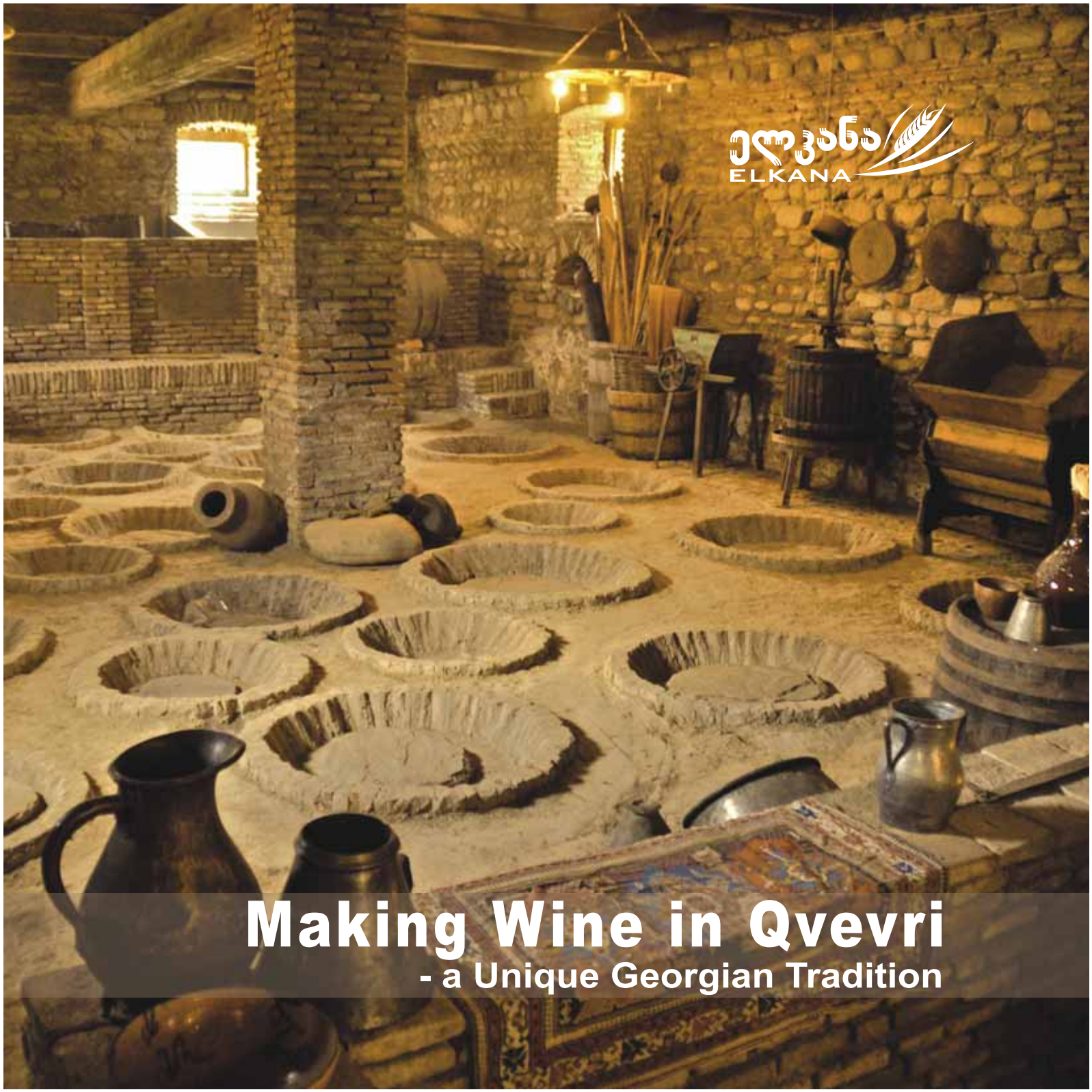

Making Wine in Qvevri

- a Unique Georgian Tradition

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ELKANA

Making Wine in Qvevri

- a Unique Georgian Tradition

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Prepared by: Giorgi Barisashvili

Reviewers: Dr. Maia Mirvelashvili, Dr. Levan Pruidze, Dr. Teimuraz Ghlonti

Editorial Board: Mariam Jorjadze, Tamaz Dundua, Manana Gigauri

English Editing: Mary Ellen Chatwin

Design and make-up: Manana Gigauri

Photos: Giorgi Barisashvili, Tamaz Dundua, Ia Ebralidze

Photo on the cover: Tamaz Dundua

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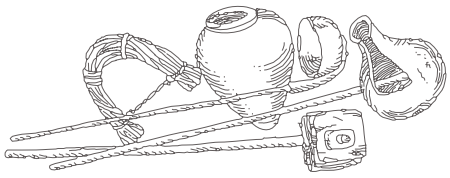


Foreword

Traditional Georgian wine is hardly imaginable without a qvevri! The qvevri is a phenomenal vessel that originated in the remote past of Georgian history. This brochure, published by the Biological Association Elkana, will briefly familiarize the reader with the ancient and modern history of the qvevri and qvevri-making, how kvevris are kept and how wine is made in a qvevri. Obviously, only one book cannot offer all the information that exists about qvevris and qvevri-making in Georgia, so here we offer our readers a glance at the main topics and facts so you can learn more when you come to Georgia!

Elkana and the Georgian Institute of Horticulture, Viticulture and Winemaking and with support from the Institute's Director, Professor Teimuraz Dekanosidze, leading Georgian specialists have reviewed this brochure and prepared reviews. Some extracts from these reviews:

"The qvevri is the oldest Georgian original wine vessel used to store cereals and other purposes, its principal function being the making/fermentation and storage of wine. It is supposedly the main original use of this rather unique vessel from the late Stone Age within the territory of what is today known as Georgia. Georgian traditional winemaking technology is unique in the world, for it is completely based on the use of the qvevri. In different regions of of the country, it is used differently; however the principle is the same: final fermentation of the grape juice/must on all or part of the grape pomace (skins, seeds, stems).

The follow-up stages of aging and maturing also take place in qvevris. Full-value aging of a Georgian traditional wine takes at least five years. At the end of this period, a perfect product - a natural wine that is unrivaled in the world of winemaking.

The art of qvevri-making has been preserved only in Georgia, and it is very regrettable that skilledq vevri-makers can now only be counted on the fingers of one hand. Before it's too late we should support them and encourage others to understand this difficult but unique national tradition, and provide every working qvevri-maker with worthy conditions.

