

## HELLENISTIC WINE PRESS IN BURGAZ/OLD KNIDOS

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### INTRODUCTION

Wine has always been an essential commodity for the entire Mediterranean basin all through the antiquity. The convenient climate for viniculture led to the expanded production of wine as a trade commodity and also triggered the economic development for Greek city-states during the Late Classical and Hellenistic periods in particular. Despite the fact that wine production dated back to at least 3<sup>rd</sup> millennium BC (Forbes, 1955, 139) there was a dramatic expansion in organized wine production as a trade commodity during the Hellenistic period on the basis of evidence related to discovered wine-press installations, amphora workshops and distribution of trade amphorae in the Mediterranean basin (Şenol, 2010).

The subject of this article is a Hellenistic winery discovered at Old Knidos/Burgaz located at the southwestern coast of Anatolia, at Datça in Muğla province. Here the main aim is to present a general definition of the winery, in particular the restitution work that has been done for the superstructure of the installation and its mechanisms. It was probably one of the workshops which became the significant components of the cityscape in Burgaz/Old Knidos by the end of the Classical period. The site was known to scholars since 19<sup>th</sup> century AD for its well preserved wall remains and abundant surface finds referring to a settlement (Bean and Cook, 1952, 173-6). It is situated 2 kilometers to the northeast of modern harbour of Datça. Since 1993 archaeological excavations have been carried out by the support of the Centre of Research and Assessment for the Historic Environment (TAÇDAM) and the department of Settlement Archaeology in Middle East Technical University at the site of Burgaz. The archaeological excavations revealed occupation layers dated from Geometric periods to the end of the Classical period. The site of Burgaz in Knidian territory was identified as *Palaia Knidos* by its excavators on the basis of epigraphic and archaeological evidence (Bean and Cook, 1952, 171-212; Tuna *et al.*, 2005, 517-31). The archaeological excavations revealed the remains of Classical

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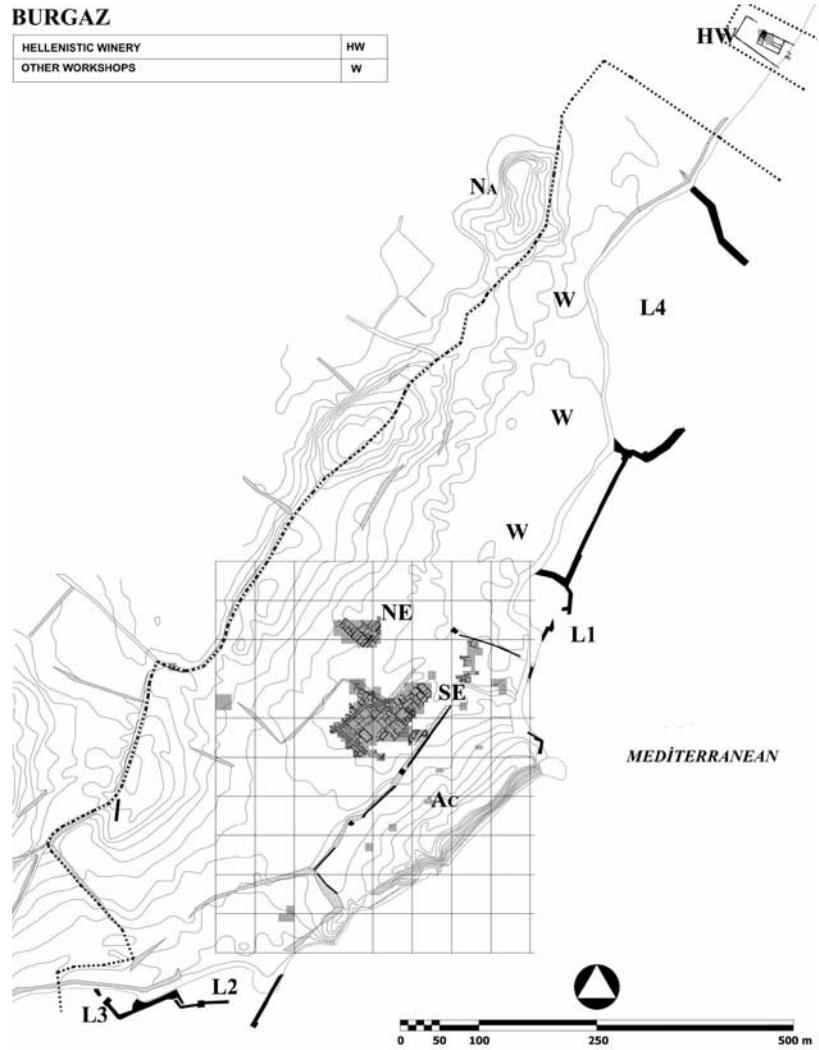


Figure 1. General plan of ancient Burgaz and the location of the winery.



Figure 2. A view of the winery.

settlement extended whereas the Hellenistic and Roman occupation is represented with some patches of graveyards and sporadic habitation areas in mixed uses of agricultural activities, production and storage facilities.

