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EDITORIAL FOREWORD

On behalf of the editorial board and the administration of the faculty of Archaeology – Fayoum University, we are proud to present the fourth issue of *SHEDET* (the Journal of the Faculty of Archaeology – Fayoum University). With this journal, we are opening a new era of scientific publication of Heritage and Archaeology in Egypt, designed to reach people all over the world, and to be judged according to international standards of excellence.

Presenting the fourth volume of *SHEDET* gives us – in the same context of our three previous volumes– happiness and challenge; happiness in being able to provide our readers with a volume of selected and refereed intellectual contributions, and challenge in trying to sustain this journal and provide publications of international quality. Of course help is needed from scholars and researchers all over the world in the field of heritage and archaeology, to be able to continue and sustain producing this publication. The continuation of this journal is vitally important, as it is one of the very few scientifically peer-reviewed journals dedicated to Archaeology in Egypt

The main scope of the *SHEDET* Journal is various aspects of ancient Egyptian, Islamic and Coptic archaeology, conservation, museology, and heritage (concerning language, literature, history, art, and related subjects), before the modern period. It aims to publish research that contributes to the enlargement of knowledge or the advancement of scholarly interpretation.

Finally, we would like to thank all contributors to the successful publication of this new journal for their support and collegial collaboration, and express our hopes for more successful issues to come. We must also thank all the editorial team, language editor, and advisory board for all their efforts.

Prof. Dr. Atef Mansour & Prof. Dr. Ahmed Tony

Fayoum, 2017

CONTENTS

EDITORIAL FOREWORD		IV
CONTENTS		V
ANCIENT ARCHAEOLOGY & EGYPTOLOGY		
DENISOVA CAVE: A PROMINENT PALAEOLITHIC SITE IN NORTH ASIA	Abou Al-Hassan BAKRY	1–21
UNPUBLISHED MUMMY BANDAGES IN THE EGYPTIAN MUSEUM CAIRO	Ahmed Kh. SAFINA	22–36
WHAT IS THE TITLE OF MERREW?	Islam I. AMER	37–50
THREE INCOMPLETE LIMESTONE STELAE FROM IHNASYA EL-MEDINA (HERAKLEOPOLIS MAGNA)	Hayam H. RAWASH	51–66
ISLAMIC ARCHAEOLOGY		
THE COINAGE OF AL-ANDALUS	Almudena ARIZA ARMADA	68–90
COFFEE CUP HOLDERS “AZRUF” MADE OF BRASS “AN ARCHAEOLOGICAL AND ARTISTIC STUDY”	Ayman M. EDRIS	91–102
A RARE PERSIAN PORTRAIT RUG “DATING & ANALYSIS”	Hamada THABET & Ramy MOHSEN	103–115
TIRNOVO (SINCE 1965 “VELIKO TÄRNOVO”) FROM MEDIEVAL BULGARIAN CAPITAL TO TURKISH ISLAMIC CULTURAL CENTRE A GENERAL OVERVIEW	Machiel KIEL	115–131
BETEL BOX (PANDAN) FROM MUGHAL ERA IN INDIA PRESERVED AT NATIONAL MUSEUM OF NEW DELHI “COMPARATIVE ARTISTIC STUDY & FIRST PUBLISHED”	Sameh ELBANNA	132–153
CONSERVATION		
THE MORTAR DAMAGE AND ITS HARMFUL EFFECTS ON THE GLAZED CERAMIC TILES IN TERBANA MOSQUE – ALEXANDRIA, EGYPT	Elshaimaa ABD-ELRAHIM & Ibrahim WESHAHY	155–166
ESTIMATION OF FIRING TEMPERATURE OF ISLAMIC CERAMIC USING XRD AND FTIR	Hamada SADEK	167–174

ISLAMIC ARCHAEOLOGY

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Betel box (Pandan) from Mughal Era in India Preserved at National Museum of New Delhi “Comparative Artistic Study & First Published”

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ABSTRACT

The subject matter research is a metal masterpiece published for the first time. Betel Boxes, or Pandan, are unique metal boxes made for preserving a mixture of betel leaves with other additives like areca, tobacco and nuts. The box being analyzed here, preserved at the National Museum of New Delhi in India, is one of many metal boxes that were common in the Mughal era, and many of these boxes are now found in various international museums and private collections.

This metal box is particularly intriguing to study because this will be the first published study, there is a lack of scientific studies dealing with this types of boxes in general, and to have an overall understanding of the industrial and decorative techniques used in making these boxes in contrast to other metal boxes with similar functions.

Four aspects of this particular betel box will be the focus of this study; first, its description, second, defining the term Pandan or Betel in light of its function, third, the craftsmanship /aesthetic, and fourth, a comparative study with other similar metal boxes preserved in international museums.