The present outline published by Elkana, aimed at promoting the qvevri, contains valuable and competent recommendations and advice on its practical application. It should be available to all those interested in Georgian viticulture and winemaking. The time has come when Georgians should protect their way of life and national traditions – and traditional winemaking is paramount. If we achieve this, nothing will compete with these Georgian wines with their unmatched qualities, throughout the world."

Levan Pruidze
Historian and agro-ethnologist

"The work 'Making Wine in Qvevri' is dedicated to the popularization of ancestral Georgian winemaking, including measures to maintain and service the traditional vessel, the qvevri.

This book explains different types of qvevri, lids, hallmarks, heat-insulating properties, and maintenance/servicing measures (liming, washing, waxing). Also included are traditional winemaking technologies according to individual regions: Kakheti, Imereti and Kartli (Khidistavi). Although it's a small volume, the work is informative and well researched.

In our opinion, the publication of the brochure is a rare and praiseworthy event because it addresses both specialists and individual connoisseurs of wine and will promote Georgian traditions for future generations.

Maia Mirvelashvili
Doctor of Agricultural Sciences,
Senior Researcher,
Viticulture Agrotechnology
Research Department

"The importance of qvevri for wine fermentation and aging has been known from time immemorial. Since the first half of the 19th century, the wine specialist G. Lentz [1], advocated for the policy of replacing local traditions, habits and vine varieties with the European ones, yet in 1846 he recognized the advantages of the Georgian qvevri over European barrels and vats.

What is the qvevri and why should wine be made in it? The reader will find answers to these questions in the work published by the Biological Farming Association Elkana, containing data on the history of qvevri-making in Georgia, the role of qvevri in the process of alcoholic fermentation of wine, its aging and storage, how qvevris are made and maintained. The reader can find practical advice and recommendations concerning the care and preparation of qvevri for the harvest season. This useful work is very timely and can be regarded as a guide to the interesting and important world of traditional Georgian winemaking. We hope that the Elkana publication "Making Wine in Qvevri" will accomplish this noble mission."

Teimuraz Ghlonti
Doctor of Technical Sciences,
Winemaking Adviser of Alaverdi Monastery
Traditional Marani,
Full Member of the International
Academy of Viticulture and Winemaking

[1] German wine specialist, who lived and worked in Kakheti in 40-ies of 19th century

Introduction

Based on scientific and archeological research data, one may say with confidence that "Georgia is a country of vine and wine, where many varieties of grape have been developed. 'In no other country in the world is wine so good and drunk so amply as in Georgia' [2], where the archaic winegrowing and winemaking techniques have been preserved and are still being employed"...[3]

In the course of its centuries-old history, the country has developed a unique winemaking technique - pouring grape juice into qvevris, the large clay vessels buried in the earth up to their tops, then sealed. Since antiquity, this knowledge has gradually developed and improved nourished by experience.

Among ceramic artifacts found by Georgian archeologists, the qvevri is unique and its traditions have endured over the centuries. The oldest earthenware discovered in excavations is clear evidence of the high level of craftsmanship of the ancient Georgians. Qvevris were used for storing cereals, melted butter, for chacha (grape vodka) and other vodkas, for pickled and other food products. However, the origin of the qvevri is associated most distinctly with the development of winemaking, and is chiefly used as a wine vessel.

Of course large earthenware crockery is found in other regions, though mostly for other purposes.

2 From Georgian folklore

3 Lekiashvili. Thou Art a Vineyard. 1972, Tbilisi

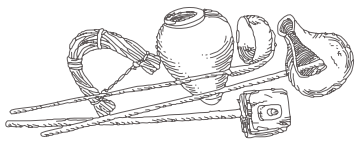
Making a type of clay vessel to be used in winemaking was principally developed in Georgia, and thus the country possesses one of the most important examples of the world's winegrowing and winemaking history. As many scientists believe, the word ghvino (wine) originates in the Georgian language and then spread into many other languages (wine, vin, vino, etc).

The qvevri and its technology have evolved over time, yet due to their uniqueness, they have reached us almost unchanged after many centuries.

Qvevri-making used to be the leading branch of the five branches of pottery in Georgia. Not long ago, qvevris in Georgia were widely used, however today their use and production are limited - only a few artisans are still master qvevri-makers. Qvevri making, especially for large-capacity qvevris, requires great skill, experience and expense.

To illustrate that qvevri-making is a very complex branch, it can be contrasted to that of the brick-maker, who could freely make tiles; and to a potter, who could freely make the traditional bread ovens called tonne. However the skills needed to make qvevris have always been considered a higher and distinct art in Georgian ceramics.

In the past kvevris were made in many places including Sairme, Tskhavati, Utslevi, Anaga, Bodbiskhevi, Chkhiroula, and others (see following chapter). Today qvevri-making is only found in five or six villages of Georgia.



Names of kvevri in ancient Georgia

In ancient times clay vessels for wine storage of different sizes and shapes were named according to their shape and use. Georgian qvevris have different shapes and sizes and are called by different names. For example, interesting references can be found in Sulkhan-Saba Orbeliani's 18th century dictionary of the Georgian Language "Sitkvis Kona": "*A churi is a vessel made of clay: qvevri, kvibari, kotso, khalani, dergi, lagvni, lagvnari and the like."*

In old Georgian the word "churi" had several meanings (weapon, chain armor, and vessel). Today, in West Georgia churi is used for qvevri. Interesting references concerning the names of qvevri in two provinces of West Georgia were found by the academician Ivane Javakhishvili:

"In Guria and Samegrelo they use two names to define two vessels of different sizes. In particular, big and average-size vessels were named 'churi' in Guria and 'lagvani' in Odishi; while smaller ones, holding up to 5 buckets of grape juice or wine, were known as 'kvibari' in Guria and as 'lakhuti' in Odishi."

Today, out of the diversity of ancient Georgian names referring to wine storage vessels of different sizes and shapes, the following are still used: qvevri, churi, dergi, lagvini, lagvani, lagvinari, kvibari, kubari, lakhuti, chasavali, khalani, and kotso. Perhaps in the remote past there were other names used for these wine storage vessels, though they have been lost over time.

Kvevri-making in Georgia: past and present

Many Georgian villages were engaged in qvevri-making, but we shall dwell on the most well-known places where the famous Georgian qvevris were made.

In Eastern Georgia, the following provinces and villages were noted for qvevri-making:

Sighnaghi district villages: Anaga and Bodbiskhevi;
Telavi district - Vardisubani; and
Sagarejo district - Antoki.
The regions of Kartli and Kakheti also procured qvevri through the seasonal travels of artisans. Villages include Sartichala, Khashmi, Sagarejo, Digomi, Akhalkalaki (Kaspi district), Kavtiskhevi, etc.