The archaeological evidence clearly point out that during the late 4<sup>th</sup> century BC the settlement pattern has changed dramatically in Old Knidos /Burgaz settlement, which is hallmarked with the expansion of industrial quarters and harbour facilities. The spaces in habitation area have been re-organized for industrial activities, which imply a gradual abandonment of the settlement and its transformation into an industrial centre. By the 3<sup>rd</sup> quarter of 4<sup>th</sup> century BC most of the population has moved from Old Knidos/Burgaz settlement and the area was used for production as well as the storage of commercial goods for loading onto cargo vessels during Hellenistic and Roman periods (Tuna *et al.*, 2010, 201-3). Hellenistic period of Old Knidos is hallmarked with this shift in settlement pattern due to the movement of settlement centre from Burgaz to Tekir cape. The political conjuncture of the era and the yielded socio-political changes were reflected with spatial reorganizations in general and beginning with 4<sup>th</sup> century BC the participation of Knidos in market economy caused changes in land use as well. In order to expand the agriculturally convenient land, the sloped areas with low land potential were terraced and viticulture became the most significant type of land use in the region. The winery, which is the subject of this article, might have been an important element of this economical shift in the town.

Old Knidos probably has always been an important wine producer. The remains of the agricultural terraces used for viticulture are still well defined and visible in its territory. The archaeological surveys and excavations which uncovered the amphora workshops and deposits of slags at Reşadiye and Hızırşah villages point out the mass production of trade amphorae from the Archaic periods to 7<sup>th</sup> century AD (Tuna *etal.* 1987; Tuna and Empereur 1989, 555-67). Strabon (XIV.I.15) also mentions Knidos for producing exceptionally good wine.

The Hellenistic winery is located to the northeast of the settlement center at Old Knidos/Burgaz (**Figure 1**). The production elements of the winery were found pretty intact and well preserved. The installation consisted of a pair of stone-cut press beds with collecting vats, a room for manual treading of grapes by foot, a basin for collecting the juice, three compartment *dolia* and depot spaces (**Figure 2**). The superstructure of the installation is not well preserved, but the large amount of terracotta roof tile fragments found in the collapse deposits helps us to make a restitution of the roof (**Figure 3**). The wooden parts of the production units such as the beam used for the presses were naturally not preserved as well.

The winery was first mentioned by Cook and Bean in 1950's and they have even published a sketch plan of it (Bean and Cook 1952, 173). The excavation of the workshop by Burgaz/Old Knidos team was carried out at two different stages in years of 1995 and 2003, with very short campaigns. The 1995 campaign focused on the cleaning of the production units associated with crushing and pressing activities (Tuna, 1996, 255-72) whereas the 2003 campaign was dedicated to produce a detailed ground plan of the winery (**Figure 4**).

The units of the winery were close to the surface with easily accessible floors below the plough soil. It seems highly likely that none of the units of the winery was filled intentionally for a leveling process or any other

Figure 3. Drawing of an intact roof tile and calipter found at the winery.

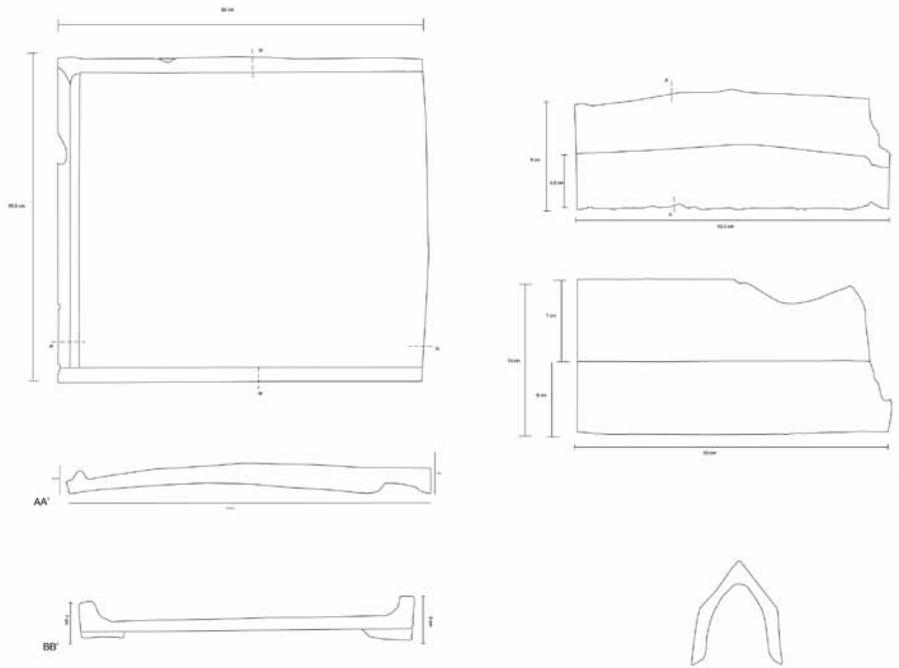
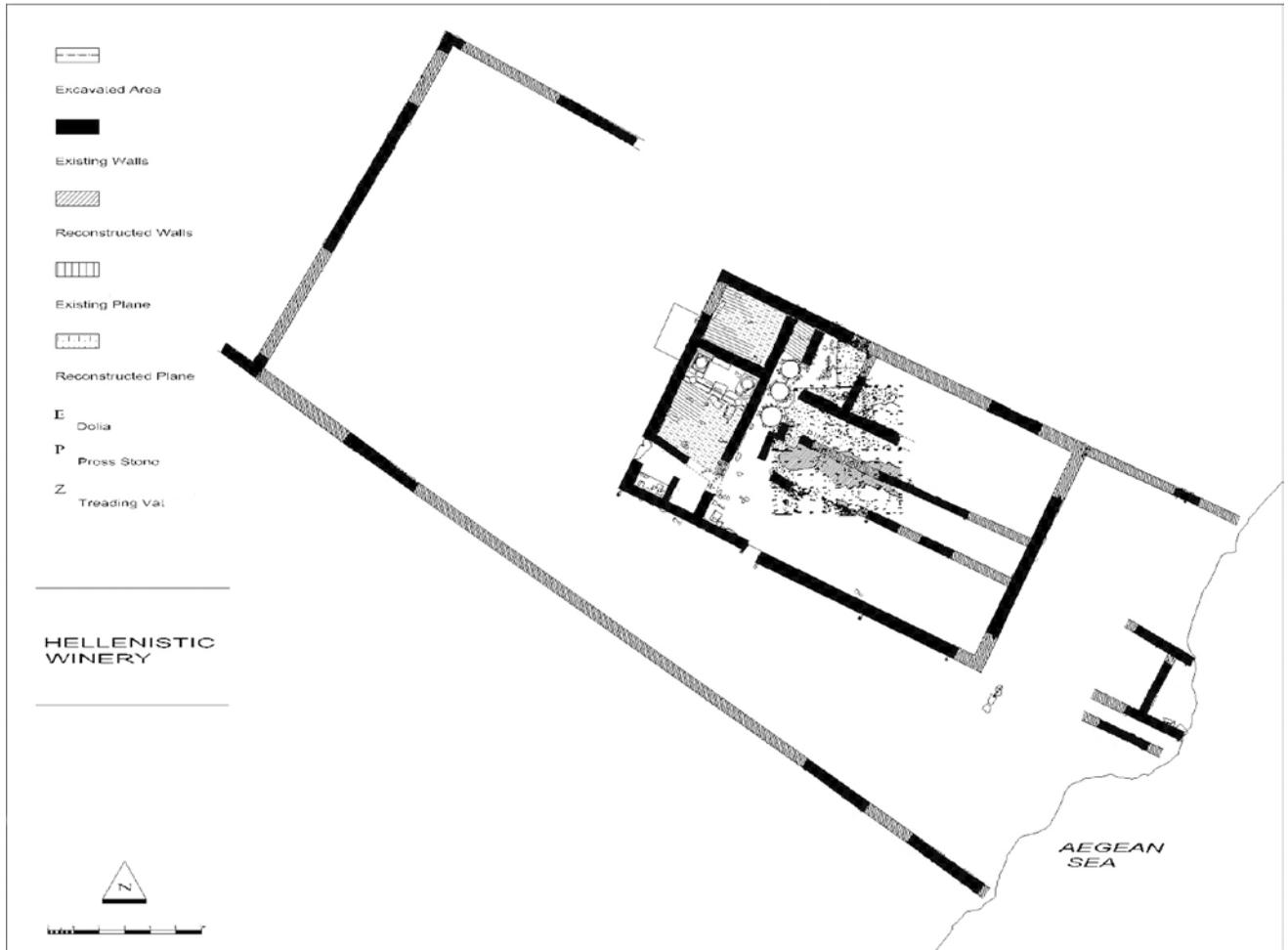


