, Dunglik, south of Lopnor, 1 July 1900. Local name: *Jantak*.

Acc. No. S12-17068. *Apocynum pictum* Schrenk. Locality: Camp I, Dunglik, south of Lopnor, 1 July 1900. Local name: *Tjigge*.

Acc. No. S12-17069. *Apocynum pictum* Schrenk. Locality: Karaunelik-köl. Freshwater lake on the right bank of Lower Tarim River, 20 May 1900. Local name: *Tjigge* ('for making cloth and nets').

Acc. No. S08-6315. *Artemisia maritima* L. Locality: Tatlik-bulak ('sweet spring'), southeast of Lopnor, 3 July 1900. Local name: *Japptjan*.

Acc. No. S05-8562. *Artemisia maritima* L. Bash-kurghan. Camp III, on the frontier between East Turkestan and northern Tibet, 5 July 1900. Local name: *Ermen*.

Acc. No. S06-4774. *Asparagus breslerianus* Schult. & Schult. Identified as *Asparagus maritimus* Pallas by Ostenfeld and Paulsen (1922: 90). Locality: Ak-satma, Middle Tarim River, in the forest, 10 October 1899. Local names: *Itt-muntjak* and *ak satma*.

Acc. No. S14-49491. *Bassia scoparia* (L.) A.J. Scott. Ostenfeld and Paulsen (1922: 86) use the synonym *Kochlia scoparia* (L.) Schrad. Locality: Tatlik-bulak, southeast of Lopnor, 3 July 1900. Local name: *Lalu*.

Acc. No. S-GH-5300. *Bolboschoenus maritimus subsp. affinis* (Roth) T. Koyama. Identified as *Scirpus affinis* Roth by Ostenfeld (Ostenfeld & Paulsen 1922: 90). Locality: Kara-koshun, beneath Yurt-chapghan, Lopnor, 24 June 1900. Local name: *Ghas-otto*.

Acc. No. S14-49505. *Calligonum sp*. Locality: Dunglik. 12 miles southeast of Lopnor, 1 July 1900. Local name: *Tjutjun*.

Acc. No. S07-16535. *Clematis tangutica* (Maxim.) Korsh. Identified as *Clematis orientalis* L. by Ostenfeld and Paulsen (1922: 83). Locality: Bash-kurghan, three days' journey southeast of Lopnor, 5 July 1900. Local name: *Mandar*.

Acc. No. S12-10488. *Cynanchum acutum* L. Locality: Tuna-toghdi. Lower Tarim River, 8 June 1900. Local name: *Jörgöll*.

Acc. No. S09-21281. *Elaeagnus angustifolia* L. Locality: in the Tarim River estuary, early summer 1900. "Occurs in all oases and at all rivers in East Turkestan." Local name: *Jiggde*.

Acc. No. S05-8502. *Glycyrrhiza inflata* Batalin. Described as *Glycyrrhiza hediniana* (holotype) by Hermann Harms in Ostenfeld and Paulsen (1922: 66). *Glycyrrhiza hediniana* is nowadays regarded as a synonym for *G. inflata* (Grubov 2003: 64). Locality: Tuna-toghdi, Lower Tarim River, 8 June 1900. Local name: *Sarik*.

Acc. No. S-G-8869. *Glycyrrhiza inflata* Batalin. Described as *Glycyrrhiza hediniana* (type specimen) by Hermann Harms in Ostenfeld and Paulsen (1922: 66). Locality: Tuna-toghdi, Lower Tarim River, 9 June 1900. Two local names are given in separate paper notes on this herbarium sheet: *Sarik* and *Kosu-kullak*.

Acc. No. S12-26816. *Halostachys belangeriana* (Moq.) Botsch. Described as *Halostachys caspica* (Pall.) C.A. Mey. in Ostenfeld and Paulsen (1922: 38). Locality: Yurt-chapghan, Abdal, 21 June 1900. Local name given: *Köl köuruk* ('vid stranden växande'; i.e. 'growing along the shore').

Acc. No. S05-8494. *Launaea polydichotoma* (Ostenf.) Amin ex N. Kilian. Identified as *Chondrilla polydichotoma* by Ostenfeld and Paulsen (1922: 29). Locality: Camp I. Bunglik, south of Lop-nor, 1 July 1900. Local name: *Eschek-kojmetj*.

Acc. No. S05-11035. *Hordeum bogdanii* Wilensky. Without locality, 1900. Identified as *Hordeum secalinum* Schreb. in Ostenfeld and Paulsen (1922: 95). Local name: *Japptjan*. "The name of

the plant is 'Japtjan', and it occurs in many places of the Lopnor district, as evident from many toponyms, e.g. Japtjanlik-köl."

Acc. No. S10-16361. *Lactuca tatarica* (L.) C.A. Mey. Ostenfeld and Paulsen (1922: 29) use the synonym *Mulgedium tataricum* (L.) DC. Locality: Camp XVI, Tuna-toghdi, eastern Tarim, Tarim River delta, 8 June 1900. Local name: *Gatji*.

Acc. No. S14-49557. *Lepidium cordatum* Willd. ex Steven. Locality: Kamisch-bulak, spring at Bash-Kurghan. Three days' journey southeast from Lopnor, 5 July 1900. Local name: *Ak-basch*.

Acc. No. S05-8546. *Lycium ruthenicum* Murray. Locality: exists everywhere in Tarim and Lopnor areas. "The East Turkestan name of this plant, *ak-tikken* ('white colour'), is very common in geographical names. I have mapped nine places called Tikkenlik [...] in East Turkestan." Spring and early summer 1900. Local name: *Ak tikken* (Figure 2).

Acc. No. S11-36859. *Myricaria davurica* (Willd.) Ehrenb. Ostenfeld and Paulsen (1922: 54) use the synonym *Myricaria brevifolia* Turczaninow. Locality: Bash-kurgan, Camp III, south of Lopnor, 5 July 1900. Local name: *Balgun*.

