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Sardoba Hunters, Part II

TASHKENT, Uzbekistan July 31, 1997

By Adam Smith Albion

Presented below, an edited Transcription of the Author's FIELD-BOOK, being the Journal of a Field-Trip across the Steppes with Dr. Asror Nizomov, undertaken to investigate historical Methods of Irrigation and Water-Management in Central Asia; incorporating Material drawn from Dr. Nizomov's Lectures on that Subject, and his didactic Discourses on a Range of other Subjects as well; not omitting Descriptions of Noteworthy Occurrences on and off the Road, Altercations with Dr. Nizomov, Reconciliations, Philosophical Digressions and other Divagations &c. &c.[1]

* * *

"...The simplest irrigation device is *a bucket*...You bring your bucket to the river, fill it with water, carry it to your field and tip it over the crop. That is the essence of irrigation. And irrigation is the origin of civilization...

"That is why it is an error to maintain that the first great human invention was the wheel. The wheel was an afterthought! Mesoamerican cultures managed without it altogether. But the bucket — that is fundamental. From this we must conclude that mankind's founding genius was the inventor of the bucket" [*A. Nizomov, near the Labi-Hauz, Bukhara, 12 July 1997*].

I have promoted this bizarre conjecture of Asror's to the head of my notes as the *leit-motif* of our trip. It is an absurd argument — a *reductio ad absurdum* in fact — yet curiously challenging and appropriate on the lips of a man emotionally devoted to pre-modern forms of irrigation.

I recognize that Asror is urging the priority of the bucket *literally*. But I find that the antithesis "wheel" versus "bucket" can also be construed *symbolically* in a satisfying way so as to reflect his whole world view: it suggests the contrast between industrial and pastoral, between the factory and the farm, between the machine with its spinning parts and the plodding plow, between the mechanized tempo of the new and the time-honored pace of the old... In short, between everything Asror likes and everything he doesn't.

Our wheels definitely need fixing. Now, this is *not* a metaphorical utterance about the breakdown of modern civilization, it is a judgment on Asror's Zhiguli, which sputtered to a halt in the middle of nowhere today, and not for the first time. The two of us had to push to restart it. The car is also clearly incontinent — which is to say, it is unable to hold its water. We now have to replenish it every few hours from our canister, yet we cannot detect the leak although the car leaves wet spots behind it on the road and puddles when we park. Therefore we drive under constant threat of overheating, with one eye riveted to the temperature gauge and our

[1] For the background to this journey and the origin of the author's "field-book," the reader is kindly referred to ASA-22 *Sardoba Hunters, Part I.*

minds engrossed by Central Asia's perennial problem, *where to find water*.

Do not imagine obtaining water on the Karshi steppe is a simple matter. It is a desolate place, known in the past as "the Land of Yellow Silence" (*Kray zholtogo bezmolviya*). We came across small canals, many owing their existence to the Karshi Land Development Project of the 1970's. We pulled over hopefully, and slithered down their banks canister in hand, but they were often so silty and weed-infested that we feared the water would choke the radiator. Thus we saw with our own eyes how in many places the irrigation infrastructure was collapsing for lack of maintenance and funds. So we were forced to become suppliants, knocking on doors whenever houses came into view. But even if the taps were working (and there was no guarantee of that), people were frequently very chary about sharing their precious reserves with us. Their lack of generosity seemed to pain them as much as it disappointed us. After all, these were Uzbek families who, faced by serendipitous guests, would probably have killed the fatted sheep at the drop of a skull-cap. Yet there they stood on their own thresholds, shifting uneasily from foot to foot as we importuned five liters of water for our car.

As for filling up at a service station, or simply getting the leak repaired, such facilities are rather rarer in Uzbekistan than desert wells used to be along the Silk Route. Finding petrol also presents significant difficulties. Thus Asror and I fell into the ancient rhythm of travel in Central Asia, as ancient as the caravans. Like them, we came to conceive of our journey across the steppes as a series of *stages*. Either we anxiously tacked from town to town, or we posted between roadside havens where we hoped to find food and water to refresh our beast, the flagging Zhiguli, and push on. Consequently, whenever I saw a gas pump or a dripping water spigot in the distance, I thanked Allah for bringing us in safe. It was probably much the same prayer medieval merchants uttered at the end of the day's march when the caravansarai came into view.

* * *

We set out from Tashkent early in order to beat the traffic and the heat, heading southwest on Route M39 toward Jizzak. At the edge of town, notwithstanding our precautions, we got caught up in the moil of station wagons, donkey carts and push-trucks heading for the open-air Hippodrome market. In this hectic emporium the prospective buyer can browse shirts and leather goods (usually imported from Kazakhstan, Turkey and Dubai), power tools, refrigerators, old pipes and plumbing bits, second-hand motorcycles and mountains of diverse junk to his heart's content. Despite the early hour (7 a.m.) it took us ten minutes to inch through the crowds.

A short distance from the Hippodrome, we knew we had reached the perimeter of Tashkent when the bottles appeared. In the United States, desert-city limits are approximately congruent with "Last Chance for Gas" signs. The Central Asian equivalent is a long line of plastic soda bottles filled with petrol or motor oil. They are set at intervals along the roadside on upturned crates while their owners, usually teenage boys, lounge in the shade under poplar trees. Petrol runs 30-35 *sum* / liter (U.S.$0.21 - 0.25), oil costs 60 *sum* / liter ($0.43). We shot past and found ourselves at once in the countryside.