Figure 4. Ground plan of the winery.



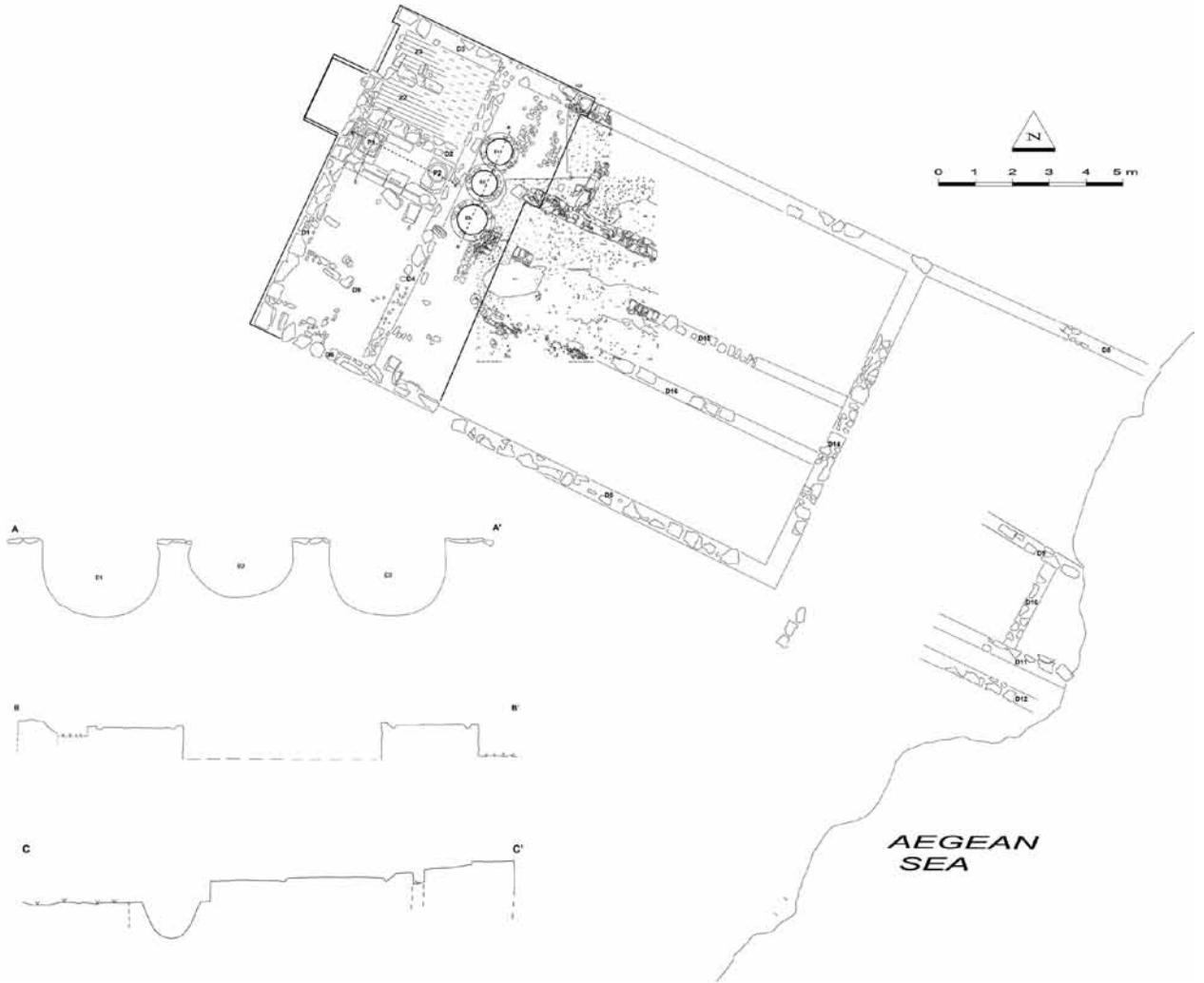
building activity. Therefore the debris excavated at the basin, Z1, Z2 or any other unit of the winery might have been accumulated by time. Therefore the archaeological small finds used for dating of the installation are few in number, yet still introduced in this work under the section “small finds and dating”. The amphora handles with stamped seals found in one of the treading spaces are the most solid evidence for the dating of the winery and presents us a time interval for the use of it. The stamps are not included in this study for they are studied as a subject of another article entitled “Stamped Amphora Handles from the Hellenistic Wineries at Ancient Burgaz” to be published in the proceedings of the International Congress of Analysis and Uses of Greek Amphora Stamps organized by French School of Athens on 3-5 February 2010 by Numan Tuna and İlham Sakarya.