Acc. No. S11-37580. *Myriophyllum spicatum* L. Locality: Tarim River, Abdal, Lopnor, 22 June 1900. Local names: *Ölen-ott*, *ussun-ot*.

Acc. No. S11-37581. *Myriophyllum spicatum* L. Locality: Chivilik-köl, Yettim-tarim, a branch of Tarim River, 2 June 1900. Local name: *Usun-ott*.

Acc. No S05-8451. *Primula nutans* Georgi. Locality: Tschiqelik-uj, Tarim River, west of Lopnor, 15 June 1900. Local name: *Tjiggelik*.

Acc. No. S11-11100. *Phragmites australis* (Cav.) Trin. ex Steud. Collected at Usun-Köl, lake at the village Abdal, 23 June 1900. Local name: *Kamisch*.

Acc. No. S13-9346. *Salix alba* L. Locality: Tarim River delta towards Lopnor, common in several places. Spring 1900. Local name: *Tal*.

Acc. No S09-45014. *Saussurea salsa* (Pall. ex Pall.) Spreng. Locality: Eastern Tarim River, Camp. XVI, Tuna-toghdi, 8 June 1900. Local name: *Kekkija*.

Acc. No. S10-15011. *Scorzonera divaricata* Turcz. Locality: Bash-Kurghan. Camp III, south of Lopnor, northern Tibet, 5 July 1900. Local name: *Yellik-Ott*.

Acc. No. S14-49494. *Suaeda splendens* (Pourr.) Gren. & Godr. Ostenfeld and Paulsen (1922: 86) use the synonym *Suaeda setigera* (D.C.) Moq. Locality: Tatlik-bulak, southeast of Lopnor, 3 July 1900. Local name: *Schapp*.

Acc. No. S11-36808. *Tamarix androssowii* Litv. Locality: Karaumelik-köl, freshwater lake on the right shore of Tarim River above the estuary, 20 May 1900. Local name: *Ter-julgun* ('pisk-tamarisk'; i.e. 'whip tamarix').

Acc No. S11-36848. *Tamarix hispida* Willd. Locality: Tatlik-bulak, southeast of Lopnor, 3 July 1900. Local name: *Ötschke-julgun*.

Acc. No. S14-49511. *Typha domingensis* Pers. Ostenfeld and Paulsen (1922) use the synonym *Typha angustata* Bory & Chaub. Locality: Kara-koshun, Lopnor, beneath Yust-chapghan, 25 June 1900. Local name: *Jekken*.

Acc. No. S11-13605. *Utricularia vulgaris* L. Locality: Mapik-köl, a part of Kasa-kochun, Lopnor, 23 June 1900. Local name: *Dillpar*.

Acc. No. S08-10690. *Zygophyllum xanthoxylum* (Bunge) Engl. Locality: Tatlik-bulak, southeast of Lopnor, 3 July 1900. Local name: *Java Keuves* ('vild bomull'; i.e. 'wild cotton').

ETHNOBOTANICAL DATA

The plant list shows that the area inhabited by the Loptuq was relatively poor in botanical resources. The people were highly dependent on the few usable species growing in the area. We do not know exactly how many taxa existed when Sven Hedin visited the region, but Hedin was a skilled cartographer and many local phytonyms were recorded because they contributed a whole name or part of a toponym. Plant names can "explain" for instance why a certain place received its name, thus reflecting local ecological knowledge (Jarring 1997: iii). Hedin (1898b: 602, 757) himself briefly discussed his methods in recording local words: he had a secretary, Mirza Iskender from Kashgar, who helped him record toponyms and other names.

We have reason to believe that the local flora was somewhat richer a hundred years ago when water was more abundant. Recent explorations indicate that the number of plants is currently very limited in the desert area. The Chinese Lop Nor Scientific Expedition in the early 1980s came across only 36 species of 13 families, mainly Chenopdiaceae and Compositiae, and 26 genera. All of these were drought-resistant, salt-tolerant shrubs and perennial grasses (Zhao & Xia 1984: 316; see Chen et al. 2006). Most of these plants are unsuitable as sources for food and probably of limited use in folk medicine. It is necessary to emphasize that knowledge of locally available plants also includes other bio-cultural domains, such as their use as fodder, fibres, construction material, equipment, tools, and so forth.

Data about other uses of specific plants appear to be rare. In the Hedin herbarium we have come across only one voucher specimen containing more detailed information about the specific use of a plant: *Apocynum pictum* Schrenk, which was used for manufacturing textiles and nets. Its local name is given as *tjigge* (i.e. *čige*). Hedin's notes correspond to those of Prejevalsky (1879: 107–111), who writes that this taxon provided fibres for clothes and fishing nets for the Loptuq. Katanov & Menges (1933: 103) also mention *čigä* 'wilder Hanf' ('wild hemp') among the Loptuq.

Katanov had recorded in 1897 a rather detailed description of how the *čigä* fibres were prepared and made into cloth by the Loptuq. Women gathered the plants in the shrublands and softened their harvest in water. After a few days, they took the plants out and peeled off the skin. If the plants had soaked for five or six days in water, they began to stink and separated into individual fibres (Katanov & Menges 1933: 57). Hedin described in his diaries of 1896 how the fibres were worked into fine, soft threads, which were then twisted into string. They were also tied into nets with diagonal meshes (Jarring 1997: 107–108). In his diary from the second expedition in 1899–1902, Hedin observed an old woman "sitting there, beating *tjigge*-fibres until they became fine and white as cotton, ready to be used for making sack cloth (*tagars*)" (Jarring 1997: 107).

