Maria Rosaria Belgiorno

Behind Distillation
Experimental Archaeology

The journey of the channel rim devices from Tepe Gawra to Sardinia passing through Cyprus
BEHIND DISTILLATION
EXPERIMENTAL ARCHAEOLOGY
1 – ONE

Tepe Gawra and the spread of its channel jar
to Slovakia Sardinia and Cyprus
(experiments visible on web site www.perfumeypark.org)

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DEDICATION

This research is dedicated to Prof. Vassos Karageorghis, whose scholarly advice to compare the tripod of Teratsoudhia with the Ubaid pots of Tepe Gawra, and screen their functionality, and form the basis of the results presented in this short essay.
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Behind distillation

FOREWORD

Giorgio Samorini

In the literature of the twentieth century there is a general tendency to consider the techniques of distillation as a conquest of our era, since it is believed that the first to discover they were the Greeks residing in Alexandria in Egypt at the beginning of the Christian era. The same tendency leads us to consider, the distillation technique of fermented spirits, to obtain beverages with a higher concentration of alcohol, an art spread in Europe only around the twelfth century AD (Forbes, 1948, Liebmann, 1956, Dietler, 2006).

But nineteenth-century scholars were not of this opinion. The writings of Morewood (1824) and Farley (1907) bear witness to a sudden change of opinion, for which it is legitimate to suspect that these statements were dictated by that "modern-centric haughtiness" typical of the twentieth century Western man, which led us to believe that the ideation and the distilling techniques were too complex for the ancient man, understood as "primitve". The archaeological discoveries and modern studies, first of Belgiorno, are debunking this "myth" of the twentieth century, despite the difficulty of acceptance that generally accompanies the changes in paradigm. Archaeology is not a columnist's lounge, it is a scientific discipline, which nowadays uses sophisticated analytical techniques, through which it is increasingly able to reconstruct the technical possibilities, the "shadows" and the thought of ancient man; which today appears to us anything but "primitve".

The archaeological finds found on three continents demonstrate the great antiquity of the practice of distillation, which originated long before our era (Belgiorno, 2017). Even in the Americas, where it is common to believe that
the distilling technique was brought by the Spaniards, after the advent of Christopher Columbus, you find archaeological material and literary indications suggesting a traditional pre-Columbian knowledge of the distilling art (Samorini, 2018).

In the current state of knowledge, the hypothesis suggested by Belgiorno that the distillation techniques have been discovered independently in different geographical areas, through a process of cultural convergence induced by common empirical observations, seems plausible. So, without having to call into question cultural diffusionism, the alternative, sometimes a bit abused by scholars, which involves a transfer of knowledge through human contacts and migrations.

One wonders what were the mental processes that made distillation, with consequent research and development of distillers. As Belgiorno pointed out in the first pages of this paper, "the need to distil created the so-called alembic, and not the inverse"; a need that started from some empirical observations of very ancient date, for which it is opportune to focus our attention.

A first factor that may have promoted the ideation of the distillation process concerns the randomness of the observation that is plausibly happening almost everywhere, especially among the coastal populations, when, for the most varied reasons, one has started to boil marine water, and found that the droplets that are formed by the condensation of vapor on the surface of an object placed above the boiling liquid, for example a lid, are sweet and not salty like sea water. This observation had already been made by Aristotle, who wrote in the 4th century BC.

“Salt water when it turns into vapour becomes sweet, and the vapour does not form salt water when it condenses again. This I know by experiment. The same thing is true in every case of the kind: wine and all fluids that evaporate
and condense back into a liquid state become water. They all are water modified by a certain admixture, the nature of which determines their flavour. But this subject must be considered on another more suitable occasion”. (Meteorology, II, 3, 358b Translated by E. W. Webster).

Alexander of Aphrodisias, the main ancient commentator of Aristotle, who lived between the 2nd and 3rd centuries AD, commenting on Aristotle's passage, reports that the sailors, when they did not have enough fresh water, knew how to extract it from the sea water, boiling it and putting on the pot rags or sponges that were soaked in the steam and that, squeezed, provided desalinated water (Gwei-Djen et al., 1972: 27). From this same observation the concept of purity or greater purity of the condensed liquid with respect to the original liquid can be derived.

A second empirical observation may have occurred anywhere man has developed alcoholic beverages - grape wine, cereal beers, ciders, mead, etc. The great antiquity of the processing of fermented beverages is widely highlighted by archaeology (Samorini, 2017), and the oldest date was recently set around 11,000 BC, related to the production of cereal beer by the Near East's Natufian culture (Liu et al., 2018).

It is plausible to think that these drinks may have been placed to heat in a pot over the fire for the most varied reasons: the droplets that formed from the condensation of the vapor were inflammable, due to the high concentration of alcohol. The observation that may have happened accidentally innumerable times, arouses curiosity and at the same time suggesting magic spiritual and religious interpretations.