### DEFINING THE SPACES AND SUGGESTED RECONSTRUCTION FOR THE SUPERSTRUCTURE

The stages of wine production which followed basically treading and collecting for fermentation required simple installations typically cut into bedrock. Such installations are found in the countryside in ample amounts all over Mediterranean and Near East. There is also a great variety of more complex wineries which probably served for a rather expanded production in a commercial context. The process from treading to collecting was interrupted with second pressing of grape skins left from treading in that sort of more sophisticated installations. That second stage in wine production was an optional stage which was pressing out the must left in leftover grape skin with a rock cut press after treading (Frankel, 1997, 74). The presence of a true press is not necessarily associated with a commercial scale production, yet the presence of large collecting basin, *dolia* and large presses clearly imply the expanded production capacity of an industrial activity.

Burgaz Winery is definitely a complex installation which served for industrial production, situated on the coast with a suitable port. Its dating with the aid of small findings perfectly matches with the period hallmarked with shifts in settlement patterns represented with the emergence of industrial quarters that replaced the residential ones.

The winery building (**Figure 5**) is a rectangular structure 16 m by 10 m defined with walls D1, D3, D14 and D6. The core of the winery complex or in other words the main production unit of the workshop consisted of two rooms Z1 and Z2, where treading of grapes took place. D15 and D16 walls and most probably D224 wall divided the rest of the space into corridors used for storage. Certain parts of the space divided into cells perhaps later on. Z1 and Z2 are separated by D2 wall. Z1 is a 7 by 8 meters room and the stone cut twin press beds are situated to the north of Z1. D5 wall separates Z1 room from the cells to the south and there is an entrance defined with a large flat threshold stone ca.2 meters placed at the end of D1 wall, most probably a two flanked door. Z2 room is a 7 by 6 m room with an *opus incertum* floor (**Figure 6**) made of amphora handle fragments and it is sloped towards D1 wall. The stone cut gutter placed into D1 by perforating the wall connects Z2 to the basin placed to the west of D1. The channel connecting the room to the basin clearly implies the function of Z2, which was used for treading the grapes. In this room plenty of sealed amphora handles are found. The amphora seals found in the deposits in this area



**Figure 5.** Ground plan of the winery and the sections.



**Figure 6.** View of Z2 room with *opus incertum* floor.

date the using period of the winery from the 1<sup>st</sup> quarter of the 3<sup>rd</sup> century BC to the 2<sup>nd</sup> half of the 1<sup>st</sup> century BC.

The production units of the winery consisted of two press beds (**Figure 2**) with a diameter of 85 cm and two rooms. Room Z2-Ab was used for treading and the juice was transferred to the basin located to the northwest of the winery next to wall D1 to which Z2 is connected via rock cut gutter placed into wall D1. It is not quite possible to make estimation about the storage capacity of the basin since the certain depth and extension of the basin was not determined due to the destruction of the area. The floor of Z2-Ab is composed of lime cement mixed with sand/*khorassani* layer with inserted amphora handles by the *opus incertum* technique (Tuna, 1996, 258-9). The crushing floor was sloped to the side of the wall D1 where a gutter was used to lead the juice to the tank in the courtyard to the west. In the second stage of the pressing the pulp remained from treading of the grapes in Room Z2 were pressed once more on stone cut press beds. The pressing of grape skins left from treading drained the entire must from the grape for maximum amount of production or perhaps for a second quality product. This time the juice obtained from the second hand pulp was collected in small round collecting vats in-front of the press beds (**Figure 2**). These two collecting vats are connected to each other through a channel and have a certain elevation that the juice would yield into the three compartment *dolia*. The *dolia* are placed into a platform built of rubble stones. These are terracotta *pithoi* with large rims placed into the floor and fixed with rubble wall around their rims. From South to North E1, E2 and E3 had different diameters and depths; E1 1.60 m diameter, 1.20 m depth; E2 1.40 m diameter, 90 cm depth; E3 1.40 diameters, 1.20 m depth. E1, which is the largest of *dolia* is connected to the collecting vats in-front of the press beds. The stone cut gutter connecting E1 to the collecting vats was not found in-situ but scattered on wall D4. It fits to the end of the channel perfectly and leaves no doubts for its use.