Qvevris from Vardisubani

In the 19th century, the village of Antoki was noted for qvevri-making in Kakheti as ethnographic material and literary data have shown. Prince Jorjadze refers to this village in his work Viticulture and Making and Improvement of Wine, a Guide for Makers of Kakhetian Wine. Tbilisi, 1876: *"Before and now, a qvevri made in the village of Antoki of the Sartichala uchastok (sub-district) of Tiflis uezd (district) is found to outperform the qvevris made in other places, and those having taken a qvevri from this place, before or now, are all satisfied and say that it stores wine well and for a long time, and that the qvevris of this village are being praised far and wide."*

The famous Georgian historian and geographer Vakhushti Bagrationi when describing Alistskali Valley ("The Description of the Kingdom of Kartli"), notes as follows:

"Above Ali, on the slope of Mt Likhi, a fortress stands. Behind the fortress, there is Utslevi village, wherein good and best wine vessels (churi) are made"...

We studied the village Utslevi in the Khashuri district and nearby villages and found that today no one is engaged in pottery making. However the locals, especially the elders, still remember the earlier production of tiles, various earthenware and locally made vessels.

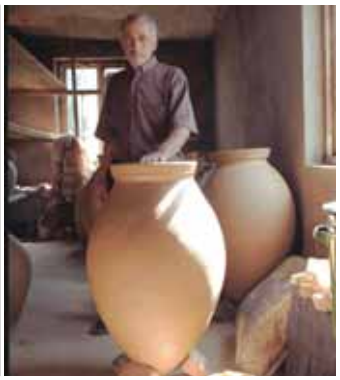
Pottery, and particularly qvevri-making, was also well-developed in Ksani Valley, Kartli, especially in the village of Tskhavati, although locals no longer carry out this activity. Tskhavati earthenware crockery was famous and in high demand in many villages and towns of East Georgia. Tskhavati qvevri-makers were known for their small-size qvevris (kotso) or slightly bigger ones. Large-size qvevris, as narrates M. Zandukeli in his work Georgian National Ceramics (Ksani Valley), Tbilisi 1982, were brought into the Ksani Valley from Imereti (West Georgia).

Vardisubani village in the Telavi district (Kakheti) used to be a famous qvevri-making center, where this activity has been followed for ages. Vardisubani is the only village in East Georgia where qvevri-making has been preserved since ancient times. Earlier the village was also engaged in making tonne, bricks, tiles, and earthenware crockery and was famous for en masse production of large-size qvevris. At present maximum capacity of qvevris produced in Vardisubani is about 2-2.5 tons. According to the local population and qvevri-makers, even larger qvevris were also made in the village in earlier times. In general, the region of Kakheti was distinguished for making large-capacity qvevris. For example, one still can find qvevris in the village of Shilda that hold 6000-8000 liters.

Imeretian qvevris in the yard of Tbilisi Ethnography Museum

Qvevri-making in Makatubani village

Qvevri-maker from Atsana



Qvevri-maker from Shrosha

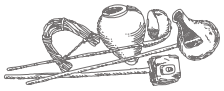
In West Georgia, for example in Imeretia, the best-known qvevri-making villages were Boslevi, Chkhirula, Makatubani, and several others.

We have studied well-known villages in Guria, West Georgia, where pottery was produced, and qvevri in particular. Some include Aketi and Atsana. High quality qvevris are still being made in these localities although craftsmen are far fewer - today only two qvevri-makers are still working in Atsana.

In the village of Aketi the availability of high-quality clay has meant that artisans can still produce qvevris and crockery as well as other earthenware (tiles, tonne[4], bricks, well crowns) in Aketi proper and Atsana. In Samegrelo, qvevri-making was practiced in the villages of Namkolao, Mukhuri, Jvari, Chale, Namkoli, Chkaduashi, Pakhulani, Kortskheli and others. In the area of Lechkhumi, artisans from the village of Sairme were noted for this skill.

Qvevri-making is still practiced in several Imeretian villages as well, though comparatively smaller sizes are made. Although qvevris holding 2000-2500 liters are also made here, the fact that Imereti, in comparison with Kakheti, is a comparatively land-poor region means that the land dedicated to vineyards occupies a relatively small area. Thus small-capacity qvevris are quite sufficient to hold the yearly grape harvest.

Today, qvevri-making is restricted to three Georgian regions: Kakheti, Imereti and Guria. In general, Georgian qvevris vary in capacity from 2 to 3 liters to 6000-8000 liters, although in ancient times artisans supposedly made even larger vessels that could hold 10,000 to 15,000 liters.



[4]Traditional bread-making ovens

The advantages of using the qvevri

Although the benefits of making and storing wine in a qvevri have never been fully understood or comprehensively studied, we believe the subject is highly significant for traditional Georgian winemaking. We address three key techniques of vinification:

achieving a natural temperature balance in the qvevri;
wine fermentation and aging;
removing tartar from qvevri wine.

Winemaking in factory conditions that require chemical additives to render a desired stability and clarity to the wine is very different from the traditional methods using the qvevri and marani[5]. The latter process is natural and requires no chemical agents, provided that the qvevri and marani themselves are made and arranged according to standards.

The primary benefit of using the qvevri is that the wine varies only a few degrees in winter and summer. The optimal temperature for wine storage and maintenance is naturally maintained in a qvevri, while under factory winemaking conditions temperatures have to be maintained by costly equipment.

Temperature plays a key role not only when storing wine but also during fermentation. As a rule, the exterior of a qvevri is treated with lime wash and the outside walls of large-size qvevri are covered with limestone. The lime-treated walls of a qvevri preserve wine at temperatures higher than the ambient temperature, which results from alcoholic fermentation, and lasts for a longer time than for non-limed qvevri. Qvevri walls can hold a stable temperature as long as necessary for malo-lactic, or secondary fermentation, as it is frequently called. Under household conditions, this fermentation continues for about a month. Malo-lactic fermentation plays a special role in making red wines, and is important for white wines as well, especially more astringent ones. The content of malic acid in the wine diminishes and the wine acquires certain gustatory qualities, completeness and perfection - its unpleasant high acidity disappears. The process of removing tartaric acid (tartrates) from the wine also serves to reduce acidity. We return to this subject as a process in winemaking.

In qvevri-winemaking, the second and one of the most important processes is the fermentation and aging. qvevri not only stores the wine well but actually contributes to the processes of fermentation and aging better than other vessels do. The opinion of some winemakers today that the qvevri does not contribute to fermentation and aging is ungrounded and erroneous.

In making a Kakhetian- or Imeretian-type wine in a qvevri, all processes are carried out chronologically and naturally which, under factory conditions, require different techniques and chemical additives.