Once again Aristotle seems to be aware of this phenomenon, reporting that the exhalation of wine is inflammable, and that this exhalation "has no taste of wine and does not cause intoxication like any other wine" (Meteorology, IV, 9, 387b).
It is from these empirical observations that the concept of the spiritual waters comes, a term now in disuse in the Italian language, but still used in English to indicate spirits (spiritsuous liquors), i.e. liquids that "internally have a spirit". Also, the ardent water and the French water-of-life (eau-de-vie), as well as other terms widespread in the world to designate alcoholic distillates, originate from the concept of a liquid that has inside the fire, a liquid that burns. Even before the feeling of burning in the stomach when ingested, the liqueurs burn because if placed in contact with the fire emit a flame.

Around this flame that emanates from a liquid, as an exuberant manifestation of the opposites, religious rites were developed with rituals aimed at impressing and marvelling the spectator neophytes. The Christian theologian Hippolytus has left a testimony of this in his passage (*Refutatio omnium haeresium* (4.31), a work of the third century AD, where he describes the gnostic baptism, during which "the fire obtained from distilled wine" magical flames on the head of the baptizing.

Since the most ancient times the distillers have been used for two main purposes: to produce essences and perfumes, and to obtain liquids with a high concentration of alcohol. For many reasons it is not yet possible to determine with certainty the use of the equipment found in archaeological contexts, whether for intoxicating, magical, medicinal or cosmetic purposes. We do not know if these ancient stills could produce alcoholic distillates, as well as essences and perfumes.

On this problem, Belgiorno offers a consideration that at first glance might seem puzzling or elusive, that is, that we should not look for a differentiation of use for these stills because there was not, and that this promiscuity of use would have "facilitated the mixing of material for the production of pharmaceutical compounds".
Behind distillation

Aware of how many times our modern thoughts, with their functional cataloguing, obscure and do not allow us to capture the modalities of ancient thought, I do not object to this courageous hypothesis, while awaiting the results of future research. A contribution to this problem can be made by the experimental archaeology, and in this regard, the project of Belgiorno to give voice and mumble to those archaic stills, testing the functionality of identical experimental apparatuses, can only be warmly applauded.


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**Giorgio Samorini** was born in Bologna in 1957, is an ethnobotanical scholar specialized in the traditional use of intoxicating plants. He has conducted field surveys with ethnic groups in Africa, Latin America, and Asia. He has published numerous articles in scientific journals and several books, including Mythology of inebriating plants (2016) and Archaeology of inebriating plants (2017).
BEHIND DISTILLATION - EXPERIMENTAL ARCHAEOLOGY

1 - Tepe Gawra and the spread of its channel jar
to Slovakia, Sardinia and Cyprus

1. Introductive notes

1.1 - Behind Distillation and Experimental Archaeology

The evidence gathered in writing Behind Distillation did not fully satisfy my curiosity and obviously did not stop the search for more information and details about the different distillation systems that, since ancient times, have been used in different parts of the world and are still part of the cultural heritage of the local folk traditions. What has undoubtedly emerged from my first research is that distillation is a very ancient art known all over the world for many centuries before someone decided to fix its parameters and functions.

It was born regardless of and before the invention of ceramics, for which I consider the equation valid that the need to distil created the so-called alembic, and not the other way around. Therefore, denying that distillation was historically born only after the circulation of the so-called domed alembic heads arbitrarily claimed as an Arab invention.

The extraordinary amount of documentation related to distilling practices carried out today using barrels and wooden accessories, simple perforated vases with marsh and bamboo canes, coatings of banana leaves, ditches dug into the ground, hot stones buried along with various plants, column formed assembling elements of stone, pottery and wood, by agricultural and nomadic populations that do not know the so-called domed alembic, it takes us back in time, to bear witness to a tradition and ancient knowledge that nobody should ignore.
After all, the various equipment we find in the different countries is itself evidence of a different path that began individually, without following the suggestions of other cultures, or coming from the European and Mediterranean area that should have communicated the distillation technique in chronological terms.

So much so, that at the same time as the invention of the domed alembic head in the Mediterranean, China was distilling in a totally different way, as well as Mongolia and India, while alternative techniques had been known for centuries in Central and South America.

Although it is obviously superfluous to carry out distillation experiments using objects and systems still in use, well known and documented in rural areas, since their existence is often ignored in the treatises concerning distillation, we considered it appropriate to include some of these in our experimental journey. Perhaps they belong to the prehistory of distillation of which the alchemists and erudite West seek in vain to erase the memory.

Obviously, the experimentation that concerns them is part of the second step of our project. Another aspect that we must consider, before carrying out distillation experiments with ancient apparatuses, concerns the product that regards the use of this technique. Also, in this case we have to ponder the current use: i.e. for what we use distillation in the agricultural and private sectors, obviously excluding industrial uses. In this regard, apart from the production of chemical compounds that affect a completely different cognitive sphere, we discover that the distillation is mainly used in the production of alcohol and alcoholic beverages and in the production of aromatic waters and essential oils.

Of course, one of the first questions concerns the difference in smell and taste of distillates produced in ceramic vessels, even if the specimens used in the process are more or less comparable with the metal apparatuses mainly used today. And we wonder about the difference in terms of quality,
conservation and safety, including an essence produced in a copper still from that produced in a ceramic apparatus.