In Room Z1 (Ad) the botanical sample of *Vitis vinifera* were found attesting that the workshop was used to process grape. The analyses of the botanical sample were carried out by E.O. Dönmez at the laboratories of Biology Department in Hacettepe University. Another sample taken from Room Z2 (Ab) are found out to be grape seeds and once more verified that the workshop must have been operated as a winery.

The threshold of the entrance which served as one of the passages from the courtyard is located at the west side of the workshop (**Figure 7**). This space is identified as a storage room, due to the presence of the large number of *pithoi*, amphorae and few grinding stones fragments (Tuna, 1996, 259). The main entrance, on the other hand, was identified at the southern side of the roofed sector of the winery which has a direct access to the courtyard enclosed by *peribolos* walls. On the northeast side of the workshop, semi-closed storage rooms have been uncovered during the excavation. These rooms might have been used for storage as implied by the Hellenistic fragments of storage vessels and coarse ware. Adjacent to these rooms, alongside to the sea shore, the quay with large limestone blocks was presumably constructed as embankment to serve cargo vessels for loading processed products.

For the unpreserved superstructure of the winery a reconstruction is suggested on the basis of similar contemporary wineries from other centers. For the press system a simple lever and weight press is suggested (**Figure 8**). Lever and weight press is defined as the first technological advance in

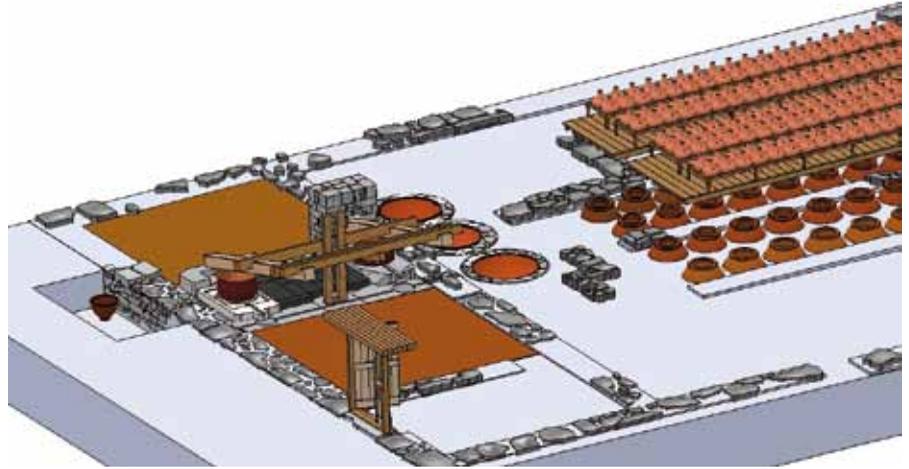


Figure 7. 3D drawing of the winery.



Figure 8. 3D drawing of the winery; A close view of the lever and weight press located in front of Z2 and the basin connected to Z2 via rock cut gutter.

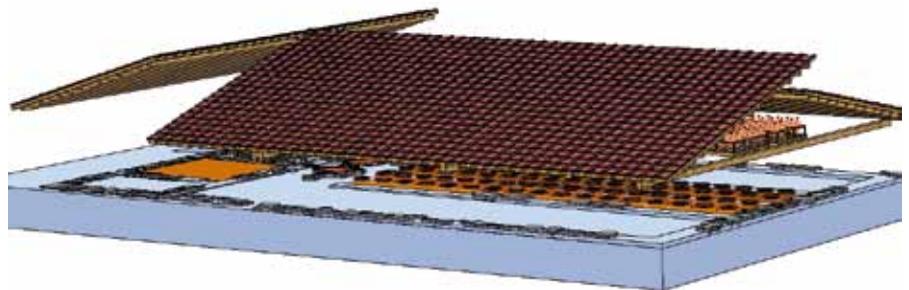


Figure 9. 3D drawing of the winery; The view of the mezzanine and the roof of the installation.

the development of wine and olive oil production (Frankel, 1997, 75). In fact it is senseless to seek for a step by step technological development in sense of time or specific regional varieties for olive oil and wine production. Rudimentary ways of wine and olive oil production were used in domestic scale contemporary with complex installations served to commercial aims. For Burgaz winery which produced with an expanded capacity for trade

we suggest a double lever and weight press (Forbes, 1955, 108-11, 131-8; Savvonidi, 1993, 227-35). It should have been a double beamed lever and weight press due to the proximity of stone cut press beds. The beams were anchored at the fulcrum of small walls placed behind the press beds.

The storage places extending towards the coast are divided into magazines by D15 and D16. The walls that enclose the winery have a width ca.90cm. The thick enclosure walls perhaps imply the presence of a mezzanine above the storage space which would be used for the placement of amphorae (Figure 9).