KEYWORDS

Pandan – Mughal – Box – Silver – Brass – Enamel

المخلص

صندوق لحفظ نبات التنبول (باندان) من العصر المغولي الهندي محفوظ بالمتحف الوطني بنيو دلهي "دراسة فنية مقارنة ونشر جديد" يعد العصر المغولي في الهند (932-1237هـ/1526-1858م) من أكثر العصور الإسلامية ثراءً وزخرفة يشهد على ذلك العديد من العماير والتحف التطبيقية التي تعود لهذا العصر. تعد التحف المعدنية من أروع التحف التطبيقية التي ترجع لهذا العصر؛ حيث جاءت متنوعة الوظائف متعددة الأشكال، وموزعة بين متاحف العالم. يتناول هذا البحث نشر جديد لتحفة معدنية، وهي تمثل نوع فريد من الصناديق المعدنية كان مخصصاً لحفظ خليط أو مزيج أساسه نبات البان أو التنبول ويضاف إليها أيضاً الأريكة والتبغ والمكسرات في بعض الأحيان، ويطلق على هذه الصناديق (Pandan) باللغة الهندية أو (Betel Box) باللغة الانجليزية.

الصندوق موضع الدراسة محفوظ بالمتحف القومي بنيو دلهي بالهند، ويعد واحداً من صناديق معدنية كثيرة جداً انتشرت في الفترة المغولية الهندية اتخذت نفس الوظيفة وهي حفظ نبات التنبول وغيره من المكونات، مع اتخاذها أشكالاً وعناصر زخرفية مختلفة، ويوجد الكثير من هذه الصناديق اليوم في العديد من متاحف العالمية والمجموعات الخاصة. وتوجد العديد من الأسباب لتناول هذا الموضوع أهمها: نشر جديد لهذا الصندوق، وقلة الدراسات العلمية التي تتناول هذا النوع من الصندوق، فضلاً عن معرفة الأساليب الصناعية والزخرفية المستخدمة في هذا الصندوق، وعقد مقارنة بينه وبين غيره من الصناديق المعدنية الأخرى التي تتشابه معه في الوظيفة.

يتناول البحث دراسة هذا الصندوق المعدني من خلال أربعة مباحث: الأول يتناول الوصف الفني للصندوق موضع الدراسة، والثاني يتناول الباحث فيه التعريف بمصطلح (Betel / Pandan) والذين أطلقا على هذا الصندوق، كما يتناول الباحث فيه وظيفة هذا الصندوق، والثالث: ويتعرض فيه الباحث للأسلوبان الصناعي والزخرفي المستخدمان في الصندوق موضع الدراسة، والرابع: ويشمل دراسة مقارنة بين الصندوق موضع الدراسة وغيره من صناديق (pandan) المعدنية المحفوظة في متاحف العالمية، وينتهي البحث بأهم النتائج التي توصل إليها الباحث، وقائمة بأهم المراجع، فضلاً عن الأشكال واللوحات التوضيحية المزدودة بها الدراسة.

الكلمات الدالة

صندوق حفظ التنبول – مغول – صندوق – فضة – نحاس – المينا

INTRODUCTION

The era of the Mughal Emperors of India¹ (932-1237 AH/1526-1858 AD) is one of the most remarkable periods India's history.² The architecture/monuments and applied arts attest to the refined technical artistic prowess of the architects and artisans of that era, under the meticulous care of the Mughal Emperors' patronage, representing the height of eastern Islamic art.

Islamic art from the Indian Mughal era receives great attention; India has become a popular center for applied arts with various media – metals, ceramics, wood, glass, textiles, rugs, marble, stone – due to the abundance of raw materials, the skill of industrialists and artisans and craftsmen. India is one of the richest havens for monuments of the Islamic world, dating as far back to the entry and subsequent spreading of Islam.

The beautiful collections of Indian artifacts from the Indian Mughal era (932-1237AH /1526-1858 AD) can still be seen in India's museums, although many artifacts – candlesticks, arms, jugs, jars, flasks, trays, incense burners, bowls, hookahs³, boxes, etc. – have been distributed among the world's museums and private collections. Among them, is a distinctive metal betel box.

Ornate metalwork, often glazed with silver, were commonplace in houses and temples in India. They were also made using gold, silver, inlaid precious stones and enamel, often used for jewelry.⁴ Various regions of Mughal India were reputed centers of specialized artisans and craftsmen, Hyderabad in Deccan was particularly renowned for their metal craftsmanship, known as Al-Baydarī style.⁵

¹ The Mughal Empire in India was founded thanks to Babar Shah from the descendants of Timur Lank, and was succeeded by descendants of a number of great emperors such as Humayun, Akbar, Jhangir, Shah Jihan and Warangzeb. See: al-Shayal, *Tarīkh al-Abaṭāra al-Maghūl*, pp. 7/8.

² India is a vast country bordered on the north by the Himalayas, the Hindus and Sulaiman mountains to the west, Afghanistan and Iran, India to the south and the Arabian Sea to the west, the Bay of Bengal to the east and Silan on its southern tip and From the north to the east to the mountains of Assam, India derives its name from the word "Sandhu", the Indian name of the river "Indus", the river "Sind", and from this word the words "And" and "Hind" meaning "land behind the Andos River" and then became the people from this region are called Hindus or Indians, and their country became known as Hindustan

- El-Nemer, *Tarīkh al-Islām fī al-Hind*, p.2

Some believe that the origin of "India" is related to the god "Andra" the ancient god of India.

Leopon, *Ḥaḍārat al-Hind*, p.25. For more details on India's history, culture and history, see:

-Williams, *The Historians History Of The World*, London 1926.