Fishing nets were also "made from the leaves of *tjigge*, the common 'rat-tail', which we know so well. The leaves are dried, then boiled for half a day in water. When they have turned soft, they are worked into fine soft threads, which are twisted into strings, which in turn are twisted two together into strings, and tied into nets with diagonal meshes" (Jarring 1997: 107–108). Ståhlberg & Svanberg (2010: 435) provide further information about the importance of this plant for the Loptuq. For a general overview of the use of *Apocynum* as fibre and a medicinal plant in Central Asia, see Thevs et al. 2012.

Another plant of great importance was the common reed *Phragmites australis* (Cav.) Trin. ex Steud., locally known as *kamisch* (i.e. *qamïš*) (Malov 1956: 126). This reed, which was abun-

dantly available in lakes and marshes, provided building materials and fuel for the Loptuq. The most prevalent type of dwelling was the *satma* or *qamïš üy* 'reed hut'. The hut was constructed with a rough framework of poplar logs tied together; its flat roof was made from reeds, and even the floor inside the hut was covered with reeds. In the middle of the floor was a fireplace. The reed hut consisted of several rooms, some of which were used mainly for storing stock fish and smoked duck (Hedin 1902: 51–53). The fresh shoots of the reeds were eaten and sugar was extracted from their roots (Ståhlberg & Svanberg 2017; for a global overview of the cultural and economic importance of this species, see Köbbing et al. 2013).

An edible plant mentioned by Hedin was the Russian olive, *Elaeagnus angustifolia* L. According to Hedin, it was common in East Turkestan, but the local name he recorded was *jiggde* (i.e. *jigde*). This plant occurs as an element in many toponyms in the Lopnor area, such as Jigde geren 'silverberry hut' and Jigdelik toqaj 'silverberry forest' (Jarring 1997: 210). Hedin reported that the tasteless fruits were often eaten by the Loptuq. According to Katanov's informant in the 1890s, the berries were prepared in a kind of soup. In the summer, each adult picked 10–20 bags of these berries (Katanov & Menges 1933: 59).

Hedin also mentions a certain kind of *jigde*, the so-called *karghajigde* (i.e. *qarγa jigde*), or 'crowberry', which was used for making flour. It was "highly esteemed along the Lower Tarim River" people (Hedin 1904: 134; see also Le Coq 1922: 126; Katanov & Menges 1933: 106; Jarring 1964: 96; 1997: 356). Le Coq (1911: 126) wrote that it had edible fruit, although lacking in taste. The flowers of *Elaeagnus* have traditionally been used in East Turkestan for medicinal purposes to cure asthma, chest pain and lack of sexual desire (see Lu et al. 2017). Swedish missionary John Törnquist (1926: 160–161) reported in his book about Kashgar that *jigdä* was an inexpensive fruit available for everyone and it was also used as fuel. According to a report from Kashgar, the locals produced wine from *jigdä* berries (Jarring 1993: 13). This use is also known in other areas of Central Asia (Svanberg 1987).

Several plants were eaten by domestic animals. For example, *jantaq* or *Alhagi kirghisorum* was described by Hedin as a thorny plant growing in desert areas and eaten by camels. The plant was also gathered as fodder (Hedin 1904: 502). Its significance in the Loptuq world view is also reflected in many toponyms where the plant name appears (Hedin 1904: 185; Jarring 1997: 193). It is known as *jontoq* in Uzbek and *jantaq* in Kirghiz (Zaurov et al. 2013: 28).

In his list of places where plants were collected, Hedin mentions Chimen-köl on the road to northeastern Tibet. Hedin (1922: 18) notes: "The plant taken at this place, *Eurotia ceratoides*, is in East Turkestan called *teresken* (usually pronounced *tesken*), and in Western Tibet on the road between Yarkand and Ladak *yapkak*. In the region of the Kara-korum and on both sides of the Kara-korum Pass, this plant is nearly the only one to be found, and is therefore sometimes the saviour of a caravan. In spite of its hard, dry stem it is eaten by ponies and mules." In Hedin's scientific descriptions we read that *teresken* is a hard, dry and scrubby plant used as forage or fuel (Hedin 1905b: 100, 104). This plant is today known as *Krascheninnikovia ceratoides* (L.) Güldenst. A voucher specimen (S08-15155) from Köl (Camp VI) in Tibet is found in the Hedin herbarium, and the Eastern Turki (Uyghur) name is annotated on the herbarium sheet (cf. *täskan* 'a shrub-like plant'; Schwarz 1992: 960).

The name *jappkak* is found in the herbarium specimen S08-15156, which was collected on the shores of Kum-köl on 28 July 1900 at Camp XVI in northern Tibet. Following Hedin's comments, Gunnar Jarring (1997: 196) agreed that *japqaq* is a hard and dry plant used as forage or fuel, also called *jer baγrï*. Le Coq (1922: 122) identified *yapqaq* as *Eurotia ceratoides*

(a synonym for *Krascheinnikovia ceratoides*). A Loptuq toponym including the plant name recorded by Hedin is Japqaqtïq 'the place with *japqaq* plants' (Jarring 1997: 196).

VERIFYING PLANT NAMES

We have here verified several of Hedin's recorded phytonyms in Eastern Turki and Loptuq lists (Table 3). Linguists, historians, geographers, ethnographers and others can benefit from the ethnobotanical analysis of the plant names. The plant names also reflect the Loptuq habitat, world view and relationship with the environment, which can contribute to the process of reconstructing and understanding their culture.

Some plant names are not corroborated by other sources, and it is possible that Hedin or his assistant misunderstood the informants. Such misunderstandings can develop "ghost words" or "ghost information" in research literature. This term refers to words that have never existed or possessed the meaning or use attributed to them (Clauson 1955; see Svanberg 1998: 133). For that reason, a few dubious phytonyms have been left out here, as they were probably missed or mixed up with others. We cannot be sure that all of the plant names were actually used locally, although most of them were collected in the Lopnor and Lower Tarim River areas.