### ESTIMATING THE PRODUCTION CAPACITY

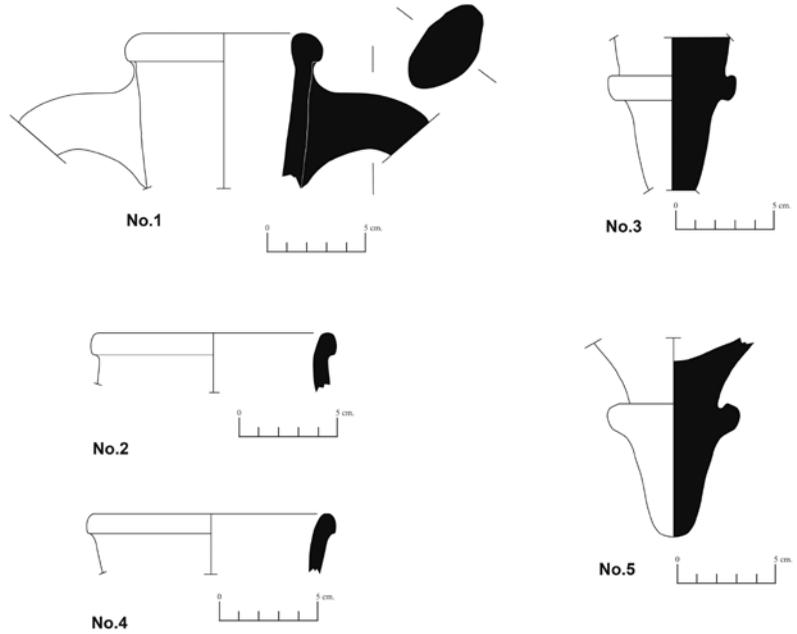
It is possible to make an estimation of the production capacity of the winery by calculating the volume of the storage vessels and depots. The three compartment *dolia* connected to the press beds via stone cut channel each have different storage capacity, which are E1 could hold 1238 lt., E2 976 lt. and E3 1655 lt. The total storage capacity of the *dolia* was 3869 lt. The mezzanine placed over the storage space where *pithoi* were presumably placed might have had extensive place for 378 amphorae and each could hold 22,5 lt. In total 8505 lt. of wine could be stored in amphorae. The standard *pithoi* found in the excavations have capacities ranging between 450 lt. to 640 lt. and in total 72 *pithoi* could be placed at the storage space and could hold 39,200 lt of wine. The amphorae and *pithoi* could have stored 47,705 lt. of wine.

The dimensions of the treading area are 500 x 450 cm. In this area fresh grapes of 20 cm thick were laid and treading which presumably weighed 1850 kg. The grape must produced from that process would be around 1200 lt. In that case if the *dolia* were used for daily storage treading process could have been performed three times per day and the amount of fresh grapes to be treading would have been around 5550 kg. and that would yield to 3615 lt. of grape must. In addition there were still space at the northern part of the winery where 48 *pithoi* could have been placed and those would have stored 26,400 lt. of wine or 200 amphorae and 4500 lt. of wine. To the south the space could also hold 68 more *pithoi* which would store 37,400 lt. or 230 amphorae which would store 5175 lt. of wine ready for transportation.

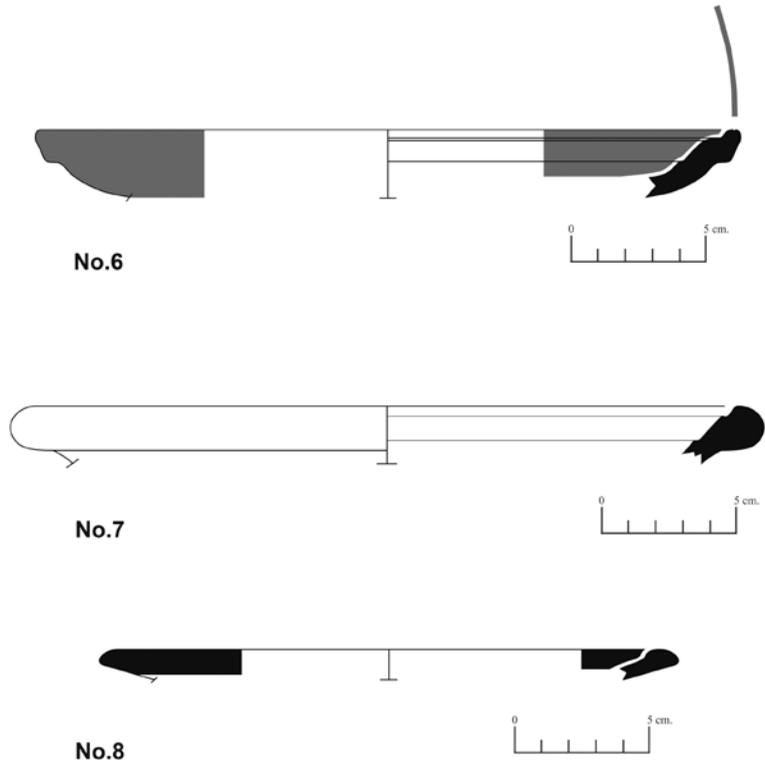
Those are maximum capacity amounts to be processed daily in the winery and therefore it is also possible to make estimation about the number of the laborers. In total perhaps 15 laborers served at the winery whereas six of those made the treading of the grapes, three of those could have been doing the pressing activity, another three probably were busy with transportation of the must to the storage vessels and two took care of emptying the *dolia*. Finally maybe one could have been organizing the whole process. These estimations are totally depending on our personal observations that we have done at the contemporary wineries around Urla region at İzmir.