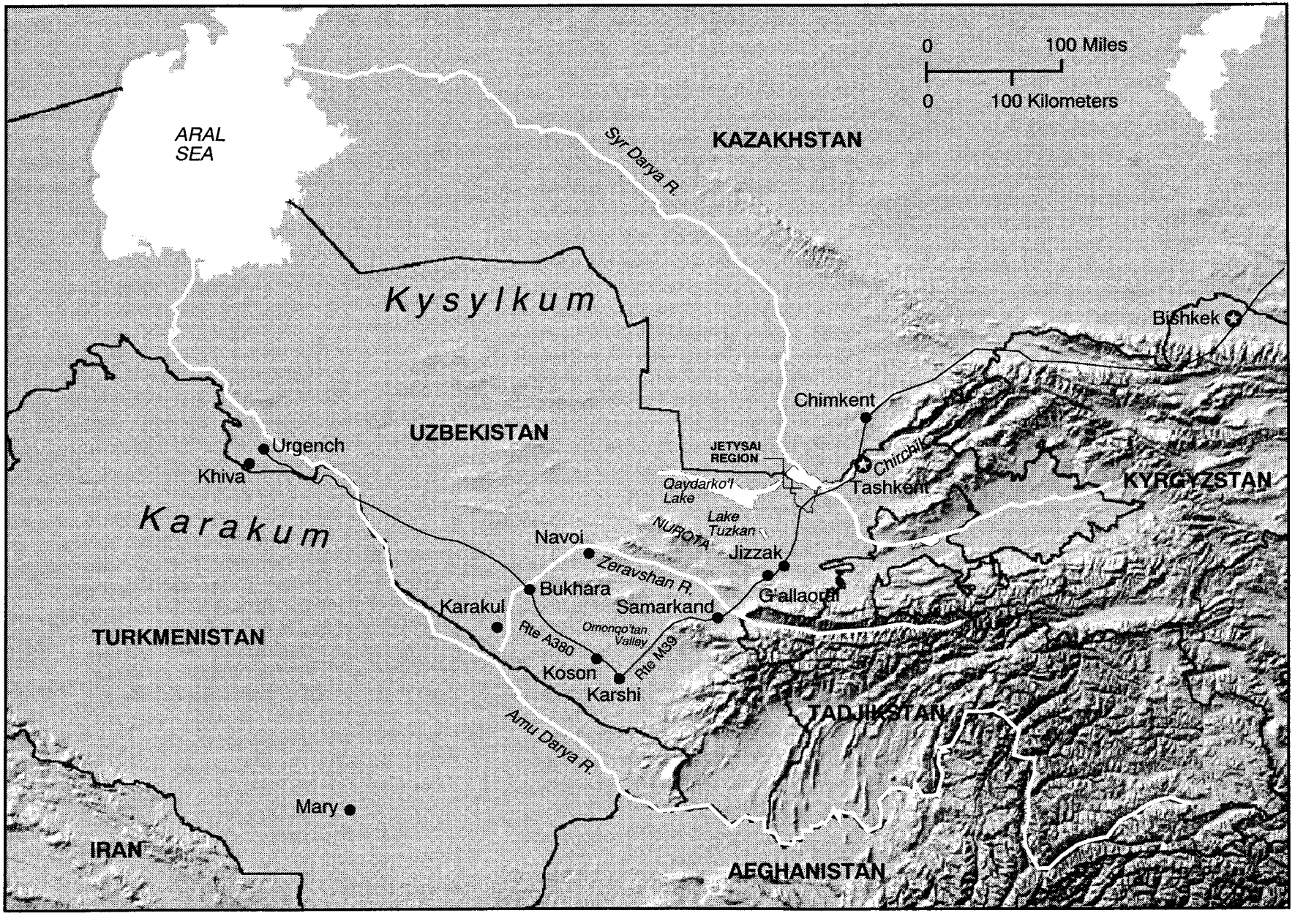
On either side of us stretched fields of cotton and watermelons irrigated by the Chirchik river. Asror pointed out many empty fields where the wheat sown in April had been harvested in June. They had already been newly plowed and awaited a second planting — usually of corn, but occasionally carrots, onions or turnips. These second crops would be ripe by late autumn. We noted apple groves, but they were mysteriously devoid of apples or blossoms. Perhaps there had been a blight; we stopped to ask, but no one was around.

Past the Syr Darya river, the Jaxartes of antiquity, we encountered a *chiy* seller dozing in a haystack. *Chiy* are mats of cross-plaited reeds, bound with twine. They are about the size of a small door. The reeds can be woven in two styles: the plaits of *chiy bo'ira* are rather tighter and more intricately reticulated than the plaits of *chiy bordon*, and the greater work involved was reflected in the prices — 45 *sum* ($0.32) / mat for the former, 35 *sum* ($0.25) / mat for the latter.

Seeing *chiy* for the first time, I was delighted to think a fairy tale was coming to life. For it was by laying a line of *chiy* across the Hungry Steppe that Khusro, Shah of Persia, fooled Princess Shirin into marrying him.[2] I had imagined those reed mats of the story were long extinct in Central Asia — so the unexpected discovery that they continued to exist was very exciting, as if I had caught a live coelacanth.

It turned out that the man in the haystack, who leapt up as we approached, was both salesman and artisan, gathering fascicles of reeds from the river banks nearby and weaving them himself. He was deadly earnest about the universal appeal and utility of his product. Why, everyone needs a *chiy*! He was astonished to hear we did not have them in America. They are good for thatching roofs, or covering floors, or sleeping on; they can be used as screens, or fences, or trellises; they serve as a handsome ornament for your home, or chicken pen, or pumpkin plantation. And if I was intending to erect a house and sought material for the foundation, did he have a recommendation for me! *Chiy also* make excellent substructures for buildings since they soak up damp and keep the salt in the ground water from rising into the walls. He even claimed they would cushion a house during an earthquake (always a consideration in Uzbekistan), and imme-

[2] The plot of *Farhad and Shirin* is summarized in ASA-22.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TADJIKISTAN
Amu Darya R.
Mary
IRAN
AFGHANISTAN

diately demonstrated their springy, shock-absorbent quality by throwing a heap onto the ground and enthusiastically trampolining on them. Truly, a gift for the person who has everything! I felt sorry for him when I did not buy one.

One of the products of Stalin's strange gerrymandering of borders in Central Asia is the Jetysai region of Kazakhstan, a small globule of territory that protrudes south into Uzbekistan. The frontier is quite arbitrary. Without warning, token border posts materialized. We entered Kazakhstan without formalities and exited it again thirty minutes later. The change in flags did not affect the landscape, of course, which continued to be flat and khaki-colored, though regularly punctuated by green fields. Nonetheless, Asror was quick to note differences.

"Don't you see how inferior the farms are?" he asked. I confessed I did not. "Then look at how unkempt the furrows are, and how poor and scrubby the cotton is," he said. "No one is weeding or hoeing. The fields are empty! An Uzbek would never take care of his crops as badly as that. Admittedly it is hard to make things grow here — the soil is very salty, because we are in a depression and the groundwater is high. But the Kazakhs are terrible farmers. Agriculture doesn't come naturally to them. They are much better at animal husbandry. Well, what do you expect, they're still nomads at heart... Look at that!" He indicated a field of slightly dog-eared wheat. "It's July already and the wheat isn't in! What are they about? They'll be too late for the second crop."

Without the evidence of my own eyes, I would have dismissed this kind of talk as ethnic stereotyping and Uzbek chauvinism. But it was true: the moment we crossed back into Uzbekistan the fields were noticeably better tended, neatly scythed and plowed.