Table 3 Hedin's record of vernacular phytonyms

Ak-basch (*aq baš*) = *Lepidium cordatum* Willd. ex. Steven. Pepperwort.
Ak tikken (*aq tikän*) = *Lycium ruthenicum* Murray. Russian box thorn.
Balgun (*balγun*) = *Myricaria davurica* (Willd.) Ehrenb. Dahurian tamarisk.
Dillpar (*dilpar*) = *Utricularia vulgaris* L. Greater bladderwort.
Ermen (*ärmän*) = *Artemisia maritima* L. Sea wormwood.
Eschek-kojmetj (*ešek qojmeč*) = *Launaea polydichotoma* (Ostenf.) Amin ex N. Kilian.
Gatji (*γačï*) = *Lactuca tatarica* (L.) C.A. Mey. (L.). Blue lettuce.
Ghas-otto (*γaz ot*) = *Bolboschoenus maritimus subsp. affinis* (Roth) T. Koyama. Bulrush.
Itt-muntjak (*it munčaq*) = *Asparagus breslerianus* Schult. & Schult.f. Wild asparagus.
Jantak (*jantaq*) = *Alhagi kirghisorum* Schrenk. Camel thorn.
Japptjan (*japčan*) = *Artemisia maritima* L. Sea wormwood.
Japtjan (*japčan*) = *Hordeum bogdanii* Wilensky. Wild barley.
Java Keuves (*java käväz*) = *Zygophyllum xanthoxylum* (Bunge) Engler.
Jekken (*jäkän*) = *Typha domingensis* Pers. Southern cattail.
Jiggde (*jigde*) = *Elaeagnus angustifolia* L. Russian olive.
Jörgöll (*jörgöl*) = *Cynanchum acutum* L. Swallowwort.
Kamisch (*qamïš*) = *Phragmites australis* (Cav.) Trin. ex Steud. Common reed.
Kekkija (*käkija*) = *Saussurea salsa* (Pall. ex Pall.) Spreng. Saw-wort.
Köl köuruk (*qöl köuruk*) = *Halostachys belangeriana* (Moq.). Botsch.
Kosu-kullak (*qozu-qulaq*) = *Glycyrrhiza inflata* Batalin. Chinese liquorice.
Lalu = *Bassia scoparia* (L.) A. J. Scott. Common kochia.
Mandar (*mandar*) = *Clematis tangutica* (Maxim.) Korsh. Golden clematis.
Ölen-ott = *Myriophyllum spicatum* L. Eurasian watermilfoil.
Ötschke-julgun (*öčke julγun*) = *Tamarix hispida* Willdenow. Kashgar tamarisk.
Sarik (*sarïq*) = *Glycyrrhiza inflata* Batalin. Chinese liquorice.
Schapp (*šap*) = *Suaeda splendens* (Pourr.) Gren. & Godr. Sea-blite.
Tal (*tal*) = *Salix alba* L. White willow.
Teresken/tesken (*teresken*) = *Krascheninnikovia ceratoides* (L.) Gueldenst, Pamirian winterfat.
Ter-julgun (*ter julγun*) = *Tamarix androssowii* Litv. Tamarisk.
Tjigge (*čige*) = *Apocynum pictum* Schrenk, Lop hemp.
Tjiggelik (*čigeliq*) = *Primula nutans* Georgi. Siberian primrose.
Tjutjun (*čučun*) = *Calligonum sp*.
Ussun-ott (*uzun ot*) = *Myriophyllum spicatum* L. Eurasian watermilfoil.
Yapkak (*japqaq*) = *Krascheninnikovia ceratoides* L. Gueldenst, Pamirian winterfat.
Yellik-ott (*jelik ot*) = *Scorzonera divaricata* Turcz.

An example of misunderstanding is probably *turkomak* (i.e. *turqomaq*), which Hedin wrote on a voucher specimen with the Euphrates poplar, *Populus euphratica* Olivier 1807, from the shore of Ulugh-köl, lower part of Tarim River, 20 May 1900 (NRM Acc. No. S14-49509). This identification with *Populus euphratica* is doubtful. The tree is usually known as *toγraq* in Eastern Turki (Scully 1880: 220; Törnquist 1926: 155; Jarring 1964: 309) or *tooraq*, *toyoq* or t*oγraγa* in the Loptuq language (Malov 1956: 173, 174; Fu 2000: 508). This looks like a mere slip, as Hedin must have known that the locals referred to the poplar as *toγraq*. Another kind of poplar was known as *terek* in the Loptuq language (Malov 1956: 172; see Jarring 1997: 461). According to Jarring, *turqomaq* is identified as 'sedge' (*Carex*?), and we also find the toponym Turqomaqlïq köli 'the sedge lake' (Jarring 1997: 253; see Hedin 1904: 427, 509; 1905a: 145). Sedge seems to be the more reasonable identification. Malov (1956: 176) identified the Loptuq phytonym *tuiqumaq* as referring to "a marsh plant".

Ak-basch (i.e. *aq baš* 'white head') for a kind of pepperwort, *Lepidium cordatum*, is indeed an herb that has white flowers. Hedin (1904: 10) mentioned *aq baš qïjaq* as "a kind of grass" (see also Hedin 1898b: 46). Jarring (1998:46) identified another plant taxon known as *aq baš ot* in Eastern Turki. It is difficult to know today if Hedin confused the phytonyms or if *aq baš* was the Loptuq name for *Lepidim cordatum*.