[5]Traditional Georgian wine cellar

Under factory conditions the alcoholic fermentation in steel tanks is often accompanied by using European yeast culture. We believe that with these technologies, Georgian or European wines take on a uniform character and, as a rough comparison resemble bottled soda that is very similar all over the world, irrespective of where they are bottled. Such wines are almost completely devoid of any unique character.

Wine produced using the qvevri is characterized by its unique type, stability, high potential for aging, natural brilliance, distinguished flavor and aroma, high tannin content, and other positive properties. Maintaining wine in qvevri with a natural temperature balance and optimal fermentation temperature makes European yeasts unnecessary. Even in the case of Kakhetian-type white wines, the wine can frequently stay on the pomace until early spring.

One might wonder how such wine avoids the negative effects of the lees, or grape sediment. The answer is found in the very specific shape of the qvevri: the bottom of a qvevri is a particular form of pointed cone. At the end of fermentation, most grape seeds separate from the skins and sink to accumulate in the bottom of the vessel.

This process is further facilitated by mixing the pomace. Under the effect of pressure, the grape seeds in the bottom of the vessel are covered by the lees which, under heavy pressure, cause the seeds to be separated from the wine. After fermentation has completed the grape skins remain floating on the surface under the effect of carbon dioxide inside the skins, while the lees sink to the bottom. Thus the wine itself remains in contact only with the skins and extracts a maximum of substances that are beneficial for human health. It is reputed that Kakhetian-type white wines contain many more beneficial substances than European pomace-free fermented wines. The fact that qvevri-made wines are naturally stable and do not require the addition of any chemical agents for stabilization is illustrated by Kakhetian wines, for example, which are rich in tannins. These are known for their ability to bind wine proteins that would otherwise make the wine turbid. Therefore, Kakhetian wines are not prone to such wine turbidity, which explains the natural stability and brilliance of these wines.

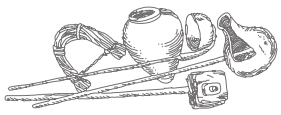
The completion of fermentation usually coincides with a gradual decrease in the ambient temperature and cold weather. This favorably influences wine clarification and the removal of tartrates. Removing tartrates from wine in ancient times was carried out differently than today. In old fragments of qvevri walls very finely crushed pieces of flint have been found as admixtures (also found are other admixtures that have not been studied in terms of winemaking technology).

Alcoholic fermentation

These presumably were used for the removal of tartrates from wine, which requires cold weather, as well as other effective techniques sometimes applied in wineries. In particular, tartrates were washed in alcohol and ground, then added to wine. As a result, both the added tartrates and those naturally available in wine are then extracted. Since silicon is a high quality crystal and wine is in constant contact with it while in qvevris, this may produce the same effect as the addition of tartrates to wine. In addition to this, silicon in the qvevri walls reinforces the strength of the qvevri itself.

Tartrates are also removed from wine by alcohol formation. Qvevri wines, and specifically Kakhetian-type ones have a high alcohol content which naturally facilitates the removal of tartrates.

Thus, the qvevri is a phenomenal vessel both in its form and content! Even today, all the processes and impacts of the qvevri on wine have not been studied completely. Qvevris do not receive the attention they deserve, even in Georgia, although their value is being increasingly recognized in Europe, where they are increasingly imported. Qvevri wine exported from Georgia to Italy or to other countries is erroneously known as “amphora wine”. However it would be advisable to preserve the qvevri name on Georgian labels with the inscription “qvevri wine”, and explain the meaning of “qvevri” on the back label.



Qvevri liming and washing

Making wine in qvevris and maintaining these special vessels have been given much attention by Georgian specialists and viticulteurs. Both in the past and the present, qvevri washing and sanitation have played such an important role in Georgia that there was a special occupation known as "qvevri washer".

Washing a qvevri well is an important precondition for producing quality wine. However, in addition to washing, other preparations of a qvevri before it is buried in the ground are also important. Coating the outside surface of a qvevri with lime and the inside walls with melted wax are both necessary.

Concerning the first process, liming qvevris, the process should be carefully studied. Cement mortar was once used for coating qvevris instead of lime. This is a mistake, because although cement is known for its strength, lime lasts longer especially when the qvevri is buried in damp soil. While lime on a qvevri can be preserved for centuries, a cement coating is limited to ten or twenty years; after this it begins to deteriorate. Contrary to lime, cement is also prone to molding under humid conditions, which adversely affects wine quality. Lime is not only resistant to mold, it is also noted for its antiseptic action. In fact qvevris can be buried without any coating at all but liming a qvevri strengthens it and improves the winemaking process.

Kvevri liming (village Kvemo Magharo)

A. Bokhochadze wrote concerning qvevri liming in Viticulture and Oenology in Old Georgia Based on Archeological Materials, Tbilisi 1963: *"All the qvevris found in the excavation of maranis, some dating as far back as the Middle Ages, bear signs of liming. To lime qvevris, a lime grout (1kg lime — 2kg sand), rubble stone and sandstone fragments, sometimes fragments of qvevri and other earthenware crockery are used. As it appears, qvevri liming is carried out locally, in the ground. In such cases, a pit for a qvevri is dug in the marani, on the bottom of which a flat stone is placed to accommodate the qvevri bottom or heel; the qvevri would be stone-faced around and coated with lime mortar. The qvevri liming is carried out bit by bit. When one stone-facing is completed, the second stone-facing would begin, and so on. The mortar thickness can be 10 to 25 cm. The mortar was applied to ensure that the qvevri cannot be removed. As the weight of a limed qvevri can be several tons, its displacement is practically impossible and in most cases will cause it to break. Therefore, the qvevris limed in one place usually remain there forever, even when the marani itself is moved and arranged in another place".*

The qvevri washing process is primordial since wine quality greatly depends on cleanliness. Since the quality of wine must be preserved by liming and waxing, a mistake made during washing may lead to irreparable spoilage. Washing qvevris, as mentioned already, has always been critically important. An interesting extract from the newspaper Meurne (Farmer) published in 1888 describes the technique: "*We know that a qvevri usually has stuck dry pomace, mold and other dirty substances on its walls. Before one sets out to washing the qvevri, I advise first to get rid of this dirt. For this purpose, newly burnt lime should be poured into a trough or a big barrel and poured over with water. The next day, when the lime precipitates, clear water should be sprayed on the qvevri insides; the lime water will eat away the dirt. After that it should be poured out of the qvevri and replaced with boiling water, then the qvevri should be covered with a lid; the steam will completely soften the dried pomace and lees, after which the qvevri can be easily washed".*

This little passage shows how much importance the author attached to cleanliness. Characteristic phrases, such as "qvevri smell", "vessel's touch" and "smacky wine" set us thinking that our ancestors could clearly recognize the smell of wine fermented in a poorly washed qvevri and, more importantly, could distinguish this smell from other diseases or defects of the wine. When the qvevri is properly washed (which seems to be more problematic today than it was earlier), the wine fermented in it will have no "smack" or "off" taste and smell, especially when the wine itself is sound.