-Schimmel, *The Empire of The Great Mughals, Art and Culture*, London, 2004

-Diurant, *Qṣat al-Ḥaḍārah al-Hindīyah w jīrānīhā*, Cairo 1935.

³ 'abd al-Dāym, "Dirāsah li-qā'dat Narjilah Hindīyah," pp.760-764 ; Stefano, Glass From The Islamic Lands, p.38

⁴ Dimand (M.S.), *Al-Funūn al-Islāmīyah*, p.163.

⁵ 'allam, *Funūn al-Sharq al-awsat fī al-uṣūr al-islāmīyah*, p. 242.

The name of Baydarī is called on of the Indian metal models and is derived from the name of Baydār, the capital of the Islamic Deccan province, and is one of the most famous ways and styles known by the Dikkan, Which is a zinc alloy with a small amount of lead, copper and tin, and laboratory research also proved the presence of iron but a small percent, As for the industrial method used in the formation of the vessels and decoration of this model, it depends on the casting and then the inlaying of the decorations, either silver or brass and in a few times used gold, and gently hammer it and then cover the entire piece with a clay containing ammonia salt, when remove this clay the background become black while the material of inlaying become more brilliant.

-National Museum Collection Bidri ware, New Delhi, 1990, p.2

Various raw materials were used in making their metalwork including brass glazed with tin, gold, silver, enamel used on brass and gold. Gold was often used in combination with rubies, emeralds and diamonds; silver was also commonly used.⁶

The diversity of the industrial methods used in the Indian Mughal metalwork is worth mentioning. They had a vast array of tools, techniques, media, and artistic expressions at their disposal, like the casting and engraving, interlacing with floral, geometric and inscriptions motifs, as well as human, animal drawings and figurative subjects.

This, being the first publication⁷ of this metal masterpiece from the Indian Mughals is a unique type of metal box for preserving a mixture of betel, in addition to areca, tobacco and nuts, and is one of many metal boxes that were spread in the Indian Mughal period (the same function was used to preserve the betel leaves with other ingredients). These boxes took different forms and decorative elements. Many of these boxes are found today in various international museums and private collections, however there is a lack of scientific studies on the subject;⁸ the main impetus for preparing this research.

This article discusses the study of this metal betel box through an introduction and four topics and conclusion. The first of the four topics is a the technical description, the second is a definition and an exposition of its function, the third is an analysis of the raw materials, and industrial and decorative techniques used in its manufacturing, the forth is a comparative study between betel box in India's National Museum and other betel boxes preserved in the international museums, and lastly, a conclusion with recommendations, as well as an appendix with plates and a list of references on which the research is based.

The description of the betel box (Pandan)

Main data (Pl. 1)

Type: Metal box for preserving the leaves of betel (pan).

Material: Brass with remains of silver.

Date: 12th A.H/18th AD.

Length: 18.5 cm, **Height** 10.2 cm.

Conservation number: ACC.NO.63.1480

(in the decorative arts hall No. 2 in the ground floor at the National Museum in New Delhi, India)

Technical description



Pl. 1. A Betel Box (Pandan) in the form of oyster or oval shell.

- Khalīfah, "Tūḥaf ma'danīyah min Ḥaydr'bad al-Dikn -ṭirāz al-Baydarī", pp. 367, 368, 369, 372.

⁶ Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, pp.13-14- 62-66-80-90-160-170-200-215.

⁷ The researcher wrote to the National Museum in New Delhi, India, to inquire about one of the unpublished metal boxes, The museum officially responded to the researcher that the betel box under study has not been published before, and the researcher completed a form as to send a photograph of the subject study, and in this regard, the researcher goes on to express his thanks and appreciation to the officials of the National Museum in New Delhi, in particular Dr. Anmika and Ms. Surchika for their cooperation.

⁸ There is no specialized study of this type of Betel box or pandan in Arabic, but there are few studies written in English, perhaps the most important at all :

Zebrowski, *Gold, Silver and Bronze from Mughal Indian* pp.14-62-80 -90-160-158-170-200-215.

Our subject matter is a silver-plated brass betel box with an ovigal body. It consists of two identical vertical sections, the bottom representing the base of the box, and the top representing its lid. Both the base and the lid have 14 ribs. The box is generally similar to the shape of the conch or shell,⁹ and there are two balls used to open and close the box (Pls. 1, 2, Figs. 1a/1b).



Pl. 1b. A Betel Box (Pandan), the National Museum in New Delhi (ACC.NO.63.1480)

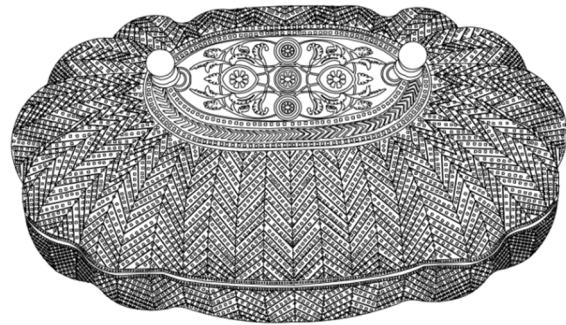


Fig. 1a. A metal betel box, the National Museum in New Delhi (ACC.NO. 63.1480)