The M39 from Tashkent is a good, wide road with a median strip kept tidy of weeds by grazing cows and flocks of sheep. I use the term "good" relatively, of course. In places the road breaks out in potholes, or suffers from sudden cutaneous eruptions like a bad case of pimples. Suffice it to say, it would not make the grade as a German autobahn. By local standards, however, its face is smooth as glass. This highway actually originates in Kazakhstan, and I have traveled its length all the way from Alma-Ata to Tashkent (*via* Bishkek and Chimkent): the Uzbek portion is the best maintained. Kyrgyz roads, as a rule, strike me as the worst in the region,[3] partly because the government there has no money for upkeep, partly because Kyrgyzstan is a well-watered country and water is the enemy of roads. Sun-baked tarmac survives better than wet paving. Therefore, transport specialists have informed me, Central Asia's best preserved roads are usually the desert highways of Uzbekistan and Turkmenistan .

A passing observation of Asror's unexpectedly sparked an argument. As we were driving along, he recalled that an important section of the Silk Route ran from Tashkent to Jizzak. Hence, we were retracing a path probably trod before us by tens of thousands of caravans and over a million camels.[4] Actually, the M39 predates the Silk Route. It is an ancient road that was adapted and readapted over the ages to serve the latest form of long-haul vehicle. In antiquity, it was an avenue for mule and donkey-carts. Then for a long period, extending into the nineteenth century, the camel-caravan was supreme. Today its place has been taken by the truck. Lorries may lack the romantic panache of caravans, but from a transport perspective truckers are the modern equivalent of the camel drivers of old. Most trucking routes in Central Asia run along the same transit axes that have been in use for two millennia.

The trouble began when I speculated aloud whether there really *was* "a Silk Route." For one thing, obviously there was no single route through the area. Rather, a network of roads branched off in various directions. However, surely there comes a point when a transport network becomes so ramified that "route" becomes a misnomer. For example, the first wagon trains heading for the American West followed trails that were sufficiently close together, parallel and small in number to be called a route. But now consider the situation today, after 150 years of infrastructure development. What is the "route" for modern traveling salesmen making their way from Philadelphia to San Diego? The question is meaningless: nowadays there are too many alternative paths linking the end-points.

By analogy, caravan merchants were the traveling salesmen of the sixteenth century, maneuvering between Shanghai and Cadiz (although of course no one caravan went the whole distance; goods traveled in relays). Between those two end-points "the Silk Route" in its heyday seems to have sprouted so many arteries and veins and capillaries that its topology suggested a plan of the bloodstream more readily than a "route." If one takes a map and tries to connect up all the towns that claim to have been on it, the resulting tangle resembles the circuit diagram for a Mir spacecraft. So would it not be sensible to abandon the notion of a "Silk Route" altogether? Perhaps we could rethink it (especially the complex portion running through Central Asia) as a large trading space that connected China, India, Iran and Europe — an interconnected commercial "regime," as a political scientist might say, through which merchants circu-

[3] I do not speak of the roads in war-torn Tajikistan.

[4] A rough estimate for the average number of camels per caravan is forty. In fact, the major consumer of camels in bulk was not merchants but the Tsar's armies; for the final expedition against Khiva, the Russians purchased 26,000 of them to carry luggage and tow cannons. (I am indebted to Boris Golender, a Tashkent historian, for these figures.)

lated with their goods in *many* directions?

This notion had been brewing in me for a while, and I set it forth to Asror quite fully. To do him credit, he did hear me out. That the idea greatly displeased him was clear, however, from the way his fingers began thrumming the steering-wheel. Finally he got so worked up about it that irritation overmastered his ability to drive and he stopped the automobile. Wordlessly, he pulled a map of Uzbekistan and environs from the glove compartment, got out of the car and spread the map open on its hood, securing the corners with the flashlight, the tea thermos and a rock. Then he beckoned to me with a finger and launched into rebuttal.

My picture of caravans peregrinating around Central Asia wherever they pleased was — Asror never minced words — *kulgili*: risible! It ignored many objective factors that put serious constraints on freedom of movement in the area. The truth was that the even for persons traveling relatively light — pilgrims, say, or the Tsar's express-mail couriers — the number of viable itineraries had been limited. As for heavily-laden caravans, the region's physical geography presented obstacles and hazards that reduced options still further. Tracks skirted deserts, for instance, as much as possible. If a road did have to enter the desert for a short stretch, it would then run the shortest course out again. Moreover, mountain or hill passes naturally had the effect of squeezing travelers into certain routes. What were the Khorgos or Torugart passes (leading from Kazakhstan and Kyrgyzstan, respectively, into China) if not huge caravan funnels? We ourselves would be experiencing one of the lesser funnels when we went through the Nurota ("Father of Light") mountains via the so-called Iron Gate.

"Another objective factor that you have overlooked, Adamjon," he continued with a grave and reproving look, "was water." Trails could never stray too far from water sources. By the same token, wayfarers could not wander too far off those trails. Ancient roads frequently were just straight lines — as straight as the terrain permitted — from one well to the next. If the wells dried up or became brackish for whatever reason, those routes disappeared with them. In general, the volume of traffic on a road was a function of the obtainability of water along it. The accidents of political geography often meant that communications between important towns were hampered by the lack of natural water sources between them. In such cases artificial reservoirs, or even small canals, had to be constructed to make passage feasible. For instance, the Mirza-Rabat canal was extended onto the Hungry Steppe in 1869 by the Russians in tandem with their efforts to establish a regular mail service between Tashkent and Samarkand.

Water and roads were so closely linked, he continued, that archaeologists seeking to reconstruct certain forgotten sections of the Silk Route — or to define its course more precisely in places where it was ambiguous — began by considering where water was likely to be available. (A principle of archeology that might be called, "*Cherchez l'eau.*") Such reasoning had helped identify the site of the eleventh-century Kal'tepe caravansarai near Lake Tuzkan in 1974.

The operant insight here is that water was to caravans what petrol is to cars. All vehicles run on something, and that something has to be supplied at intervals along the way. Therefore, if a tidal wave swept over the United States and erased all traces of roads, future archaeologist would still be able to reconstruct many of them from the positions of gas stations, using a kind of "join-the-dots" reasoning. The archaeologist investigating the medieval Central Asian Interstate Highway system worked in the same manner.

"All right, Asror, if we are going to pursue this analogy," I said, "what are these medieval fill-up stations, the remains of which supposedly mark out the Silk Route?"

"*Sardobas,*" he replied, with great satisfaction.[5]

* * *

SARDOBAS

[*Lecture delivered by A. Nizomov, inside Yog'ochli* sardoba, *near Galaba, 8 July 1997.*]

A *sardoba* is a domed cistern, built along caravan routes or in settled areas, designed to store drinking water and keep it cool and fresh for a long time. Its name, derived from Persian/Tajik, signifies as much: *sard*, "cool," *ob*, "water."