Too often improper washing leads to irreparable consequences. If, for example, the previous wine production was defective or disease resulted from poor hygiene, it can frequently infect future yields in the qvevri as well. Thus a mistake made once will harm the winegrower over and over again.

As seen from the example above, lime water is one of the best qvevri-washing agents. To prepare it, a slaked lime solution is used. Although there are no precise proportions for preparing qvevri-washing lime water, current practices allow us to estimate the mixture of lime and water in the proportions of 10-15 l water to 3-5 kg lime. After the lime has been burnt and well dissolved in the water (after 2-3 hours at least), the lime water should be separated from the precipitated unsolved lime particles, then the qvevri-washing lime water will be ready for use. Naturally, washing large-size qvevris will require more lime water.

Lime water should be spread evenly on every part of the qvevri then the qvevri should be thoroughly brushed by a "qvevri brush" made from the roots of St.-John's wort or by a hand brush, rinsed first with cold, then with hot water, at about 60° C, two or three times.

Qvevri washing with lime water

The qvevri should be washed until thoroughly clean which will also depend on its condition. When this is done, it should be rinsed finally with warm or cold water. It will be considered as properly washed and usable when the water left becomes absolutely clear and devoid of any taste or smell.

In practice ash or a sodium water solution (formerly known as “ash-wash”), can also be used for washing qvevris instead of lime. Both lime and ash are natural and therefore safe cleansers and do not damage the vellel walls, unlike soda (especially caustic soda) which damages qvevri walls like other chemical agents. Qvevris can also be washed with cold then hot water, without any cleansers, although washing with ash-wash or lime water is more effective.

In general, qvevri washing is very laborious especially when the qvevri washer had to enter a large-size qvevri. He had to position himself carefully inside the vessel to carry out the work effectively. In these cases one or two dry bunches of vine stalks were placed at the bottom so the qvevri washer could stand and work. Of course qvevris have to be washed with only fresh potable water. On interior surfaces of very big qvevris (for example, 5000 to 7000 liter capacity qvevri) the qvevri-maker added steps from top to bottom, also made of clay, so that the washer could go down and up inside the qvevri more easily. The steps also served as supports for a board on which the washer could stand or sit to work.

Wine lees and tartrates tend to eat deeply into the qvevri’s porous walls, and removing them takes effort. The main problem for a qvevri washer is not the obvious dirt on qvevri walls but the grime found deep in the pores of the walls.

Qvevri brush made of the roots of St.John's Wort

Qvevri brush made from the bark of bitter cherry tree

This is the main danger to wine in terms of quality deterioration. Such dirt should only be removed by cold or hot water. In ancient times however, qvevri washers effectively applied lime water and ash-wash for the purpose.

In addition to qvevri washing with lime we can look at the application of ash which, as already noted, is effective poses no problems for the storage vessel or quality deterioration when applied properly. Any wine residues in qvevri such as tartrates, colorants, lees, etc. are acidic, whereas ash is a weak alkali and dissolves such residue.

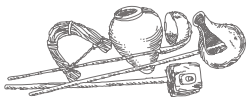
To prepare an ash-wash, sifted wood ash is poured into water, mixed well and boiled. Proportions are 1-1.5 kg of pure sifted ash to 3-5 liters of cold or boiling water. The ash sediment should be separated from the liquid wash mixture which is then ready for use. Formerly ash-wash was used for washing hands, face and head, as well as for plates and dishes and other household utensils.

The qvevri is rinsed before the ash-wash is applied. Following the lime/ash treatment it should be rinsed first with cold and then hot water, and then finally re-rinsed with cold or warmish water. Ash is applied both in the form of ash-wash or as dry ash if the newly washed qvevri has remained empty for some time. In such cases the sifted pure ash is spread over the whole inner surface of the newly washed qvevri, while the walls are still wet. The qvevri walls will dry and the ash will stick to them, effectively preventing the development of harmful microorganisms in the wall pores. Although such qvevri washing requires comparatively more effort it is justified to better protect the qvevri walls.

Also to disinfect qvevri walls, sulfur can be burnt inside the vessel, in the following proportions: 3 g sulfur for 100 liters of volume. Applying a larger dose, up to three times bigger, is not harmful. Sulfur can be burnt in qvevris after ash has been poured into them. It can be used both in powder form and as prefabricated wicks. In both cases, melting sulfur dripping into the vessel should be avoided to prevent giving the wine an odor and taste of rotten eggs.

Fumigation with sulfur is possible just before the qvevri is filled with wine or even earlier when it is empty, even once every two months, for example. If the sulfur burning in the qvevri takes place immediately before filling it with wine, pulp, or must, the process should still be preceded with washing. Pouring wine into an unwashed qvevri is inadmissible! The sulfur must be burned in a freshly washed wine vessel while its insides are wet. At this time, the smoke of the burnt sulfur reacts with the moisture remaining on the qvevri walls to produce sulfuric acid. This goes into the pores of the inner walls to disinfect and cleanse the dirt.

Sulfur burning is also carried out in dry qvevris that were previously washed, though the cleansing effects are lesser than if it was just washed. After washing, if the qvevri remains empty for some time, sulfur should only be burnt in it once it is dry or else the smoke of sulfur reacting with water drops will dry and form a white-yellowish crystal coating on the inside walls. This can give a bitter taste to the wine and make it “rough” as a result.



Qvevri waxing

No less important than thorough cleaning and disinfecting, is the subsequent treatment of the qvevri's interior walls. Although the inside walls of a qvevri can remain without any treatment at all apart from washing, and only a few make the effort to make wine in qvevris, they should carry out all the processes traditionally. Beeswax and only beeswax (not paraffin, chemical colors or other agents) should be used to coat the inside walls of a qvevri. Sometimes paraffin, chemical colors, cement and tar have been used. Formerly even goat or other animal fat was used for this in Georgia. All these are gross violation of traditional winemaking technology and adversely affect wine quality.

The decision to wax a qvevri's inner walls has to be made carefully, as qvevri winemaking technology usually implies the direct contact of the wine with the clay walls. Waxing is justified when qvevri walls are very porous. Highly porous qvevri allow wine to leak out or water to seep in. New, unburied qvevris as well as used qvevri which are already buried in the ground can be waxed, although it's more difficult in the latter case.