Pl. 1c. The same Betel Box, the upper section

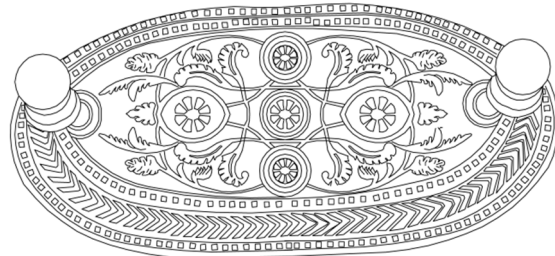


Fig. 1b. A detail

Both the base and the lid are silver-plated brass decorated with engraved geometric and floral motifs. The geometric decorations cover the majority of the outer surface of the box, the base and the lid, with the exception of the upper part of the lid, which is decorated with geometric zigzag ornamentation interspersed with small squares.

A decorative ellipse framed by three borders is in the center of the lid, the middle frame being biggest, has a chevron (V-shaped) successive decorative pattern, while the other two borders have a pattern with squares. The two metal balls used to open and close the lid are on opposite each other outside of the ellipse.

The floral motifs are found in an ellipse toward the center of the lid's top. Within this

⁹ Seashell: is the shell of the pearl and so on, combining shells.

- Ma'rūf, *al-Mūnjid fi al-lūghat w al-adāb w al-'ulūm*, p.419.

Some bracelets in India are made of ivory or shell fish. In fact, women's bracelets in India differed in shape and symbol according to customs, traditions, place and social status. Some of the pearl necklaces that were associated with the Indians by the moon, which in turn was associated with the cycle of fertility and development and its ability to heal certain diseases.

- Prior - Admason, *Maharaja's Jewels*, p.12 ; Eisaa, "al-Mar'ah fi al-Taswīr al-Maghūli al-Hindi w al-Mahli al-Mu'asr "Dirāsah li-Malāmiḥha – Azīā'iha w Zīnatiḥā," pp.554-555 ; Thaban, "Al-Ḥijārah w Fan al-Mūdāwāh", pp. 11: 13.

ellipse there are five flowers, four of which are parallel and balanced on the vertical and horizontal axes, and the fifth is located in the middle. The backgrounds of these flowers have stems which lead to the leaves and/or palm trees. Some of the leaves have serrated edges similar to the leaves wrapped on the top (Pl. 2, Figs. 1a/1b).



Pl. 2. The studied betel box, various angels of view

There are no legs for this metal container (Pl. 2c); its stability is from the level of the oval in the base of the box, which is similar in shape to the part of the lid, but without the presence of the two balls.

Betel Boxes or Pandan (Terms of definition and function)

Definition

It is a box for preserving three things: palm, areca, and betel nut.¹⁰ The word Pandan is composed of two parts: Pan, an Indian word for betel, and Dan, a Persian suffix, although betel was not used in Iran or any Persian-speaking provinces.

Peanuts or betel leaves are entered in specialized dictionaries as a leaf of betel or mixed with some nuts and ingredients used for chewing.¹¹ Generally, pan (a term used in northern India) means palm, chips of nuts extracted from the palm of the Areca (Surpari in Indian language); a very common tropical Asian palm in India and Southeast Asia which is also a drug. The areca palm is mixed with a lemon paste (Chunam in Indian language), Indian shell¹² and spices such as cinnamon etc. It is then wrapped in a soft betel leaf, which is then chewed making ones saliva red and teeth black¹³ after habitual use.

Asian evergreen betel leaves were used in the east as a stimulant, and chewing of a mixture of pan or betel leaves with areca (a seed of the Indian herb named Areca catechu of the Palmae family) and nuts, as well as smoking paddy¹⁴, are very important traditions in the Indian subcontinent, in fact it is used to treat and/or improve bad breath.

Betel leaves contain volatile aromatic substances that relax the nervous system, which in turn relaxes the body. The seeds, of the betel leaves, contain (11-26%) tannins, and

¹⁰ Michell, *The Majesty of Mughal decoration: The art and architecture of Islamic India*, p.284

¹¹ *Random House Webster's College dictionary*, New York, 2nd edition, 1999.

¹² It is clear that the oysters and the shells played an important role in the structure of the betel nut or the drugs that were placed in these boxes and had a role in the Indian folk medicine in general, so It was not strange that the shape of the box under study should come in the form of shell.

¹³ Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, pp. 263-264

¹⁴ A type of tobacco that is not manufactured and spread in India and very cheap, and this tobacco does not smoke and is made of tobacco leaves powder (snuff).

alkaloids (0.15-0.67%). From a pharmacological perspective, the active ingredients in betel leaves relieve colic, pain, the central nervous system; it is a physical and psychological relaxant, antifungal and an anti-inflammatory.¹⁵

Betel leaves are widely chewed in India, Pakistan, Bangladesh, Burma, Sri Lanka and other regions of Southeast Asia. It is wrapped with areca and calcium hydroxide, a formula known as the "betel chewing" (sometimes made with tobacco), used by Indians for thousands of years. Locally grown orange Supari seeds are one of the main ingredients in the manufacture of betel chewing, which has a narcotic and calming value. The stimulating effect increases with chewing reducing anxiety and stress. A small amount of betel leaves are often used as a mouth cleaner and/or to refresh the soul. Pan or betel chewing in ancient Indian folk medicine was used in the Vedic era¹⁶ as a breath freshener¹⁷.