Moreover, we cannot and must not therefore seek a precise differentiation on equipment intended to produce alcoholic beverages or fragrances, as it seems clear that there has never been any. On the contrary, it is possible that the promiscuity of the employment facilitated the mixing of materials towards the production of pharmaceutical compounds. So, we have a wide choice regarding the materials that we can use in testing the equipment.

The ingredients that we used in the tests are not therefore identifying the real use of these devices, for which the debate remains open, therefore our choice will remain in the natural environment and biodiversity of the place to which the equipment belongs.

We refer above all to the archaeological context and to the associated material that can be more indicative about the destination of the specimens found. Most of the objects associated with the distillation were found in domestic environments at Tepe Gawra, Slovakia and Sardinia, some in the tombs, like in Cyprus. They were all found in fragments but have since been restored. The chronology spans 3000 years, from the end of the fifth millennium BC to the end of the second millennium BC.
1.2 - Protocol of Experimental Archaeology of The Perfume Theme Park Museum:

1.2.1 - Introduction to the protocol:
- It is obviously impossible the use of chemical “reverse engineering” to remake the ancient perfumes, however a correct protocol of experimental archaeology may reveal much information about the knowledge, process, and philosophy regarding the production of something that still today has a primary importance in human life and around which a turnover of incalculable value moves.
- Considering that a protocol of experimental archaeology is valid when it respects the archaeological original parameters on which the hypothesis has been made, regarding materials, the archaeological context, the geographical location and social environment, our protocol regards the evolution of the techniques to produce perfumes in ancient circum-Mediterranean cultures, in BC time, including maceration, effleurage of animal and vegetable fats, distillation, and binary employ of different techniques.

1.2.2 - Aim

The aim of the protocol is not simply to demonstrate that it is possible to produce perfumes following the ancient recipes and using replica apparatuses, but to experiment with various organic materials (plants) which have been utilized in the production of ointments, essential oils, hydrosol and oil perfumes. Specifically, to learn how different objects/apparatuses and different plants responded in the production and preserving of fragrances. How many people and what time factors were involved in the various stages of manufacture, considering the causality, knowledge and cultural heritage in terms of evolution of the different technologies.
1.2.3 - The experimental archaeology steps:

1 - Converting hypothesis into a verifiable form
2 - Selecting the experimental materials
3 - Operating with the objective and effective materials
4 - Observing the results of the experiment
5 - Interpreting the results of the experiments in different inferences.

1.2.4 - The investigative parameters of each case include:

1 - The recognition of the archaeological and historical data
2 - The formulation of an indicative inference
3 - The distinction of convincing data
4 - The formulation of a probable interpretation

1.2.5 - Archaeological evidence:

For implements and apparatuses five orders of evidence are considered:

1- Formal properties size and typology.
2- Analogy with objects coming from similar environment, contemporary situation and geographic area
3- Skeuomorphism with more recent and modern objects used for the same purpose
4- Limitations imposed by the formal properties for a possible different use
5- Social involvement and cultural evolution of the people that produced and used fragrances.
1.2.6 - An example of the methodology applied to each case.

- **Indicative data:** the alembic of Pyrgos is composed of four pieces.
- **Indicative conclusion:** the apparatus was used for distillation
- **Probative data:** the four pieces of pottery match together
- **The form** is almost identical to apparatus still used in India
- **India apparatus** is extensively used for distillation of fragrant plants and flowers
- **Probabilistic inference:** the Pyrgos’ apparatus is a primitive alembic for distillation.
- **The experimental replica proof** demonstrates it is really an apparatus for distillation.

1.2.7 - Conclusion

- We hope that from the result of the comparative study it will be possible to understand if the technological process put in place is the one used in the past. In the impossibility of having direct testimonies, these results can be considered plausible proofs of the hypotheses formulated.

- From the same results, the social aspects and the commercial implications on which much of the current academic discussion is running can be assessed through historical comparisons.

- For each of these cases of study, we will give a vote of credibility, between one and five, to compare with the experimental parameters used to make the text and equate the differences.
Behind distillation

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Behind distillation


Since the most ancient times the distillers have been used for two main purposes: to produce essences and perfumes, and to obtain liquids with a high concentration of alcohol. For many reasons it is not yet possible to determine with certainty the use of the equipment found in archaeological contexts, whether for intoxicating, magical, medicinal or cosmetic purposes. We do not know if these ancient stills could produce alcoholic distillates, as well as essences and perfumes. On this problem, Maria Rosaria Belgiorno offers a consideration that at first glance might seem puzzling or elusive, that is, that we should not look for a differentiation of use for these stills because there was not, and that this promiscuity of use would have "facilitated the mixing of material for the production of pharmaceutical compounds". Aware of how many times our modern thoughts, with their functional cataloguing, obscure and do not allow us to capture the modalities of ancient thought, I do not object to this courageous hypothesis, while awaiting the results of future research. A contribution to this problem can be made by the experimental archaeology, and in this regard, the project of Belgiorno to give voice and mumble to those archaic stills, testing the functionality of identical experimental apparatuses, can only be warmly applauded.

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