The first mention of *sardobas* is by the Arab writer Mahsidi who visited Merv (today Mary, in Turkmenistan) in the tenth century. Their shape and purpose remained essentially unchanged for a millennium; some village *sardobas* still functioned well into the twentieth century. Once there were nearly a thousand of them throughout Central Asia. The ruler of Bukhara, Abdullakhan (1557-1598) alone is reported to have built or restored five hundred during his reign. According to sixteenth-century sources, there was a *sardoba* every 24 kilometers (3 *tosh*, or 4 *farsakhs*) along the Bukhara-Merv branch of the Silk Route. (In Persia they were more frequent, every 2-3 *farsakhs*.) Today only seven or eight are standing in Uzbekistan; the rest are in ruins or have disappeared and are known only from historical documents.

Sardobas are usually found at the bottom of hollows in the ground, where they were built so that precipitation or other water would flow down toward them. They are cir-

[5] Our argument as to whether there was a "Silk Route" continued throughout the journey. In retrospect, I feel both points of view are valid, depending on what section of the 13,000 kilometer "route" is under discussion.

cular and brick-lined. Their distinguishing features are as follows [*diagram 1*]:

(1) Hemispherical masonry roof. (The largest approached fifty meters in diameter.) Its function was (a) to protect the water from animal filth, dirt, sand, etc.; (b) to prevent evaporation. The dome is pierced by four to twelve windows, and has a hole on top, creating good ventilation and a microclimate, keeping the water cool.

(2) A feeding (inflow) canal, and an exit (outflow) canal. Animals drink from the sump outside the *sardoba* fed by the effluent water.

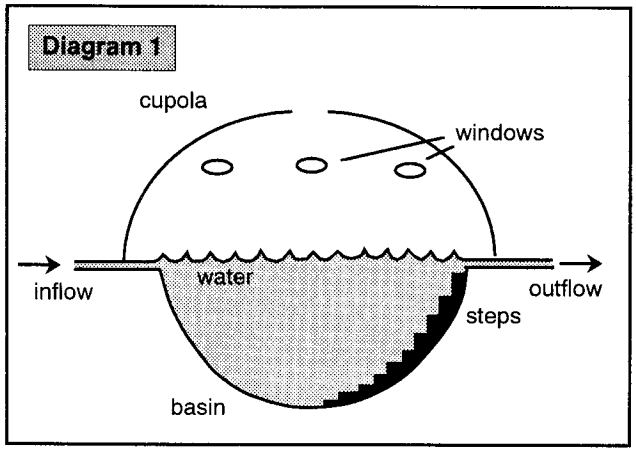
(3) Basin, where the water collects and is stored. It might be over 20 meters deep. In order to prevent seepage, or contamination (salinization) from the ground water beneath the *sardoba*, the basin is thrice lined, with (a) leather at the bottom, then (b) reed mats [salt-absorbing *chiy* — see above], then (c) baked brick on top. The bricks are cemented with a special water-resistant grout called *kyr*, made of lime, gypsum, crushed charcoal and wood ashes. Another lining of *ganche* or paste made of alabaster is also possible.

(4) Steps, leading from ground level to the bottom of the basin, (a) for easy access to the water if the level drops, or (b) to facilitate cleaning. Every one or two years all the water must be removed so the basin can be cleaned by hand. In villages, scrubbing the *sardoba* was a community-wide activity [a *hashar*: see ASA-22] called the *taganak*. At caravan stops, the organization of the cleaning was the responsibility of the *quduqchi*, or "well-supervisor."

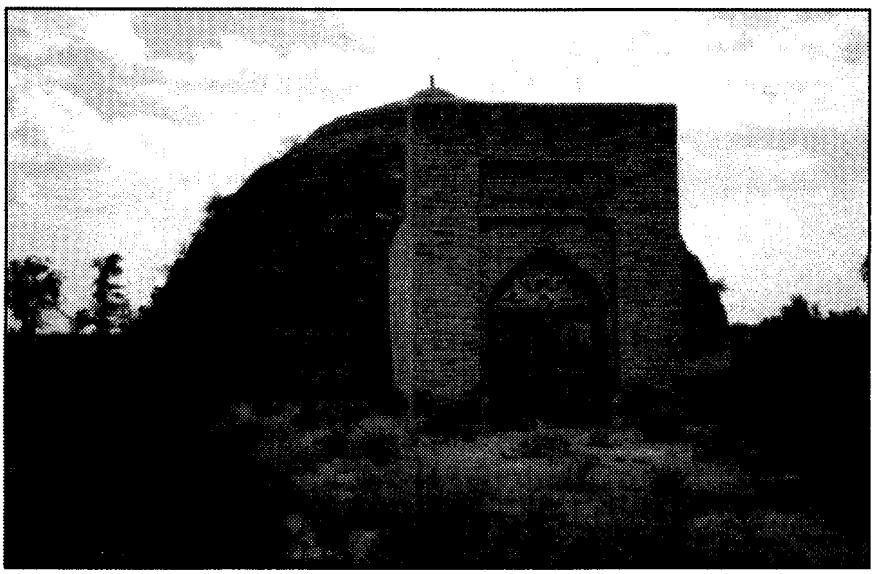
(5) Ornate entrance portal, and short corridor leading into the rotunda.

The disappearance of the *sardoba* may be ascribed to various factors. In part, its fate paralleled that of the caravans after the sixteenth century, when the exploration of sea-lanes reduced the importance of overland trade routes. The introduction of railways to Central Asia administered a further blow. Also, many *sardobas* were destroyed by the invading Russians and later by the Red Army's operations against the *basmachi* rebellion.

However, Soviet irrigation programs sounded the death knell for *sardobas*. As the water table grew contaminated and salty ground water rose, it seeped into the bricks of *sardobas* by capillary action and made their water undrinkable. Today one encounters villages where the inhabitants suffer water shortages in plain sight of a heap of masonry, the significance of which they have forgotten, but which was once a handsome *sardoba* that quenched the thirst of their forebears for a thousand years. A. Nizomov says the *sardoba's* decline touches him personally as a symbol of how the wisdom of the past, and respect for water, is vanishing in Central Asia. [*End of lecture.*]



Asror's project at the moment is to hunt down all the *sardobas* in Uzbekistan of which traces remain and map them. The map will supplement the book he is writing, the first major investigation since M. E. Masson's monograph (long out of print), *The Problem of Studying Sardoba-Cisterns* (Tashkent, 1935). It is partly a labor of love, partly an attempt to fill a gap in the field of Central Asian archeology. He believes the remains of many *sardobas* await discovery; the list held by the heritage department of the Ministry of Culture, based on Masson's work, is incomplete. He explores for *sardobas* by burrowing into the archives — ancient chronicles, travelers' descriptions, geographical treatises, municipal records, the books and business ledgers kept by merchants, accounts of military expeditions, spies' reports — then hops into a car and follows his nose. He feels his map should provide literally graphic solutions to many vexed questions about the Silk



Yog'ochli sardoba

Route; points that were unclear should leap to the eye.