Betel leaves should be taken after meals because they contain an alkaline liquid, however they can be taken any time. Their use was very important for the royal classes; the aristocratic and middle classes were given betel leaves immediately after meals before their departure.¹⁸

Indian scientists at the Indian Institute of Biochemistry in Calcutta claim that betel leaves are particularly beneficial in treating leukemia, which peaked the interest of Western and even Japanese scientists. Preparation of betel leaves or pan has different forms and flavors depending on the region or its quality. There are many types of pan or betel leaves that grow in the different regions and the methods of preparation varies from one country to another i.e. betel leaves from Bengal have a relatively weak flavor. The most popular is the thick black betel leaves which are chewed with tobacco, next is type known as Panarasi Pan, where the betel leaves are mixed with areca, lemon and many of the flavor extracts.

There is a particularly sweet variety that does not contain betel, tobacco or areca, rather it is mainly made from coconut, fruit and various spices. Preparing betel leaves or pan at home is largely considered a waste of time, regardless of how deeply rooted the tradition is. Posebish Bant, a professor of diplomacy at Jawaharlal Nehru University and author of *The leaves of betel are the leaves of joy and pleasure* said "when you give betel leaves to someone you offer India to him". Pan or betel leaves have been part of the Indian heritage since ancient times, and it is difficult to find an area of the country that does not have their unique preferred blend.¹⁹

Function

Based on the above definition of betel leaves, the terms "pan" or "betel" or a chew are widely understood in South and Southeast Asian vernacular. The mixture or its components

¹⁵ Gupta, "Al-bān awrāquh lil-bahjah al-muta'adidah," Al-Sharq Al-Awsat, No. 11078, March 28, 2009, link: http://archive.aawsat.com/details.asp?section=62&article=512681&issueno=11078#.WP_HCYWcHug

¹⁶ (The Vedic Age 2000: 1000 BC) is the source from which Indians derive their history in its primitive stages, and Veda means knowledge, and Hindus call upon all their inherited heritage.

Eisaa, "al-Mar'ah fi al-Taswir al-Maghūli al-Hindi w al-Mahli al-Mu'asir "Dirāsah li-Malāmiḥha – Azīā' iha w Zinatihā," note 2 p. 532.

¹⁷ Gupta, "Al-bān awrāquh lil-bahjah al-muta'adidah," Al-Sharq Al-Awsat, No. 11078, March 28, 2009, link: http://archive.aawsat.com/details.asp?section=62&article=512681&issueno=11078#.WP_HCYWcHug

¹⁸ Zebrowski, (M.), *Gold, Silver and Bronze from Mughal Indian*, p.263.

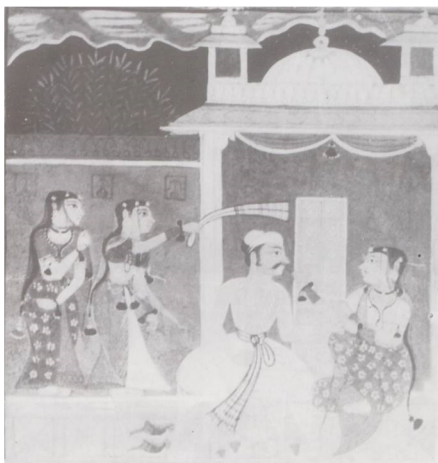
¹⁹ Gupta, "Al-bān awrāquh lil-bahjah al-muta'adidah," Al-Sharq Al-Awsat, No. 11078, March 28, 2009, link: http://archive.aawsat.com/details.asp?section=62&article=512681&issueno=11078#.WP_HCYWcHug

were kept in special metal boxes – pandan, coined based on the frequent use in the preserving or the plant; "Dan" is a Persian suffix, and "Pan" are compounded to make "Pandan".

From the above we conclude that the function of metal boxes known as Pandan boxes (or betel box) were limited to being containers for keeping the plant or betel or other components of betel nut²⁰, such as tobacco, nuts, spices and other materials, because the main ingredient kept in these boxes was the plant or the betel, Pandan in Indian & betel nut box in English.

During the reign of the Mughal emperors, the word "Pandan boxes" (or "boxes") referred to the box used to preserve the plant. Betel, other dairy components, and betel chewing was common in the early years of the Christian era as mentioned in the Buddhist texts and medical works of Sasaruta (a famous Indian physician) recorded in the first century AD. The first Indian writing has references to prestigious offices having a bag of betel leaves and also a tin cane for the king²¹.

Chewing betel has its roots in Indian culture. A miniature of manuscripts, and one in particular, a painting attributed to the Rajasthan School dating back to 1605 AD is a testament to that culture, depicting a prince sitting and a woman handing him betel chewing (Plate 3).²²



Pl. 3. A prince sitting and a woman handing him betel chewing.
(‘ukāsha *al-Tṣawir Maghūli al-Islāmī fī al-Hind*, pl. 6)



Pl. 4. Part of a carpet with floral motifs, preserved in the Museum of Islamic Art in Berlin.
(Bing, *Islamic Works of Art*, p. 49.)