Ak tikken (i.e. *aq tikän* 'white thistle') is the name for Russian box thorn, *Lycium ruthenicum*. It is a shrub with black fruits (Hedin 1904: 382). Scully (1880: 216) listed the phytonym *áq tikán* for sea buckthorn, *Hippopahae rhamnoides*, and for the Russian box thorn, *Lycium ruthenicum*, while Schwarz (1992: 956) has *aqtikän* for Chinese juniper, *Juniperus chinensis* (see also Jarring 1997: 25).

Balgun (i.e. *balγun*) is the name for *Myricaria davurica*, a shrub belonging to the tamarix family, Tamaricaceae. It is described as "a kind of bush" (from Mongolian *balγu* 'tamarisk') used as fuel. Hedin noted the *balγun* bushes, with their small whitish-grey flower clusters and hard stems and roots, often growing on miniature mounds. The phytonym was also a component in several toponyms (for instance Baš balγun and Qaš balγun; Jarring 1997: 57).

Dillpar (i.e. *dilpar*), identified as *Utricularia vulgaris*, is a phytonym which could be translated as 'heart-ravishing' (Jarring 1997: 130). Dilpar is also a toponym in the Lopnor area (Hedin 1905a: 7, 10).

Ermen (i.e. *ärmän*) is given as the name for sea wormwood, *Artemisia maritima*. Scully (1880: 216) provides *árman* for common wormwood, *Artemisia vulgaris*, while Schwarz (1992: 961) has rendered it as *ärmän*. Hauenschild (1989: 26) listed *adättiki ärmän* and *qara ärmän* as the Xinjiang Uyghur names for *Artemisia vulgaris*. The name is also a component in a local toponym, Ärmänköl 'wormwood lake' (Jarring 1997: 49).

Eschek-kojmetj (probably *ešek qojmeč* 'donkey plant'), for *Hexinia polydichotoma*, is a sand-binding plant with yellow flowers. Scully (1880: 217) noted *áishák qamush* in Eastern Turki. Schwarz (1992: 970) has identified Uyghur *išäkqomuši* as the perennial herb *Scorzonera subacaulis* (Regel) Lipsch., which also has yellow flowers.

Gatji (i.e. *γačï*) for blue lettuce, or *Lactuca tatarica*, is mentioned by Hedin (1904: 390); Malov's (1956: 98, 133) Loptuq word list renders it as *käšä*. It is a component in the place name Ġačïlïq 'a place with *gači*-plants' (Jarring 1997: 156).

Ghas-otto (i.e. *γaz ot* 'goose-grass') is a kind of bulrush, *Bolboschoenus maritimus subsp. affinis* (synonym *Scirpus strobilinus*). It was described by Hedin as a kind of sedge that was very common at Kara Koshun and other lakes (Jarring 1997: 315). In modern Uyghur, *γaz ot* refers to the perennial herb *Agrimonia pilosa* Ledeb., according to Schwarz (1992: 971). This herb is not a grass, however.

Itt-muntjak (i.e. *it munčaq* 'dog necklace') is identified as *Asparagus breslerianus*. A reference to dogs in Turkic plant names is usually pejorative (Tryjarski 1979; Hauenschild 1996: 21).

Jantak (i.e. *jantaq*) is the local name for camel thorn, *Alhagi kirghisorum* (see Malov 1956:118). It was a common component in place names along the Lower Tarim River (Jarring 1997: 193). According to Hedin, it is a scrub plant which both tame and wild camels are very fond of (Hedin 1905b: 71). Katanov & Menges (1933: 109) noted that it was used as firewood. The phytonym *jantaq* for this plant is widely known in Kashgaria (see Scully 1880: 226; Raquette 1927: 16; Schwarz 1992: 971; Jarring 1964: 148; 1998:71).

Japptjan (*japčan*) was the name used for sea wormwood, *Artemisia maritima*. Jarring (1997: 195) mentioned 'a kind of bush', suggesting specific plants from various dictionaries, especially *Artemisia sp*. The phytonym is found in several toponyms, such as Japčanlïq 'a place where the *japčan* plant grows' (see, for instance, Hedin 1904: 383). Malov (1956: 118) noted *japčan* as 'a creeping plant'. For other Turkic examples, see Hauenschild (1994: 81).

Japtjan (i.e. *japčan*) is further also a name given for *Hordeum bogdanii* by Hedin. He wrote on the herbarium sheet: "Japtjan is the Eastern Turki name for the plant itself, it however occurs in many places in the Lopnor area, where several toponyms, for instance Japtjanlik-köl, indicate this." This explanation is doubtful.

Java Keuves (*java käväz*), meaning 'wild cotton', refers to the succulent shrub *Zygophyllum xanthoxylum* (Bunge) Engler, 1890. Raquette (1927: 22) has noted the forms *kebäz* and *käväz* for 'cotton plant'.

Jekken (i.e. *jäkän*) is the name used for southern cattail, *Typha domingensis*. Hedin (1904: 509) wrote that the people of the Tikenlik ('thistle place') village had earlier lived on fish, stalks and sprouts of *jäkän*, wild ducks, and eggs gathered from wild ducks and geese (see Hedin 1904: 220, 449, 485). For Scully (1880: 22), *yakan* stands for *Typha*. It was widely used as a component in place names in the area (Jarring 1997: 203). This is, however, a Common Turkic name for *Typha* species (Hauenschild 2016: 37). Fu (2006: 615) gives the Loptuq form as *jekke*.

Jiggde (i.e. *jigde*) is the name for Russian olive or oleaster, *Elaeagnus angustifolia* (see Jarring 1998: 69). The name *jigda* is commonly used in Eastern Turki (Uyghur) for the oleaster (Scully 1880: 219; Raquette 1927: 80; Schwarz 1992: 962; Jarring 1964: 96; 1993: 13). For a more detailed discussion about this plant name in other Turkic languages, see Dmitrieva (1972: 196) and Hauenschild (2006: 26–27).