Qvevri waxing is a complex process and should be performed by an experienced person. What is implied by "proper qvevri waxing" and what is the purpose of this operation?

New qvevris are waxed as follows: Pure beeswax is placed in a clean vessel and melted at a temperature from 110 to 120^{o}C. This will cause evaporation and reduce the amount of wax. At the same time the qvevri itself is heated, placed on the ground on its side with a fire kindled inside. Ideally dried vine stalks are the best choice for making the fire. The use of plastic, rubber, coal, coniferous firewood or straw for kindling a fire should be avoided, and obviously the qvevri must not be heated with the aid of fuels such as petrol, diesel or a kerosene burner. It seems that using natural gas for heating qvevris is acceptable although it has not been tested sufficiently. The wax should be applied only when the qvevri has been completely and thoroughly cleared of ashes, soot and pieces of coal.

To prevent the qvevri walls from cracking, a weak fire is kindled first, and then gradually increased, and to avoid contamination from the remains of soot and coal the fire is kindled in a tin vessel placed in the qvevri. Overheated qvevri walls can crack or overheating can cause the wax to be burnt out or evaporate when being applied to the overheated walls. The temperature of the walls has to be lower as well. If not, melted wax will stick to the remaining ashes, soot or coals and then affect the wine's bouquet and quality by the smell and taste of smoke.

Qvevri heating before waxing

To ensure that the qvevri walls are evenly heated it should be turned slowly with the fire burning, until all the walls are evenly heated to the desired temperature. This temperature can be determined by touching the outside wall of the qvevri. It should not be so hot as to burn your hand nor should it be only slightly warm. It is advisable that the qvevri be heated up to 70°C. Such fire heating is especially advisable for old qvevris that have not been used for a long time as they often have dirt deeply ingrained in the walls. The fire burns it out and facilitates cleansing.

At this time the qvevri walls - and more specifically their pores, will easily soak up the melted wax and avoid the risk of wine seeping out. The wax is completely soaked up by the qvevri walls. This technique ensures a very reliable sealer for the porous walls of the qvevri.

To coat the qvevri interior with melted wax, the following technique is employed:

a piece of cloth is fixed to a long stick. (This used to be known as a mola in Kakheti.)
subsequently it is dipped into the melted wax, and
then with circular movements of the stick in the qvevri, the walls are coated with the wax.

For a qvevri holding 1000 or 1500 liters, approximately 1.5 to 2 kg of beeswax is required, although this quantity may vary. Waxing starts from the qvevri bottom and proceeds upwards. Formerly this process was carried out with another technique: a large piece of wax was thrown in the qvevri which was then shaken, turned up, down and over until the wax was equally distributed on the walls. To wax a small-size (kotso) qvevri it would be placed in a heated traditional bread oven called a “tonne” or placed over a stanchion, a vertical pole, for heating. This is also an effective technique.

In such cases the qvevri is not contaminated with ashes, soot or coal. These techniques are equally justified for a large-size qvevri, which can be placed on its side on a special wooden beam with a fire kindled inside. It is then gradually rolled over so that its walls are equally heated. This heating technique is preferable to the first as it prevents the qvevri from becoming contaminated inside with ashes, soot and coal.

Older, buried qvevris can also be heated and waxed. First the qvevri is thoroughly washed and dried. Then a fire burning in a metal cylinder (with its top open and bottom closed) is lowered into the qvevri with a wire.

Qvevri heating before waxing

The open end of the cylinder must protrude from the qvevri opening so the smoke doesn't soot the walls. To ensure air for the coals to burn, the lower sides of the cylinder (but not the bottom) are pierced with small holes. qvevris subjected to this procedure are cleansed and ready for waxing.

Since waxing is meant to seal the principle and large-size pores, qvevri are frequently coated thickly inside. This renders them similar to enamel containers and the wine is in contact with the wax rather than with the clay walls, which means the qvevri's special properties for wine fermentation and aging are lost. Excessive waxing is not justified with the exception of rare cases when qvevris are of substandard quality and making quality wine would be impossible without thorough waxing.

Recently, enamel qvevri lining has been introduced to Georgian qvevri which is also useful when substandard qvevris are used. However, some believe that wine fermented and aged in a qvevri coated inside with a thick layer of wax, or lined with enamel, cement, etc. can hardly be called "qvevri wine", since qvevri winemaking comprises the direct contact of the wine with the clay walls. This is another reason that the best quality qvevri are highly desirable.

Another issue to be considered concerns the quality of wax. Artificial honeycombs used by beekeepers are arranged in beehive frames and in most cases plates contain paraffin, stearin and other wax-containing artificial additives. The best option for qvevri is wax extracted from wax capping with no man-made impurities. This wax is lighter in color than the wax extracted from the brood comb.

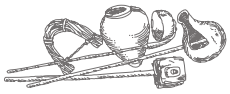
In some villages, for airtight wine storage, qvevris are first filled up with wine and then melted wax is poured on the upper surface of the wine. This has proven unsatisfactory, however for several reasons and doesn't warrant the extra cost or the sacrifice of wine quality. Small temperature changes in the qvevri cause changes in the volume of wine and make it expand or contract. Wax applied directly on top of the wine will soon pull away from the qvevri walls and cause the seal to be broken. Another problem is that the melted wax is very hot and, although on the surface of the wine, it still warms all the contents of the qvevri, causing possible propagation of acetic acid bacteria in the wine. Acetic acid bacteria spreads from the wine's surface towards the bottom of the vessel.

Wax ready for qvevri coating

Formerly there was a custom to pour vegetable oil onto the wine's surface to ensure airtight storage of the wine but this is also unadvisable since the oil becomes rancid and deteriorates wine quality. At the same time it fails to ensure airtight wine storage.

The best way to ensure the airtight storage of qvevri wine is to properly seal the vessels with lids which are the right size rather than to pour oil, melted wax or other substances on the surface of the wine.

Wax poured on the wine surface



Qvevri Lids

A qvevri lid is decisive for durable, airtight and quality storage. It can be made of wood, generally found in West Georgia, or stone, which is more popular in East Georgia, especially in Kakheti. Indeed there were several villages known for their skill in manufacturing qvevri lids. One such village was Sabue in the Kvareli district, though qvevri lids are no longer made there today.

Stone qvevri lids made of slate mined on the slopes of the Greater Caucasus were frequently used in East Georgia. Lids can also be made of other types of rock. Every stone isn't suitable for the purpose since some are prone to mold which can affect wine quality. The same qvevri washing and sanitation requirements apply equally to lids, which must be washed as thoroughly as the qvevri itself.