Materials, technique and decorative styles used in the betel box (Pandan)

Raw materials

The betel box or Pandan being analyzed is made of brass, as stated in the museum's registration, but traces of silver can be seen in some of the engraved cavities on the surface of the betel box, which confirms the use of silver on the box, however it seems to have faded over time. Raw materials used in the manufacture of metal artifacts in general and in

²⁰ Note that nuts provide humans with many calories and in this case also act as stimulant for man.

²¹ Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, p. 263.

²² ‘ukāsha (Th.), *al-Tṣawir Maghūli al-Islāmī fī al-Hind*, p.23, p.6.

the manufacture of betel boxes in particular varied, including silver, brass, bronze²³, iron and others.

As for the copper-plated metal, used on the betel box, is considered one of the oldest metals known to man. It is redish pink metallic copper known as red copper, and is be easily welded.

Brass is one of the most commonly used minerals, which functions as a betel preservative. The most common raw materials used to make the Indian boxes were brass plated with tin and gold²⁴ and/or silver which is the most common, followed by the use of white, red, green and blue enamels on brass and gold; gold inlaid with sapphires²⁵, emeralds,²⁶ diamonds²⁷ and black nilo placed in the decorations on the surface of the metal vessels.

Brass is one of the oldest types of minerals used, presumably due to its distinctive color, its ease of extraction from its ores, its malleability, and due to its susceptibility to oxidation, especially in areas characterized by moist atmosphere which leads to the formation of a toxic green or blue layer. Brass objects which are made for eating and drinking are given a layer of tin to prevent the oxidation²⁸, which explains why Pandan or other brass tools are coated with silver or gold or enamel etc.

The most common types of copper, used for making metals utensils, are red and yellow, the first type is relatively easy to cut and weld, and is easily formed by hammering and applied pressure; while the second type is even more malleable, and is formed when cold, but is cracked while hot. To increase its flexibility, it must be fermented until it appears dark red, then cooled slowly then dipped in water²⁹. This type of brass is used on the ribbing the lid and the base of the betel box or Pandan.

Silver plating, used in the manufacture of the betel box, was extensively used in metalwork in the Mughal era in India, especially betel boxes. The use of silver was also found in many metalwork attributed to the style known as Baydarī in Deccan. Perhaps its importance is due to characteristics; it is not opaque and its ability to be hammered, quite malleable, not affected by water and air, it does not oxidize when heated and exposed to oxygen, and it is a good conductor of heat and electricity³⁰.

²³ It is a mixture of copper and tin bronze knows when Muslims with white copper relative to its high proportion of white Tin.

²⁴ Gold is considered a master of metals and is used in the making of gold bars and other crafts or the crafts inlaying the gold by other materials.

²⁵ Some of the precious stones in the Holy Qur'an are mentioned, including sapphires. In the verse of Surat Al-Rahman in verse 58, where Allah said: "If they are sapphires and coral."

²⁶ Precious stones, such as emeralds and others, were more common and sourced locally in India during the Mongol-Indian period. The most famous of these stones are blue turquoise and agate of ancient gems and are used to inlay jewelry. The semi-precious jade stone is also used in the manufacture of precious jars and mugs of the rulers, and the use of this stone has been used in the decoration of the jewelry.

²⁷ Diamonds: It is the master of gems and is hardened in a transparent nature and has several colors, Indian diamonds are found in the sandstone, in the gravel and sands of rivers, Indian diamond mines are distributed in five groups located on the eastern side of the Deccan plateau.

Zaki ('Abd al-Rahman), *Al-Aḥjār al-Karīmah fī al-fan w al-Tarīkh*, pp.60,61,62.

²⁸ Al-ḥārithī, *Tūḥaf al-āwāniy w al-adwāt al-Madinīyah fī al-ʿaṣr al-uthmanī "Dirāsah fanīyah ḥadarīyah"*, p.20.

²⁹ Al-ḥārithī, *Tūḥaf al-āwāniy w al-adwāt al-Madinīyah fī al-ʿaṣr al-uthmanī*, p.19.

³⁰ Ziyn al-ʿAbidīn, *al-Maṣāgh al-Shaʿbī fī Miṣr*, p. 217 ; ʿabd al-Wāhid, *Qīṣat al-Maʿādin al-Thamīnah*, p.114 ; Al-ḥārithī, *Tūḥaf al-āwāniy w al-adwāt al-Madinīyah fī al-ʿaṣr al-uthmanī*, p.20.

Silver is called (Luna) or god of light (Diana), and it is also known as (lujin).³¹ In India, silver is often used in the manufacture of bracelets, or in the manufacture of some metal objects attributed to the Baydarī Style or metal objects such as betel boxes.

Technique style

The industrial techniques used in crafting metalwork during the Mughal era in India include engraving, incise, interlace, hammering, enamel and others.

As for our betel box, several industrial methods were used in making it. The most important method was casting, then engraving & incise to apply the decorations, and finally painting³² with silver.