Jörgöll (i.e. *jörgöl*) is the perennial climbing vine swallowwort, *Cynanchum acutum*; Jarring (1997: 217) mentioned *jurgel*, and Malov (1956: 121) *jörgöl* 'big tree'.

Kamisch (i.e. *qamïš*) was used for common reed, *Phragmites australis* (see Malov 1956: 126). The taxon is referred to as *qamiš*, *qumuš* or *qomiš* in the Eastern Turki (Uyghur) dictionaries (Scully 1880: 224; Raquette 1927: 96; Jarring 1964: 255; Schwarz 1992: 968). For a detailed discussion on this common Turkic plant name, see Hauenschild (2016: 34–35).

Kekkija (i.e. *kekija*) stands for *Saussurea salsa*. There are many species of the genus *Saussurea* in Central Asia. Hauenschild (1989: 145) has provided the phytonym *taqläulisi* in Xinjiang Uyghur and *aččiqtomir* in Uzbek for sawworts. Malov (1956: 135) mentioned *kekijä* 'grass'.

Kosu-kullak (i.e. *qozu-qulaq*) was used for *Glycyrrhiza inflata*. Hedin recorded two phytonyms for the same species at Tuna-toghdi, Lower Tarim River (see *sarik* below). *Qozu-qulaq* means 'lamb ear' (see Malov 1956: 128). Jarring (1998: 46) mentioned *qozï qulaqï ot* 'lamb-ear plant' for *Rumex acetosa* in Eastern Turki (Uyghur). This phytonym (*qozuqulaq* in Crimean Tatar, *kuzukulak* in Anatolian Turkish) for *Rumex acetosa* is common in many Turkic languages (see Hauenschild 1993: 166; 1989: 140). In Turkish, the closely related *Glycyrrhiza glabra* is referred to as *ayıkulağı* 'bear ear' (Hauenschild 1996: 105).

Köl köuruk was the name used for *Halostachys belangeriana*. Jarring (1997: 267) identified *köuruk* as the desert bush saxaul, in Khotan called *köuruk*. In the variant *köubruk* it means a bush, a kind of tamarix. *Halostachys belangeriana* is described as small to medium halophytic shrubs with apparently jointed fleshy stems and scale-like leaves. The prefix *köl* 'lake' is strange; maybe it was growing close to a lake. In his scientific report, Hedin (1904: 400) wrote about "the dark green köuruk plants" that "grow crowded together in some places and create something like dark islands in the otherwise monotonous landscape".

Lalu is the name for common kochia, *Bassia scoparia* (Syn. *Kochia scoparia*), a large annual plant found in desert shrub ecosystems. Hauenschild (1989: 95) listed the Xinjiang Uyghur phytonyms *yawa süpürgä* for common kochia, while it is called *burgan supurgi*, *makkazupurgi* and *supurgi* in Uzbek.

Mandar is the name for golden clematis, *Clematis tangutica*. According to Malov (1956: 141), *mandai* refers to a plant with yellow flowers climbing on trees. It is also a component in place names (Jarring 1997: 284). It is mentioned by Hedin (1905b: 33) as a climbing plant. Scully (1880: 225) identified the Eastern Turki plant *mandar* "as an Asclepiad, *Cynanchum* sp." For more discussion on this Turkic plant name, see Hauenschild (1994: 63).

Ölen-ott is the name given for Eurasian watermilfoil, *Myriophyllum spicatum*. We have not found this phytonym in any source for this species. However, sedge (*Carex sp*.), which often grows in wetlands, is actually known as *öläng*/*öleng* in modern Uyghur, Karakalpak, Kazak and Kirghiz (Hauenschild 2016: 106). Thus, Hedin most likely misunderstood his informant. *Myriophyllum* is a submerged aquatic plant, which grows in still water. Sedges are usually found in the same habitat.

Ötschke-julgun (i.e. *öčke julγun* 'goat tamarix') is a name for *Tamarix hispida*. *Julγun* 'tamarix' was widely used in toponyms (Jarring 1997: 215–216).

Sarik (i.e. *sarïq*) refers to Chinese licorice, *Glycyrrhiza inflata*. The phytonym means 'yellow', but the flower of the Chinese licorice is not yellow. Sarik-buja (*sarïq buja*) 'yellow plant' is known as a kind of bush. Hauenschild (1989: 82) listed *seriq buya* for *Glycyrrhiza glabra* in Xinjiang Uyghur. It occurred as a component in local place names (Jarring 1997: 404). Jarring (1998: 74) also mentioned *särig ot* as an Eastern Turki name for the plant identified as the parasitic *Cuscuta chinensis*.

Schapp (i.e. *šap*) is the name for *Suaeda splendens*, a desert plant with thick succulent leaves (Jarring 1997: 429). Malov (1956: 194) described it as a plant with a reddish and watery stem, very much appreciated by the camels. Jarring (1964: 284), who recorded the plant name at

Guma, explained it as "a desert plant with thick cactal leaves". British explorer Aurel Stein (1928: 275) found near Loulan "curious wind-driven balls of thorn, known as *shap*, which, apparently rootless, can keep alive on a minimum of atmospheric moisture".

Tal is used widely. In the herbarium sheet, Hedin noted *tal* for white willow, *Salix alba* (see Jarring 1998: 37). The word *tal* was a common component in toponyms recorded by Hedin (1904: 80, 83; Jarring 1997: 442). The phytonym is used elsewhere in the Kashgar region and East Turkestan (see Katanov & Menges 1933: 119; Jarring 1998: 75; Schwarz 1992: 960). Malov (1956: 167) translated it simply as 'plant' (Scully 1880: 219). Tal seems to be a common Turkic name for *Salix* in general (Hauenschild 1993: 173; Dimitrieva 1972: 188).