In West Georgian areas such as Imereti, qvevri lids are called orgo or badimi and are made of wood. These are specifically created from lime (linden), chestnut and oak timber. The qvevri lid most popular in West Georgia is divided in two parts with a hole in the middle to release the carbon dioxide that develops during alcoholic fermentation. The qvevris were lidded during this fermentation process and a "windpipe" was attached to the hole on the lid, and covered with a piece of gauze or other cloth to prevent insects or dirt falling into the qvevri. Then yellow earth was packed around it.

Orgo lids made of oak or chestnut wood must first of all be soaked in hot water to remove their bitterness and "coarse" substances characteristic of the timber, which might affect wine quality. The wooden lids of large qvevris used to be made of even more than two parts.

Plate stone lid (East Georgia)

Orgo (wooden) lid (West Georgia)

The practice of qvevri lidding remains a challenging issue, as proper lidding is a necessary prerequisite for a qvevri wine's durable and safe storage.

In East and West Georgia qvevri lidding procedures differ just as the lids themselves are different. In West Georgia, lids are placed directly on the opening of the buried qvevri (churi) then covered over with special yellow earth. Thereafter, the yellow earth is thoroughly packed down with a special implement called a kvezho planed out of a log. A mound of common earth is then added.

In Kakheti, East Georgia, the process is different: hand-mixed clay is applied first to the qvevri opening which has to be completely dry so this clay will stick to it well. Then the clay is covered with a stone lid which is strongly pressed into the clay, sealing the qvevri hermetically.

The clay, mixed with potable water, should also contain a small amount of sulfuric anhydride to disinfect the water and the clay. Once the clay on the qvevri opening sets and becomes hard, a burning sulfur wick is fixed sideways into the clay with the wick inwards. When the sulfur wick is kindled, the qvevri is then lidded and sealed. Gradually the air space between the wine and the qvevri lid fills with sulfur smoke which then cools and forms a vacuum.

This process is a necessary prerequisite for durable and airtight storage, however the technique is not used in West Georgia. Also in East Georgia, particularly in Kakheti, the lidded qvevri is covered with an earthen mound that is regularly dampened with water, especially important in summer.

Qvevri unlidding process

Qvevri top-attachable clay

Fixing sulfur wicks in the qvevri top-attached clay

Qvevri top-attached clay

Securing the qvevri top/mouth with a lid

The uniqueness of qvevri wine

Our goal in this book is to focus on the benefits of the traditional qvevri wine, which is unfamiliar to the public, even in Georgia, although these are ancient traditions. Even though qvevris are found everywhere in Georgia, almost every region has different winemaking practices. Formerly some of these were classified as Kakhetian, Imeretian and Meskhetian winemaking. All the practices found in a specific region were conditioned by a number of factors, including local soil types, climatic conditions, local customs and habits, the vintage year and the variety of grape and their chemical composition.

For example in Kakheti crushed grapes were fermented in qvevri with the whole chacha (grape skins and seeds), whereas with Imeretian wine, only a third of the pomace was used during fermentation. The locality where the grape variety is grown and harvested affects taste as well.

A primary and very important technique of qvevri winemaking is leaving the wine on its own pomace both during fermentation and after. In this case, traditional Kakhetian winemaking, regrettably almost lost today, is of special interest. The Kakhetian technology of making white wines in qvevri implies pouring Rkatsiteli grapes into the qvevri with the all their pomace, or else first crushing the grapes in a wine press and then adding pomace to the must in qvevri. In both cases, the alcoholic fermentation takes place using the total mass of pomace. Upon completion of the fermentation, when the floating pomace has

precipitated, or settled to the bottom, the qvevri is filled up and lidded. There is some debate about whether Kakhetian wine should be left on its pomace for fermentation. Red wines are left with skins and seeds only during the alcoholic fermentation period, which may last from seven to ten days, or two weeks at most. However to determine the length of time grape juice should be left on pomace we have to consider the grape variety, the duration of alcoholic fermentation, ambient conditions, etc.

With white wines, the old Kakhetian method was to leave wine on the pomace from autumn until the following spring (beginning of March). During this period, wine acquired the typical Kakhetian character. The widespread opinion that wine which is fermented on the pomace for a long time becomes rough and substandard is unfounded. Wine turns rough and substandard only when the necessary standards and technological processes are not adhered to.

Wine from Kakheti which was fermented on the pomace acquires a dark straw, golden or tea color; it is absolutely clear and brilliant, noted for fruity tones and, very importantly, is naturally stable.

Not only is such wine devoid of cloudiness but it contains beneficial nutrients for human health. The alcohol extracts a maximum of beneficial substances from the grape pomace. When this unfiltered and unprocessed wine is bottled, it can still be preserved and stored well.

Wine quality is influenced by more than one factor of course. First to be considered is the qvevri itself - both its own quality and cleanliness. Other factors are post-fermentation temperature; the grape variety; the vineyard location; the level of grape maturity and its chemical composition; the period of fermentation with the skins and seeds; and the hygiene of the marani. Also, if incompletely fermented, or if the wine in qvevri has not been kept on its own pomace sufficiently, it fails to develop all its beneficial qualities, and the qvevri will not have time to impart its qualities to the wine.

Imeretian winemaking techniques use only a third of the pomace at most, which is poured into the qvevri from the winepress. White-grape varieties are used here as well. Although insufficient information about winemaking is available, we know that in Kartli and Meskhet-Javakheti wine used to be qvevri-fermented and aged with a part of the pomace for a definite period of time, just as in Kakheti and Imereti.

Ladling wine using an orshimo (long-handled gourd)

Pomace-free fermentation is also used in Georgia. This so-called "European winemaking technology", has been practiced here since ancient times although there is much less information about it. Some Georgian provinces also blended the juice and pomace of several grape varieties, then fermented and aged this blend in qvevris. For example, in the Khidistavi village near the Kartlian town of Gori, they knew how to make a wine which was famous throughout East Georgia called khidistauri. This was created by blending the Kartli grape varieties chinuri, tavkveri and goruli. Formerly, in Racha, the famous khvanchkara was made by fermenting a blend of *alexandrouli* and *mujuretuli* grapes.

However, Georgian winemaking methods generally call for fermenting the grape juice (*tkbili*) with the grape pomace (*chacha*) and aging it in qvevris. Even though European (pomace-free) winemaking technology has been long known and practiced in Georgia, only wine that has been fermented and aged for some time in the qvevri is customarily called Georgian "traditional wine".