The Yog'ochli *sardoba*, shown in the picture, sat in the middle of a bare, gentle hollow about 70 meters across. We found it a few hundred meters off the main highway, at the end of a track so choked with red dust that we had to roll up the windows to avoid asphyxiation. We were directed to it by an old man (*oqsoqol*) from a nearby village. He did not recognize the word *sardoba*, but responded to the word *gumbaz* ("cupola.") I thought it a grand structure, with a Palladian quality to it. It had fine acoustics inside, which probably prompted Asror to give his lecture there. Its dome, resembling a giant tortoise-like carapace, was 18 meters in diameter. The depth of its water seemed to be about 14 meters but the clutter of accumulated garbage and alluvium made it hard to take a sounding. Salt and damp had risen two meters up the brick walls, now maculate and flaking. Legend ascribes its construction either to Abdullakhan or to Tamerlane, but no one knows for sure by whom or even when it was built. A small hostel (*khan*), of which virtually nothing remains, would have stood beside it. Together they constituted a medieval motel complex, strategically situated one day's journey from Jizzak, the nearest major town.

* * *

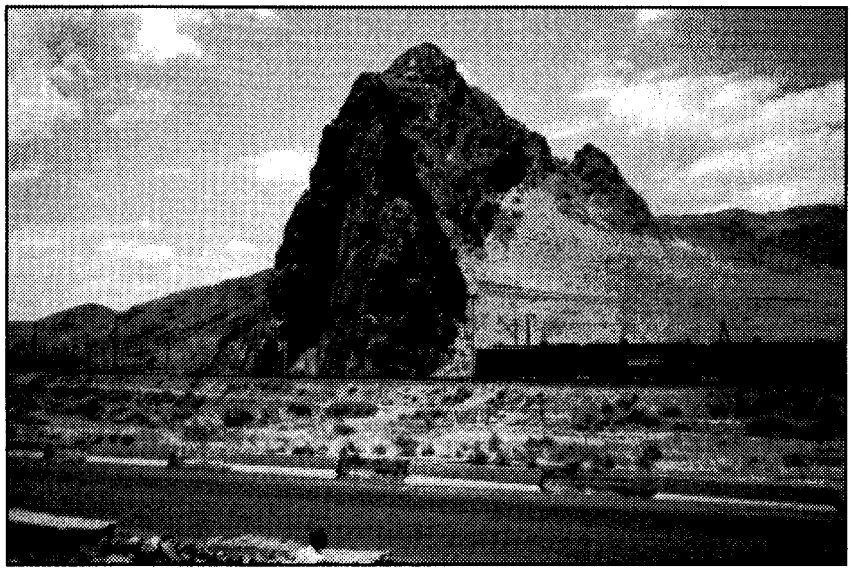
Beyond Jizzak stood the Iron Gate (*Temur darboza*). It was, in fact, a narrow gorge between the Nurota and Molguzar mountain ranges. As caravans were obliged to pass this way, it functioned as a toll booth where merchants were taxed for the right to proceed. The first to establish a control point here was probably either Tamerlane (his name Timur means "iron"), or his grandson Ulug Beg since there was a prominent plaque that had been carved into the rock bearing his name.

I believe geologists would describe the Iron Gate as a cuesta. Asror — no more geologist than I — attributed its shape to water erosion and cited as a comparative example the limestone formations at Karst in ex-Yugoslavia with their similar pattern of vertical and horizontal faults (what the British call "clints and grykes.") An unsolved mystery of the Iron Gate concerns the fish living in streams beneath it. The fish are called *marinki* (Latin name: *Schizothorax*. I have not discovered their English name). What is remarkable is that these same fish appear out of subsurface channels 150 kilometers away near the town of Nurota, in the villages of Baliqchi-ota and Qo'riz-quduq. (We saw them: they look like carp.) By what route they arrive there is unknown, but they must maneuver all that distance along a hidden current that runs underground above a non-porous layer of rock.

As Asror said, the Iron Gate acted as a funnel. Although it measured only a few hundred meters across, a road, a railway cutting, a river and a canal all squeezed through it.

The freight train that pounded through my photograph was transporting oil, most likely to Samarkand from the refinery in the Ferghana valley. Between the railroad tracks and the highway flowed the Sangzor ("Very Stony") River. Its water was clear and sparkling. The canal ran beside it. This was a channel of slower-moving water that had been diverted from the River Zarafshon ("Flashing like Gold"). The Zarafshon did not live up to its name; it was a muddy grey, the color of the Tiber.

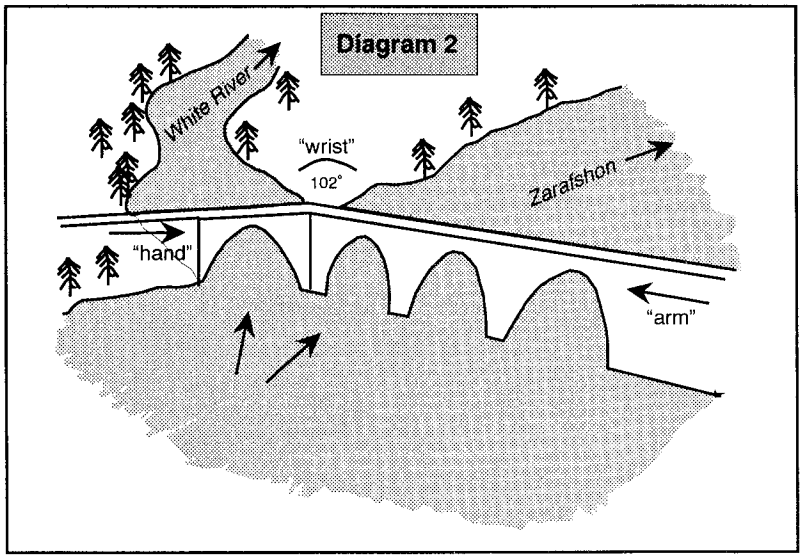
This canal, bringing the Zarafshon's alluvium-rich water onto the Jizzak steppe, originated at Tu'ya Tortar and was first built two thousand years ago by the Kushans, whose empire stretched from India (cf. "Hindu Kush") to Central Asia in the first three centuries after Christ. The Kushans are Asror's heroes. Many of their irrigation achievements survive and are in service today, such as the Dargom canal on the Karshi steppe, which we made a special pilgrimage to see. Well aware that whoever controlled the water had strategic leverage, the Kushans raised a fortress at Vargsar to guard the Dargom canal's head.[6]