Ter-julgun (i.e. *ter-julyun*) for *Tamarix androssowii* is, according to Hedin's annotation, the 'whip tamarisk'. Hedin's interpretation of the name is difficult to verify. *Julgun* (i.e. yulghun يولغون) is the name for tamarisk in Eastern Turki (Uyghur). According to Malov (1956: 335), *puta* is the word for tamarisk in the Loptuq language and a common component in many toponyms (Jarring 1997: 335). However, the Loptuq also used the generic name *julyun* for poplar (Malov 1956: 121; see Abdurehim 2016: 54). 'Whip' is usually referred to as *qamči* (قامچی) in Eastern Turki (Raquette 1927: 133). There are several Modern Uyghur phytonyms with the prefix *qamči-*, such as *qamčigül* (see Schwarz 1992: 967). The prefix *ter-* can be translated as 'to beat', 'to hammer' (Jarring 1997: 460).

Tjiggelik (i.e. *čigeliq*) for *Primula nutans* is a strange plant name, since *-liq* refers to a place where *čige* (*Apocynum pictum*) grows (see Jarring 1997: 108). This might be a ghost word.

Tjutjun (i.e. *čučun*) refers to a shrub of the genus *Calligonum sp*. It is mentioned by Hedin (1905a: 119). According to Jarring's (1964: 77) dictionary, *čučun* is a Kashgar phytonym for a desert plant without leaves, often used as fuel.

Ussun-ott (i.e. *uzun ot* 'long plant') was used for the aquatic plant Eurasian watermilfoil, *Myriophyllum spicatum*, with long, slender stems.

Yapkak (i.e. *japqaq*) is the local name for Pamirian winterfat, *Krascheninnikovia ceratoides* (Syn. *Eurotoia ceratoides*). Le Coq (1922: 122) identified Eastern Turki *yapqaq* as this taxon. In Scully (1880: 218), the same taxon appears under the name *bürtsi*. Hedin (1905b: 100) mentioned the alternative name *jer-baghri*. The plant name *japqaq* is also found in the Loptuq toponym Japqaqtïq 'a place where there is *japqaq*'. It is a component in place names: Japqaqtïq saj 'the gravel-desert with *japqaq*-plants' and Japqaqtïq tuz 'the plain with *japqaq*-plants' (Jarring 1997: 196).

Yellik-ott (i.e. *jelik ot*) refers to the perennial herb *Scorzonea divaricata*. Hauenschild (1989: 146) has listed the phytonyms *ixäkqomuxi* in Xinjiang Uyghur for the same taxon, and *tayseyiz* in Soviet Uyghur. Uzbek has several phytonyms for Scorzonea, but nothing similar to the name recorded by Hedin.

USING THE ETHNOBIOLOGICAL DATA

Climate change and humans have influenced the Lop area for millennia, but the extensive exploitation of the Tarim River in more recent decades has destroyed the marsh regions where the Loptuq used to live. Natural environments change constantly and development influences human habitats; simultaneously, human impact changes the environment. The Loptuq had adapted to the environment, utilizing some of the surrounding plants and animals, but further research is required to

determine to what degree their activities changed the environment. Apparently they could survive as fishers-foragers on the available resources, adding to their food by means of animal husbandry and household items obtained through trade with their neighbours.

In prehistorical times, there seem to have existed other plants in the Lopnor area. An archaeo-botanical study of an Iron Age cemetery shows that the local flora and plant use had nothing in common with Loptuq folk botany (Chen et al. 2016). We can safely suppose that the flora have changed several times from the prehistorical period until now due to climate and other environmental developments. In recent years, Chinese and Uyghur scholars have conducted field research in Xinjiang, yet most of their studies deal only with medicinal plants, and very few discuss other bio-cultural domains (Lu et al. 2017). More research is needed on a historical timescale. Through archaeological and botanical finds we might be able to clarify several issues, such as the lifestyle of earlier marsh dwellers; geographical, hydrological and climate changes; trade relations; and possibly even the period when the Loptuq arrived in the Lower Tarim River area.

In the linguistic field, there is still much to do. Several plant names and some notes on their usage appear in European travel reports and glossaries, but our knowledge about traditional plant use among the Loptuq and other peoples in the region remains limited (Scully 1880; Le Coq 1922). We cannot be sure if all the vernacular phytonyms were recorded from Loptuq informants or from Eastern Turki speakers (or a mixture). Jarring (1997: ix) has stated that Loptuq words are easily recognizable through their extended vowel harmony. Pronunciation can vary, however, according to settlement, and Hedin's (or his assistant's) understanding of the word may also have influenced how it was recorded. This is a question which raises issues about source criticism. Linguistic research requires both historical and modern approaches. For the Loptuq, for instance, loanwords can show their language contacts, as well as other linguistic data, which would firmly establish the location of the Loptuq on the Turkic linguistic map.

Gunnar Jarring (1998: 8) has given an example of how a broader scope of plant knowledge could be recorded. He pointed out that different names were frequently used for the same plant in Xinjiang: "The names of flowers are very fluctuating and vary considerably in different parts of the country and even within the same region." Jarring (1998: 7) published a text from Kashgar, written by Abdu Vali Akhon, a mullah of "good reputation", in 1905–1910. The text includes a chapter with a description of wild herbs and plants and other information of ethno-botanical interest. Not only herbs used for medical purposes, but also plants eaten as food by humans and domestic animals are described. Jarring's (1998: 45–48) translation illustrates the extent of Abdu Vali Akhon's knowledge of plant usage: "The *semiz ot* they [Kashgarians] also call *tuge tapanï ot*. They dry it together with meat, and eat it with meat, and consume it with *bette* [a kind of pilaf] and *kangpang* [cooked rice]. People who have a fever look for it and eat it. Both people and livestock eat this [plant called] *semiz ot*."