### SMALL FINDS AND DATING

The debris filled the basin and other spaces of the workshop seem to be accumulated loose soil. The area of the workshop was not used for a certain building activity after the use of the winery reached to an end. Therefore it is not possible to suggest a *terminus post quem* for the use of the winery. Yet there is a small group of finds mostly consisting of coarse ware such as roof tiles, mortar and *pithoi* as well as amphorae and kitchen ware mostly dated into Late Classical-Hellenistic period.



**Figure 10.** A selection of Knidian amphorae fragments found at the winery



**Figure 11.** A selection of Hellenistic plate fragments found at the winery

The most important group of findings dating the workshop are the sealed amphora handles used on *opus-incertum* floor of Z2 and the ones found by D3 wall. The corpus of amphorae stamps comprises eight stamped amphora handles recovered from the field works of 1995 and 2003 seasons of excavation at the winery. All items came from a closed archaeological

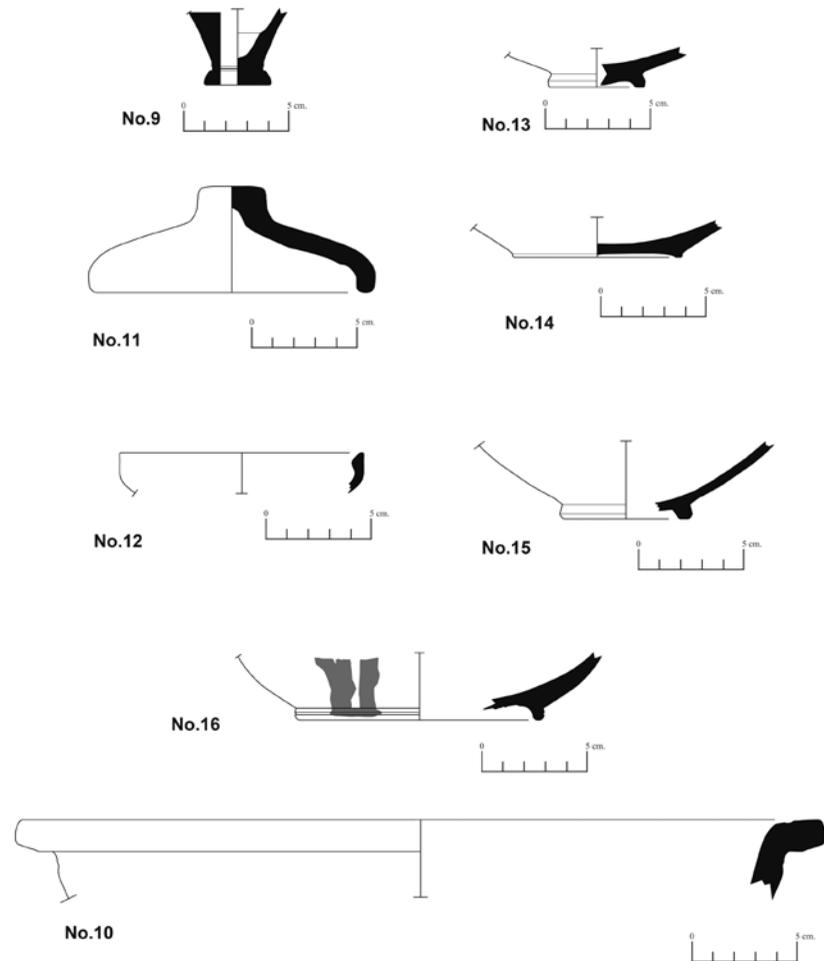


Figure 12. A selection of other type of pottery found at the winery

complex of the Hellenistic winery. The archaeological deposits, however, were mostly in secondary context due to human interventions since antiquity.

The stamped amphora handles are dated from the first quarter of 3rd c. B.C. to the second half of the 1st c. B.C. Together with the pottery fragments found in the debris we may claim that the winery was in use during that period. In this study a brief assessment of the pottery finds is included for the dating of usage period of the winery. Knidian amphorae found in Z2 area consisted of two base fragments and three rim fragments. Knidian amphorae were suggested to be produced only from 3rd century BC to 1st century BC (Grace, 1979, 7-9). Eventhough earlier examples are identified dating back to 6th century BC (Doğer, 1990, 92). The examples of amphora bases (**Figure 10; No. 3, 5**) from Burgaz Winery belong to standard types which have been manufactured from mid 3rd century BC to 1st century BC. The rim fragments (**Figure 10; No. 1, 2, 4**) of Knidian amphorae are standard types manufactured from 3rd century BC to 1st century BC. **No. 1** is a typical example of early series whereas the **No. 2, 4** belong to later series perhaps dated into 2nd century BC.

The second group of pottery finds consists of Hellenistic plates (**Figure 11; No. 6, 7, 8**). They are similar examples of rolled rimmed plates found at precisely dated archaeological deposits of Athenian Agora (Rotroff 1997,

fig.46:647, 47:662, 48:667). Similar examples were also found at Maussoleion terrace filling debris (Vaag et al. 2002, pl.49:K140, pl.11:C7). Those plates were produced from 3<sup>rd</sup> century BC to 1<sup>st</sup> century BC. None of the examples can be dated prior to 3<sup>rd</sup> century BC.

An unguentarium base fragment (**Figure 12; No. 9**) is an example of early series, dated prior to 170 BC around the third quarter of 3<sup>rd</sup> century BC (Vaag et al. 2002, pl.29, H25, pl.50, K153; Athenian Agora 33, fig.63:438).

**Figure 12; No. 10** is a lekane rim fragment known well from Hellenistic deposits of Athenian Agora (Rotroff, 1997, fig.66:1090) dated around 275-250 BC. **Figure 12; No. 11** is likely to be a cooking ware lid fragment, resembling the Hellenistic examples.