The Iron Gate, with canal and train passing through

The Zarafshon is a much-plundered river. Its waters are

[6]Throughout Central Asian history, rulers understood that the importance of guarding one's water was on a par with protecting one's city. In the eighth century a defensive wall 350 kilometers long was erected around the *whole* of the Bukharan oasis. A similar wall circumscribed the city and environs of Samarkand. The towns of the Ferghana valley were protected by a barrier running along the western perimeter of the irrigated zone. In fact the frontiers of many early empires in the region coincided w ith the furthest extent of their irrigation basins.



siphoned off and redirected for irrigation purposes so often along its 877 kilometers that it no longer reaches the Amu Darya (Oxus), of which it was once a tributary. Instead it dies a few kilometers short in theBukharan oasis. Just outside Samarkand it suffers the indignity of losing its identity altogether for 128 kilometers. It is cloven in three and fans out like a bird's foot. The northern and southern prongs become the Black and White rivers, respectively (*Qora* and *Oq daryo*). They trace out the shape of a lemon before rejoining one another near Navoi and becoming the Zarafshon again. (The middle prong, the Central Mionqol canal, runs only 10 kilometers.) Thanks to this division of the waters, twice as much of the Samarkand oasis can be irrigated than if only the Zarafshon had flowed through it in a single stream.

The Hydroengineering Plant that achieves this division into three channels is called the *Samarkandskii gidrouzel*. It stands near the town of Jomboy. It is a feat of Soviet technology. However, much more impressive is the medieval water-divider a few steps away that was designed to do much the same thing with much less fuss. It may be sadly dilapidated, but it still represents a more elegant piece of architecture than the Soviet eyesore that has replaced it.

WATER-DIVIDER

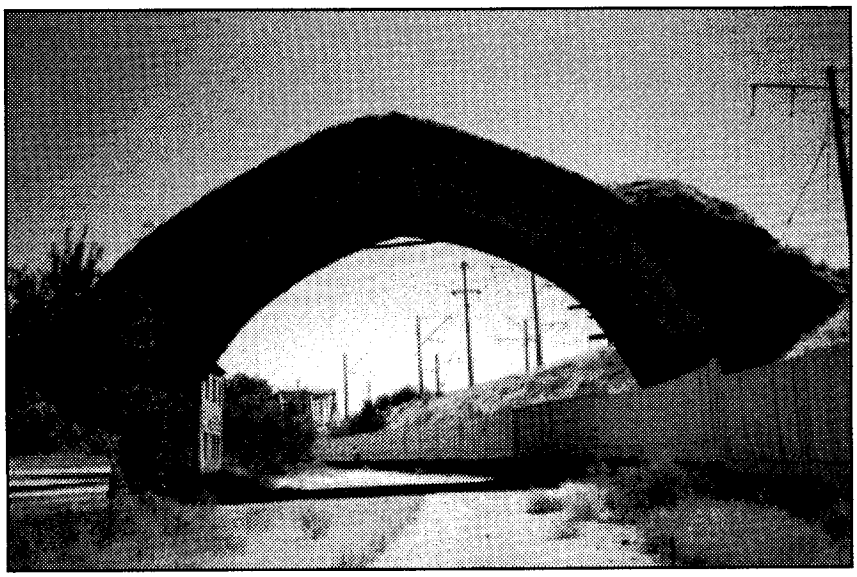
[*Lecture delivered by A. Nizomov, standing on a piece of tumbled masonry, near Jomboy, 10 July 1997.*]

This water-divider is sometimes known as *Bog'-i-zag'an* ("Garden of Ravens/ Black Kites"), since it stands where one of the sixteen or so parks that Tamerlane established in the suburbs of his capital, Samarkand, used to be located. We know an ancient bridge spanned the river here, because Arab geographers mention it.

The circumstances of its construction are precisely described by the historian and poet Kamaliddin Binay in his *Shaybaniy-nama* ("The Book of Shaybaniy"). Khan Muhammad Shaybaniy, the founder of Uzbek rule in Central Asia, was traveling with his army from Samarkand to Bukhara in autumn 1502. They arrived at the banks of the Zarafshon river but found the bridge broken and were forced to encamp. Unable to cross it, the Khan set about rebuilding the bridge. He conceived the idea of damming the river, partitioning the water with dikes using piles of stones and bundles of brushwood as trestles. When this plan failed, he sent to Samarkand for architects for consultations. Under their guidance, the army set to work and the bridge-cum-water-divider was put up in a month. It was finished on 3 November, 1502.

Its shape resembled an "arm" of seven (perhaps six) arches, and a "hand" consisting of one arch making an angle of 102 degrees (*diagram* 2). Only the "hand" has survived. It is 9 meters high and 7 meters wide, made of square bricks cemented with *kyr* [see lecture on *sardobas* (3)]. The division of the waters took place at the "wrist," where a huge earth-mound was heaped up causing the river to surge around it and split into two. The Zarafshon passed through the "arm," and the water diverted into the "hand" became the White River.

The water-divider doubled as a bridge with a span of 21 meters, over which the Samarkand-Ferghana road passed. There is a similar dual purpose water-divider elsewhere on the Zarafshon. Its bridge was one of the rendezvous spots for the protagonists in that classic of

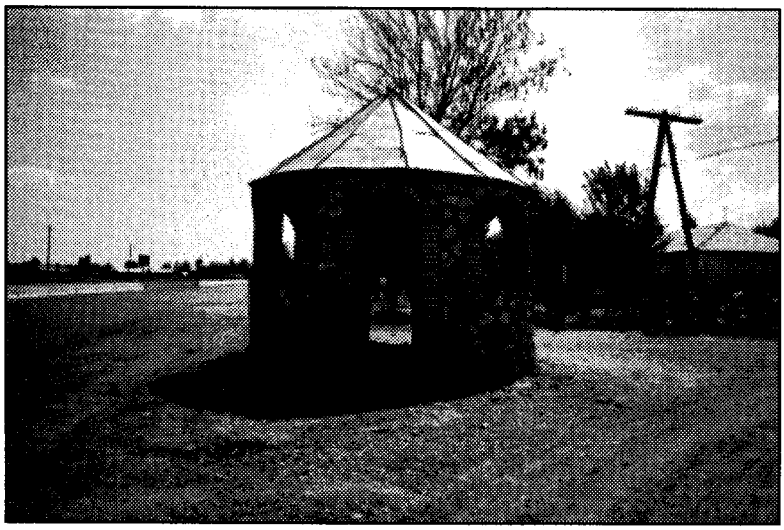


Sixteenth-century water-divider, once on (now near) the Zarafshon River

Uzbek cinema from the nineteen-forties, *Tohir and Zuhra*. Adamjon will certainly be very moved by this touching and tender love-story, which A.N. considers required viewing for all serious students of pre-modern forms of water-management in Central Asia. [*End of lecture.*]

* * *

We spent a pleasant day motoring through the G'allaorol ("Grain-Island") area, but failed to turn up any new *sardobas*. We did visit the well at Yakka Quduq, housed in a little stone tower with a conical roof. It was once the main water source for miles around. Consequently, according to Asror, it was an important rest-stop along the Silk Route and a military strongpoint for the Russians at the beginning of this century. We hauled up water in a leather bag. It was drinkable, though rather salty.