Semiz ot 'fat plant' is identified as purslane, *Portulaca oleracea* L., 1758, a well-known medicinal plant in many parts of the world. According to Malov, the locals in the Aqsu area used the succulent leaves for curing scabs. The leaves were applied to the affected area. It was also used for stomach diseases (Malov 1961: 150). *Tuge tapanï ot* means 'camel sole plant'. According to Schwarz (1992: 217), *tögitapan* is the same as the very similar *Zygophyllum oxianum* A. Boriss. It is also referred to as 'camel sole' in Uzbek and Turkmen (Hauenschild 1989). In identifying and verifying plants, a broad comparative approach is needed, combining,

for instance, botany, zoology, linguistics, medicine, nutrition, hygiene, and social and cultural and many other aspects.

INTERPRETING PLANT NAMES

Sven Hedin's herbarium from Lopnor and the Lower Tarim River region is valuable not only for ethnobotanical research, but also for regional studies of Central Asia, Turkology and several other fields. The herbarium provides us with voucher specimens of plants together with some detailed information from a disappeared culture. We can interpret the information in several ways, and it can be applied and used in many research fields, but at the same time we need to be cautious about generalizations. Intra-community and intra-cultural diversity of plant knowledge plays a certain role in the identification of plants and their uses, but folk knowledge about plants (including naming) is not equally distributed within a particular community, and it may also vary according to age, economic circumstances, gender and social context (Svanberg 2012).

Voucher specimens in herbaria are a critical part of plant name – and, as we have seen – place name research, because they provide us with a unique access to scientifically and correctly identified taxa (Nesbitt 2014). For the period before the era of digital photography, dried specimens are very important, as concrete visual information (except drawings) is seldom available. Other methods of analysis, such as DNA tests and taxonomic discussions, can never be replaced by photos or drawings, which means voucher specimens are still of immense value for botanical and ethnobotanical research (see Ghorbani et al. 2018). Correctly identified voucher specimens of plants play an extremely important role for ethnobotanists and plant name researchers, as well as for cultural anthropologists, archaeologists, historians and other researchers trying to reconstruct the past.

The phytonyms and several instances of salient data on plants recorded among the Loptuq by Sven Hedin provide us further with important clues, indicating whether the plants have had any sort of practical use. Names of plants provide researchers with considerable information about a culture (Kolosova et al. 2017). They include historical information about earlier direct or indirect language contacts and transcultural diffusion, positive or negative views of a particular taxon, and commonly shared ideas of the world. They also provide us with information about local landscape management. We should not limit our research to the traditional study of the origin (etymology) and the motifs behind a specific plant name, but try to understand how the people of a specific culture and within a certain historical time frame looked upon and experienced their environment and the plants, while providing them with names (Rydén 1994).

In the case of the Loptuq, linguistic connections can be found through the plant names with other Turkic languages, especially dialects of neighbouring Eastern Turki speakers, with whom the Loptuq had frequent contact. They also used some generally distributed Turkic plant taxons. The broad use of certain plant names for toponyms might reflect popularity or importance, but also the quantity of a plant growing in a certain area or an aspect of the landscape. Plant names also reflect the colours and characteristics of plants, their utilization or symbolic values, as well as cultural, linguistic and trade contacts. Recorded phytonyms can be among the very few remaining cultural traces of a once thriving culture, such as that of the fishing-forager Loptuq.

FUTURE PERSPECTIVES

Hedin's herbarium in the Swedish Museum of Natural History in Stockholm is not the only source containing plant names. There are many more Loptuq and Eastern Turkic plant names in Sven Hedin's manuscripts and published texts, which are useful for future research. In the book *Central Asian Turkic Place-Names*: *Lop Nor and Tarim Area*: *An Attempt at Classification and Explanation Based on Sven Hedin's Diaries and Published Works*, Gunnar Jarring (1997: 18) has mentioned other plants such as *alqat* 'red berry', a bush with red berries, which he identified as *Lycium dasystemum* (Pojarkova), a well-known medicinal plant in Xinjiang (Yao et al. 2018). Several other names for scrubs and trees are also mentioned by Jarring.

The field for research of plant names is widely open, especially in the case of the Loptuq, Xinjiang and Turkic peoples, and Central Asia in general. There are several names for scrubs and trees from the Lopnor area which still remain unidentified. Non-identified plants (grasses), according to Jarring (1997: 305), include *kara-ott* (*qara ot*), *kijak* (*qïjaq*) and *kijik ottu* (*kijik otu*). Malov also mentioned several phytonyms which require more research. *Čilve* (cf. *šilvi* in Malov 1956: 194), for instance, may refer to honeysuckle (*Lonicera* sp.) in the Loptuq language (Jarring 1997: 109).

Phytonyms and toponyms have been noted by many other travellers than Hedin. Notes on plants and their importance for the local inhabitants of the Lopnor and Lower Tarim River area can certainly be found in many other travel narratives, diaries and reports, which are interesting but as yet neglected sources. In order to understand the life conditions and language use of vanishing cultures such as that of the Loptuq, multiple sources must be employed. Every fragment of their cultural history needs to be taken into account. To obtain as comprehensive research results as possible, collections in archives and museums, herbaria and other materials from the cultural and natural fields ought to be investigated.

The phytonyms from Sven Hedin's herbarium and the information provided may serve as a source for further historical, cultural, ethnobiological, archaeological and linguistic research on the different peoples living in eastern Central Asia. Also natural scientists can profit from linguistic and cultural studies which can provide new insights into environmental changes and other topics. The present study can only provide glimpses into Loptuq folk botany and the historical, cultural and linguistic contacts of this Turkic-speaking group, all areas which are poorly investigated. Their local ecological knowledge is not only of academic or theoretical interest, however. Loptuq botanical wisdom can be of importance for the survival and future of groups living in arid or desert areas with limited water resources, facing environmental deterioration, poverty and the consequences of climate change.

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