**Figure 12; No. 12** is a rim fragment of typical one handled bowl dated into late 4<sup>th</sup> century BC. **Figure 12; No. 13, 14, 15, 16** are base fragments of Knidian bowls (Rotroff, 1997, fig.20:321, 326) dated into 4<sup>th</sup>-2<sup>nd</sup> century BC.

To sum up, the repertory and the dating of the related finds clearly prove that the winery was in use from the first quarter of the 3<sup>rd</sup> century BC to 2<sup>nd</sup> century BC. It might have ceased to operate around the mid 1<sup>st</sup> century BC. The stamped amphora handles suggest that the winery has served various fabricants during its use.

## CONCLUDING REMARKS

The winery at Burgaz/Old Knidos is one of the well preserved installations with its production units. The floor of the winery and the production units such as stone pressing beds and treading rooms were very close to the surface yet fortunately preserved very intact. Such good condition of the production units provided us with the evidence to suggest restitution for the superstructure and mechanisms of the installation. The winery has been part of the industrial landscape formed at Burgaz by the end of the Classical period, and apparently was not the only workshop with an industrial production capacity. The winery might have been an important component of the industrial activities that accelerated in Burgaz by the late 4<sup>th</sup> century BC and clearly reflected with the shifts in settlement pattern all over the town, hallmarked with conversion of residential quarters into production areas and the presence of weight stones and press beds that show the presence of workshops with large production capacity other than the winery, which is the subject of this article. The presence of true presses as well as the treading floors clearly shows that at least two different qualities of wine have been produced there. The treading with feet produced the first quality wine and then the pulp of grape skins were pressed on stone cut beds for producing the second quality wine. The spatial layout of the production units clearly point out to a continuous production process that served at industrial scale. It was also possible to make an estimation for the production capacity of the winery on the basis of carrying capacity of storage vessels and depot spaces. The location of the winery on the coast close to the harbor also implies production for import.

Due to the closeness of the floors and the production units of the winery we can hardly speak of archaeological deposits with small finds. The press beds and treading floors were already on the surface whilst the units with some depth such as dolia and basin were filled with loose soil. The loose soil accompanied with few small finds clearly point out that the space of the winery was not used for any other purposes and was

totally abandoned. Yet the amphora handles with stamps used for the *opus incertum* floor of room Z2 is the only group of finds that presents a terminus ante quem for the construction of the winery. We may claim that 1<sup>st</sup> quarter of the 3<sup>rd</sup> century BC is the earliest date for the construction of the winery, even a bit later due to the secondary use of the amphora handles as part of the floor pavement. The other finds found in deposits of loose soil that filled the dolia and the basin after the abandonment of the winery gives us the latest date for the use of it, which is around mid 1<sup>st</sup> century BC.

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Anahtar Sözcükler: Şarap üretimi; Burgaz Kazıları; Knidos; antik ticaret; klasik dönem.

## BURGAZ / ESKİ KNİDOS'TA BULUNAN HELLENİSTİK DÖNEM ŞARAP İŞLİĞİ

Şarap ve zeytinyağı üretimi özellikle Akdeniz bölgesinde yeralan Grek kent-devletlerinin ekonomisine önemli bir ivme kazandırmıştır. İklimin ve topoğrafyanın elverişliliği zeytincilik ve bağcılığın yaygın biçimde yapılmasına olanak sağlamış, zeytinyağı ve şarap ticari bir ürün olarak bu kent-devletlerin denizaşırı ticarete önemli bir pay edinmesine katkıda bulunmuştur. Muğla İli Datça İlçesi Burgaz mevkiinde yeralan ve olasılıkla Knidos kentinin eski yerleşim alanı olan antik yerleşimde yapılan kazılar MÖ 4. Yüzyılın ikinci yarısında yerleşim dokusunda önemli bir farklılaşma gerçekleştiğini ve yerleşim alanının artık iskandan ziyade endüstriyel üretim alanları için kullanılmaya başlandığını ortaya koymuştur. Yerleşim alanı içinde hanelerin işliğe dönüştürülmesi gözlenirken yerleşimin kuzeydoğusunda kalan alanda altyapısı oldukça iyi korunmuş halde bir şarap işliğı belgelenmiştir. Bu yazının temel amacı sözkonusu işliğı dair genel bir tanıtım yaparak, üst yapısı ve mekanizmasına ilişkin yapılan restitüsyon çalışmalarını sunmaktır. Ayrıca üretim birimlerinin iyi korunmasından ötürü işliğın üretim kapasitesine ilişkin tahmini bir hesaplama yapmak mümkün olmuştur. Bunun yanısıra işliğın tarihlenmesi için kullanılan küçük buluntular değerlendirilmektedir. Ancak işlik mekanı kullanım sürecinin sona ermesinin ardından başka bir amaçla

kullanılmamıştır ve uzun süre açıkta kalmıştır. İşliğin üretim birimleri de yüzeye oldukça yakındır. Bu bakımdan tarihlenebilir küçük buluntular sayıca azdır. Bununla beraber işliğin MÖ 3.Yüzyılın başlarından önce kullanılmaya başlandığı ve olasılıkla MÖ 1. Yüzyılın ortalarına dek üretime devam ettiği anlaşılmaktadır. İşliğin yakın çevresinde ve kıyı boyunca dağınık halde izlenen ağırlık taşları ve değirmen taşları çevrede endüstriyel ölçekte üretim yapan başka işliklerin de varolduğunun göstergesidir.

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