Well at Yakka Qudug

I had unconsciously — and as it turns out, mistakenly — assumed that all crops in Uzbekistan required artificial irrigation to grow. In fact, this is a piece of misinformation I had culled from a number of books on Central Asia. Therefore I was surprised to learn that much of the land we passed that day was dry agriculture (*lalmi/ lalmikor yer*), *i.e.* non-irrigated. The fields were generally given over to wheat, barley, watermelons or flax (*zig'ir*). Unlike the wheat fields we had observed previously, dry-farming land does not yield a second crop. The wheat is planted in spring and harvested in autumn (or vice versa); then the soil is plowed and left to rest for the intervening six months. The reason dry agriculture is possible here and not elsewhere seems to be related to the land's relatively high elevation, resulting in more rainfall.

Trees were comparatively scarce. We were informed by a watermelon grower that the water table sat fifteen meters underground on average, too deep for the roots of most trees to reach. Why did his watermelons prosper, then? He replied that the soil was wet enough for them, thanks in part to the morning dew. He noted further that moisture was drawn to the surface by a plant called *yantoq*, the roots of which could reach forty meters in length. A melon seed inserted into a *yantoq* plant sucked up water as through a long wick.

Asror said that the dam at Qaydarko'l had altered the local climate, contributing moisture to the air. "And that's why the quality of wool is declining," he added. The watermelon farmer solemnly nodded.

I failed to see the connection and begged an explanation. "Why, the *shuvoq* [pronounced "shwok"] is dying; *shuvoq* doesn't like moisture. So there is less of it around for the sheep to eat. And *shuvoq* is what gives the coats of the Karakul sheep its luster. Am I right?" Again the farmer nodded.

"What's *shuvoq*?" I exclaimed in frustration.

"That's *shuvoq*, of course," said Asror, pointing to a spare, weedy plant beside a fence. I bent over to pick it. "Smell it, Adamjon, it's sweet."

I did. Absinthe!

"The Marjonbulok gold mines are not too far from here. *Shuvoq* grows in ground that is rich in gold — it's an indicator of gold deposits," Asror said. Noting my skeptical expression, he went on, rather annoyed: "Well, I can see you do not believe me. But everyone knows it is true. Geologists prospecting for gold always take note of the *shuvoq*. It used to grow here in abundance. That's why, before that dam was built, the best Karakul wool came off the sheep and unborn lambs in this area."

"Unborn lambs?"

"Naturally: you have to cut open the pregnant ewes to get at the lambs inside. The babies' coats are a great luxury, incomparably beautiful and soft," Asror continued. "And the reason for it is because their mothers ate *shuvoq*. It makes the wool shine, as if it was embroidered with gold."

A few days afterward we encountered *shuvoq* again, in an unusual setting.

We had crossed over the mountains south of Samarkand onto the Karshi steppe. Interestingly, to reach the arid steppelands we had had to pass through the Omonqo'tan ("Safe Sheep-Pen") valley which, by contrast, enjoys the most rainfall of anywhere in the country. One villager to whom we spoke joked that it was the "Cherapoonji of Uzbekistan," referring to the area in northeast India that is the wettest spot on earth, receiving an average of 1,200 centimeters of precipitation per year.

Not far from Koson (on Route A380 between Karshi and Bukhara), under a blazing sun, Asror and I clam-

bered over another *sardoba* — our fourth. It stood on the land of an ex-Soviet state farm that used to be called "Third International." The *sardoba* was particularly interesting for being nearly complete, with a dome "stepped" in the manner of the Saqqara step pyramid [*see photograph below*]. Inside, it was filled to the brim with green, smelly water, in which floated all sorts of garbage — and large fish swam! They were *marinki* — the fish that negotiated the channels under the Iron Gate. How they came to be living in a *sardoba* is another mystery.

Asror, of course, had a few things to say about this *sardoba*.

ESHQUL HAJI *SARDOBA*

[*Lecture delivered by A. Nizomov, standing on its cupola , near Koson, 12 July 1997.*]

This *sardoba* owes its name and construction to one Eshqul-aka, a rich and pious gentleman who performed the *haj* to Mecca (thus winning himself the title "Haji"). On his return to his native village, he undertook to provide it with a *sardoba* as an act of charity. Its date of construction, 1892, makes it one of the last *sardobas* ever built.

A *hashar* was called, and five hundred people turned out to work on it. Contemporaries record that they were fed twice a day for free by Eshqul Haji. Because the local soil is poor and salty, material for making bricks had to be brought from eighteen kilometers away, dragged by camels. The *sardoba* is sixteen meters in diameter, approximately ten meters deep, with steps leading down into the water. The lining of its basin is unconventional: three layers of camel/cow skin and three layers of thick felt, topped off with *ganche*.

The *sardoba* is also notable for the "natural filter" built beside it. The water flowing into the *sardoba* first passed through two pools connected by a channel. They acted as a filter since any silt or dirt was deposited in them as sediment before the water entered the basin. Unfortunately, these pools no longer exist, but they used to stand where a gourd plantation is now.

The plaque on the portal records that it was restored for the first time in 1913; subsequent restorations took place in 1946 and 1956. However, what with the Karshi Land Development Project raising the water table and bringing harmful salts to the surface, the walls are crumbling, the water is too foul to drink and the *sardoba* has had to be abandoned. Another monument of our heritage — the gift to his people of the pious gentleman Eshqul Haji — has been desecrated and lost. [*End of lecture.*]

The *shuvoq* I mentioned earlier made its appearance now, as Asror was climbing down from the cupola after his fine lecture. "Stop!" I cried. "Look at your feet. It's *shuvoq*!" Tufts of *shuvoq* had in fact sprouted all over the dome of the *sardoba*.