Sometimes the wine and pomace are separated from one another after fermentation is over or even prior to its completion, as in the case of Kakhetian *saperavi*. However, the wine separated from the pomace should be returned to the qvevri and not to a different vessel (e.g. a barrel, tank, etc.). Although legislation on Vine and Wine in Georgia does not mention qvevri-winemaking technology experts believe that qvevri wine should be defined as that which has been stored in qvevris from three to six months beginning from fermentation, with or without pomace.

According to an erroneous popular view, qvevri wine can't be stored more than a year without deteriorating. Where the qvevri can no longer ensure quality storage of wine the cause is not the qvevri itself but poor maintenance and sanitation conditions.

Unlidded qvevri in Imereti

qvevri wine can be stored unspoiled for a long period of time if all the requirements are met concerning wine storage, marani design and sanitation Formerly, wine was stored in qvevris for decades, although wine quality and condition probably required periodic check-ups and interventions where necessary.

Properly maintained and washed qvevris and a well-arranged marani are the necessary preconditions for durable and safe wine storage. If a wine can be durably stored in oak barrels and steel tanks for years, it can be preserved all the better in a qvevri. In general, if the qvevri stores wine for at least two years, it means that it can remain for much longer periods as well.

Sacramental (zedashe) qvevri and wine

Although qvevri winemaking is a subject unto itself, sacramental wine and qvevri can be regarded as a special phenomenon. Making sacramental wine does not differ greatly from traditional winemaking - the principal difference is in the conceptual and perceptual aspects of sacramental wine.

According to the Georgian language dictionary, sacramental (zedashe) *wine is that used during religious ceremonies such as the celebration of the Eucharist (the Lord's Supper) or weddings.* Another definition states that sacramental or zedashe wine is the best wine, specially reserved for religious holidays. The sacramental qvevri and wine culture was found throughout the country, however this phenomenon is more frequently encountered in East Georgia, specifically in Kakheti. Formerly, practically every marani had at least one sacramental qvevri buried in the ground. Almost all families with a marani kept a sacramental qvevri for wine intended for donation to churches and monasteries and for their own consumption during secular or religious holidays.

Sacramental qvevris served as a peculiar reference point and always occupied their own distinguished place in the marani. Other qvevris were placed in relation to the zedashe qvevri, depending on its location in the marani. The zedashe qvevri didn't necessarily occupy the central place among other qvevris; quite the contrary, it was placed separately from other qvevris for quality storage in a cool, dark and relatively secluded place.

Sacramental qvevris in Alaverdi churchyard

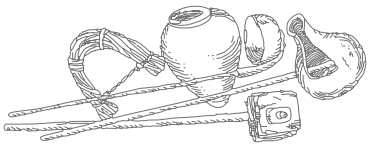
We lack data concerning the difference in the ordinary and sacramental qvevri-making technology. Differences have not been observed in the cases of liming and/or waxing of the zedashe qvevris, however it appears that sacramental qvevris had to be washed more thoroughly, and in the past the procedure probably took longer than today.

Making sacramental wine requires special attention and care, starting with qvevri washing and marani hygiene and ending with fermentation, aging and storage. During alcoholic fermentation the pomace needs to be regularly stirred inside the qvevri. This process must be repeated five times a day at least. In general, it is advisable that the pomace be agitated in the qvevri once every two or three hours at least, especially during fermentation.

When the fermentation is over, the pomace and wine are separated and the latter is decanted into another qvevri. Then the sacramental wine should be given a complete rest for some time. The first drawing of wine from the qvevri occurs at different times depending on the location, region, vintage year, and other factors.

Only red grape varieties are used in making sacramental wines. Using white grape varieties or even adding white grape juice to the sacramental wine is prohibited. Blending red and white wine is inadmissible even in the smallest proportion. Also, sacramental wines should have no contact with water. For this purpose, washed wine vessels (qvevri, barrel, glass-ware, etc.) must be used only when well dried. Grapes producing rosй wines should never be used in sacramental winemaking. In general, native Georgian red grape varieties are used, such as *saperavi, dzelshavi, otskhanuri sapere, Kartlian or Kakhetian tavkveri, shavkapito* and other varieties.

Homemade sacramental wine requires no treatment (filtration, refining or chemical additives) and the use of pure culture yeast during fermentation is neither required nor recommended. In general, making wine under household conditions, whether sacramental or ordinary, does not require the use of any additives and filtration because wine should go through all the necessary stages naturally. The only technique which could be added when making sacramental wine is burning sulfur (sulfating) in the qvevri to disinfect it before use. This was done in ancient times as well. Of course burning sulfur does not exclude compliance with the other standards of sanitation of the marani and wine vessels.



Qvevri marks

A qvevri mark is the incision made by the qvevri-maker on the neck of the vessel. We have collected photographs of qvevri marks in both East and West Georgia and Kakheti is especially distinguished by the number and diversity of such marks.

Early qvevri-makers marked other earthenware as well, such as tiles, bricks, large pots and jugs. Today abundant and diverse marks are still found on old qvevris. The qvevri mark identifies its maker, its origin and the date it was made, etc. Frequently qvevri marks let us know exactly where they were made and from where they were taken.

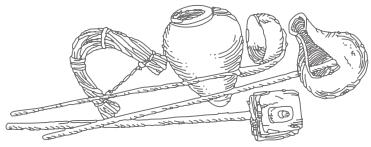
Most old qvevris are stamped with signs such as the qvevri-maker's initials, the artisan's full name, the year of manufacture, various ornaments, a cross, *borjghali* (a Georgian symbol of the sun with seven rotating wings), where it was made and its capacity.

According to popular legend the qvevri mark was also a mark of quality. Such marks could not be automatically passed on from father to son or grandson, but instead every qvevri-maker had to earn the right to stamp his own products.

Conclusion

This publication promotes the traditional Georgian wine vessel - the qvevri. It is difficult to encompass as important and as voluminous a subject as the qvevri and qvevri-making in one brochure, so many readers, especially those interested in or practicing the age-old art of Georgian qvevri winemaking, may not find all the answers in this work. However, the theme is still subject to further research and that in the near future many more questions around these issues will be answered. Our plans include new publications on winegrowing and winemaking to highlight important related issues like establishing the vineyard; the construction and design of the Georgian marani, its equipment and tools; and describing other traditional Georgian wine vessels.

In conclusion we would like to repeat that the Georgian qvevri is a unique vessel with an original shape, an archaic simplicity and, most important, an indispensable role in true Georgian winemaking.



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Association ELKANA
16 Gazapkhuli St., 0177 Tbilisi, Georgia
Phone/Fax: +995 (32) 2536488/2536487
biofarm@elkana.org.ge;
bioextension@elkana.org.ge;
www.elkana.org.ge;