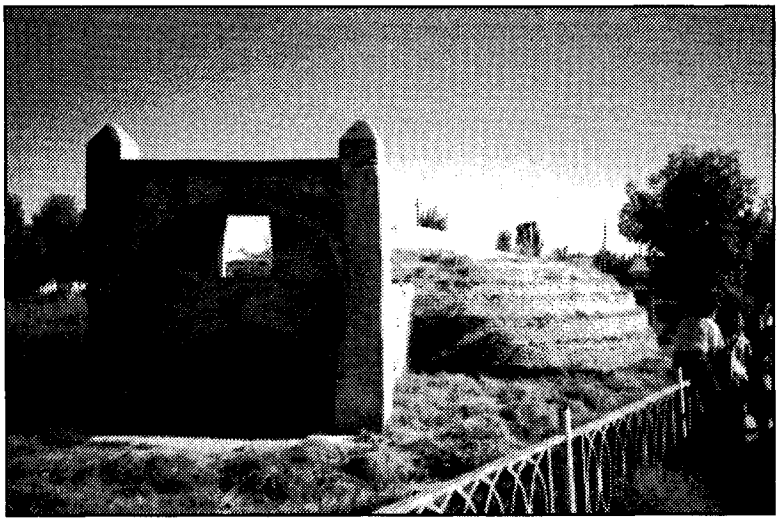
"Yes it is. What about it, Adamjon?"

I assumed my most roguish expression, for I had him. "You said it grew in earth where there were gold deposits. You got angry when I didn't believe you. But here it is growing like a weed on top of a broken old *sardoba*. How do you explain that?"

Without missing a beat, he answered: "*Sardobas are* gold. And the water in them is gold too. The fact that no one cares about them any more doesn't change that, Adamjon. The *shuvoq* knows that better than you, better than the Soviet authorities, and better than our poor benighted people today. The *shuvoq* doesn't make a mistake."

* * *

Had you been taking the air on the Labi-Hauz, Bukhara's fine central plaza, one star-encrusted evening in July 1997, you might have observed the weary tread of two grimy and sunburnt travelers heading for the outdoor teahouse. This pair of newsletters, "*Sardoba* Hunters Parts I & II," has now come full circle, for we have reached the point where the first began. The car had temporarily broken down not far from the Eshqul Haji *sardoba* on the steppe. Rushing from place to place all afternoon in search of water and petrol, I had been reminded of the Mad Max movies, where the characters circulate endlessly around a wasteland looking for fuel to keep their vehicles going. It was hot as an oven: the sunlight pouring down on my arms and neck felt like molten lead. And the land had been dry as bone and caked in salt like a white leprosy — salt deposited on the surface by the rising water table, which so angered and saddened Asror. Late that evening, we limped into Bukhara. ❑



Eshqul Haji sardoba

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Institute Fellows and their Activities

Adam Smith Albion. A former research associate at the Institute for EastWest Studies at Prague in the Czech Republic, Adam is studying and writing about the republics of Central Asia, and their importance as actors within and without the former Soviet bloc. A Harvard graduate (1988; History), Adam has completed the first year of a two-year M. Litt. Degree in Russian/East European history and languages at Oxford University. [EUROPE/RUSSIA]

Christopher P. Ball. An economist, Chris Ball holds a B A from the University of Alabama in Huntsville and attended the 1992 International Summer School at the London School of Economics He studied Hungarian for two years in Budapest while serving as Project Director for the Hungarian Atlantic Council. As an Institute Fellow, he is studying and writing about Hungarian minorities in the former Soviet-bloc nations of East and Central Europe. [EUROPE/RUSSIA]

Chenoa Egawa. An enrolled member of the Lummi Indian Nation, Chenoa is spending two years living among mesoAmerican Indians, studying successful and not-so-successful cooperative organizations designed to help the Indians market their manufactures, agricultural products and crafts without relying on middlemen. A former trade specialist for the American Indian Trade and Development Council of the Pacific Northwest, Chenoa's B.A. is in International Business and Spanish from the University of Washington in Seattle [THE AMERICAS]

Marc Michaelson. A program manager for Save the Children in The Gambia, Marc has moved across Africa to the Horn, there to assess nation-building in Eritrea and Ethiopia, and (conditions permitting) availing and unavailing humanitarian efforts in northern Somalia and southern Sudan. With a B.A in political science from Tufts, a year of non-degree study at the London School of Economics and a Master's in International Peace Studies from Notre Dame, he describes his postgraduate years as "seven years' experience in international development programming and peace research." [sub-SAHARA]

Randi Movich. The current John Miller Musser Memorial Forest & Society Fellow, Randi is spending two years in Guinea, West Africa, studying and writing about the ways in which indigenous women use forest resources for reproductive health. With a B.A. in biology from the University of California at Santa Cruz and a Master of Science degree in Forest Resources from the University of Idaho, Randi is building on two years' experience as a Peace Corps agroforestry extension agent in the same region of Guinea where she will be living as a Fellow with her husband, Jeff Fields — also the holder of an Idaho Master's in Forest Resources. [sub-SAHARA]

John B. Robinson. A 1991 Harvard graduate with a certificate of proficiency from the Institute of KiSwahili in Zanzibar, John spent two years as an English teacher in Tanzania He received a Master's degree in Creative Writing from Brown University in 1995. He and his wife Delphine, a French oceanographer, are spending two years in Madagascar with their two young sons, Nicolas and Rowland, where he will be writing about varied aspects of the island-nation's struggle to survive industrial and natural-resource exploitation and the effects of a rapidly swelling population. [sub-SAHARA]

Daniel B. Wright. A sinologist with a Master's Degree in International Relations from the Nitze School of Advanced International Studies of the Johns Hopkins University, Dan's fellowship immerses him in southwest China's Guizhou Province, where he, his journalist-wife Shou Guowei, and their two children (Margaret and Jon) will base themselves for two years in the city of Duyun. Previously a specialist on Asian and Chinese affairs for the Washington consulting firm of Andreae, Vick & Associates, Dan also studied Chinese literature at Beijing University and holds a Master of Divinity degree from Fuller Theological Seminary of Pasadena, California. [East Asia]

Teresa C. Yates. A former member of the American Civil Liberties Union's national task force on the workplace, Teresa is spending two years in South Africa observing and reporting on the efforts of the Mandela government to reform the national land-tenure system. A Vassar graduate with a juris doctor from the University of Cincinnati College of Law, Teresa had an internship at the Centre for Applied Legal Studies in Johannesburg in 1991 and 1992, studying the feasibility of including social and economic rights in the new South African constitution. [sub-SAHARA]

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