As for casting, this method was common when manufacturing metalwork in large numbers. This method includes several steps starting with making the mold that determines the form, the method of work and components depend on the form. In our case that the metalwork is hollow requiring an outside and an inside mold, on the condition that the distance confined between the inside mold and outside mold matches the thickness of the metalwork to be set³³. This method developed to be known as the style of lost wax, where the manufacturer uses the inside mold of the collapsible material after freezing the metal, provided that the outer shape is similar to the metalwork in the cavity, then it is covered with wax as much as the required thickness of the metalwork, and then plastered with clay, softly at first and then with thick clay afterward leaving holes in the outer mold. Then the outer mold is dried and put in the fire until the wax dissolves and then removed from the oven. Finally, the molten metal is poured into it before it cools.³⁴

As for the betel box under study, only half a mold can be used using this method. However, this method must come after several stages until the final form, then it is taken out of the mold, keeping it clean and cool being mindful of external surfaces. It must be prepared carefully so that the engraving, incise and silver does not oxidize.

Engraving and incise are important methods used by metal craftsmen in the implementation of many floral, geometrical decorations and inscriptions. The craftsmen would draw the decoration by the pen, and then engrave the metal following the drawing with a steel edged metal pen called "Mahfar" tapped by either a hammer or a jack.

Engraving is used on metals that are of suitable thickness so that it can bear a sharp pen and hammering; copper and bronze are very suitable for this.

³¹ El-Sirjānī, *Fan al-Šāghah*, p. 57 ; Al-hamadhānī, *kitāb al-jawharatāyn al-‘atīqatāyn al-mā’ ‘atāyn min al-Šafrā’ w al-Baydā’ al-Dhahab w al-Fiḍā*, p. 72.

³² Turks call this industrial method (Tombak). Prior to the coating process, the metalwork must be cleaned well, because the existence of a strange atom on its surface prevents the adhesion of paint. Some researchers have suggested that the word "Tombak" may have moved to Turkish from the Malaysian language, as well as other languages in which this name was known in different versions. They also tried to return the origin of this word to Turkish, where the word was expressed in very close form in different parts of Anatolia. Some areas in the cities of Qayseri and Marash also use this word.

Batur, *Tombak Ustune Bir Arastirma*, p.24 ; Al-ḥārithī, *Tūḥaf al-āwāniy w al-adwāt al-Madinīyah fi al-‘aṣr al-‘uthmanī*, notes 1-2 p.65.

³³ Al-ḥārithī, *Tūḥaf al-āwāniy w al-adwāt al-Madinīyah fi al-‘aṣr al-‘uthmanī*, p.45.

³⁴ ‘abd al-Wāhid , *Qīṣat al-Ma’ādin al-Thamīnah*, pp.35-36 ; Al-ḥārithī, *Tūḥaf al-āwāniy w al-adwāt al-Madinīyah fi al-‘aṣr al-‘uthmanī*, p.46.

Incise is light, non-hollowed engraving on the surface of metal. It is used on solid metals, which are designed with intricate precise drawings and is complementary to engraving. It is also used for decorating small spaces or narrow borders that surround the decoration, and sometimes for floral decorations used as a background for a piece of writing contrasting the difference between engraving and incise; engraving is deep whereas incise is on the surface.³⁵

The researcher suggests silver paint was used on our Pandan because there is silver residue in some of the cavities, and painting brass silver was an extensively used technique for coating copper; copper oxidizes easily and therefore covered with silver and gold, thus blocking the brass from air contact.³⁶

Other industrial methods have also been used on betel boxes from the Mughal era in India such as the pressure method, interlace and punching, inlaying, and colored enamel³⁷.

Decorative styles

Mughal antiques have a variety of decorative elements. Mughal betel leaf Pandan had floral, and geometric designs and inscriptions, as is that case with our Pandan from the National Museum in New Delhi.

The floral motifs that appear on the metal box, as mentioned above, were centered inside an oval shape located in the middle of the top of the lid of the Pandan. There are five flowers with eight petals. The background stems have leaves, some of which are palm leaves, and the others had serrated leaves. Similar floral motifs appear on Indian Mughal rugs with palm leaves, serrated leaf plants, and multi-petal roses (typically with five petals) (plate 4)³⁸

Mughal rugs had a lot of flowers and plant leaves, especially flowers with three and five-petals, palm leaves, the sprocket leaf in various forms, and serrated spearheaded sheet (the length being greater than the width and pointed from the top, similar in shape to a spear, it may be serrated from the sides or from one side – half-serrated leaves).³⁹

In any case, the floral motifs on the metal betel box resembles the floral motifs shown on the Indian Mughal rugs, in addition to some floral motifs that appear in the marble work of Indian buildings. Some of the floral decorations in the Taj Mahal (pl.5) are similar to the

³⁵ ‘abdullāh, *Al-Tūḥaf al-ma ‘dnīyah al-Ṣafawīyah fī ḍaw’ al-Tūḥaf al-Taṭbiqīyah w Ṣwūr al-Makḥṭuwāt*, p. 120

³⁶ Al-hārithī, *Tūḥaf al-āwānīy w al-adwāt al-Madinīyah fī al-‘aṣr al-‘uthmanī*, p.46

³⁷ It was common in India in the Mughal era to use enamel on copper and gold in different colors (white, red, green, blue and daisy), There are also two methods of enamel (Cloisonné), which are decorative works in which enamel, glass or gems are separated by strips of flat wire placed on metal supports. The (Champlevé) method is filled with enamel colors on the surface Metal.

- Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, p. 263

The enamel is generally a semi-transparent glass material that is melted and used in metal decoration such as gold, silver and copper. Enamel can be given different colors with some oxides added to it. We get the white enamel with the tin oxide, the blue enamel with the cobalt oxide, and the red enamel with copper oxide.

- Mahmoud, *Ṣūwar al-Salāṭīn w al-‘ūmrā’ w rijāl al-dawlah fī al-madrasah al-qājārīyah "Dirāsah athariāh faniyah"*, p. 145.

³⁸ Bing (J.), *Islamic Works Of Art, Carpets And Textiels*, p.49 ; ‘abd al-Salam., *Al-sijād al-Maghwūlī al-Hindī min khilāl al-Tūḥaf al-Taṭbiqīyah w Ṣwūr al-Makḥṭuwāt*, pl.18 A.

³⁹ ‘abd al-Salam, *Al-sijād al-Maghwūlī al-Hindī min khilāl al-Tūḥaf al-Taṭbiqīyah w Ṣwūr al-Makḥṭuwāt*, pp.289 -290-291.

floral motifs visible on the metal box under study and many of the floral decorations shown in the miniatures of the Indian Mughal manuscripts (Pls. 6/7).

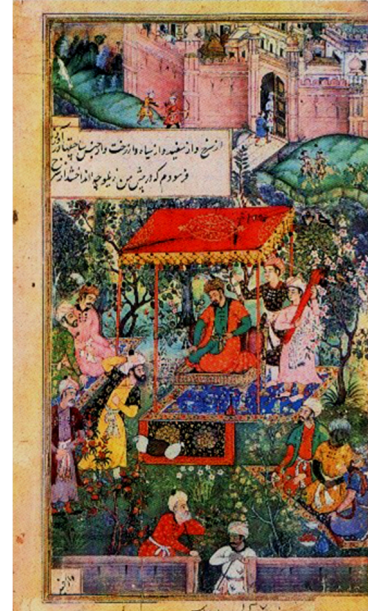
Pl. 5. A marble work of in the Taj Mahal, (Koch, The Complete Taj Mahal, pl. 241.) ▼



Pl. 6. Floral decorations shown in the miniature Babar Nama (Robinson, The Mughal Dynasties, p. 27.) ▼



Pl. 7. Floral decorations shown in the miniatures (Stronge, Painting for the Mughal, p.74.) ▼



In fact, some miniatures of manuscripts demonstrate the Indian affinity for floral decorations which is very likely due to India topography, full of rivers and cultivated fertile land, and the pervasive Iranian influences, especially Safavid, who also have an affinity for floral decorative motifs.

As for the geometric designs, it should be noted that Indians were well versed in the principles of geometric decoration; samples were found in the caves of Ajanta. During the Mughal era this tradition had already been highly developed and refined which is apparent in their architecture and applied arts.⁴⁰

The geometric design on the Pandan has a zigzag pattern, which includes small squares and is on the majority of the lid, the base, and in the middle of the lid. It is also on the center border but with a chevron pattern, while the other borders came out of small squares.

In fact, the zigzag pattern does not only feature on Indian Mughal metal boxes (Pandans), it also appears on many other metal objects, especially on Indian jewelry that adorns the arms. One example is currently preserved in the Victoria and Albert Museum in London – the Bazobend⁴¹, worn on the arms and named Vanki because its design has a V-shaped

⁴⁰ Swarup, *Mughal Art – A study in Handicrafts*, p30.

⁴¹ Bazobend: A word of Urdu consisting of two sections, the first section (pazo) means arm, while the second section (bend) means necklace or chain.

Kirānoui (M.W.), *al-qāmūs al-jādīd, ardw- 'arbī*, p. 93.

It is an bracelet worn in the arm, and is similar in function with antagonists or demalage.

- Fairoūz el-Din(Maulana), *Fairoūz al-lghāt*, p. 151.

-El Shawki (Ahmed), *tasawir almar'at fa almadrasat almughwalia alhindiati*, p.283.

pattern⁴². This design is famous in South India⁴³, and a particular favorite for women in Mughal India (Pl. 8).



Pl. 8. V-shaped pattern, “Vanki”
[<http://collections.vam.ac.uk/item/069624/vanki-armlet-unknown>]



Pl. 9. A zigzag pattern, the Dome of the
Tarābāi al-Sharīfy,

The zigzag pattern also appears on rugs shown in Indian Mughal manuscripts consisting of several broken lines resembling sea wave.⁴⁴

It should be noted that the Mamlūk Dynasty in Egypt also had a preference for the zigzag pattern, known as *al-dālīyah* according to Mamlūk archives. Perhaps one of the most impressive examples is carved on the stone domes in this era, especially the Dome of the Tarābāi al-Sharīfy⁴⁵ of the era of Sultan al-Ghūri (Pl.9). There is a strong likelihood that there is a relationship with the Egyptian Mamlūk artistic methods, especially on metalwork⁴⁶ later appearing on some of the Mughal Indian metalwork. Perhaps the reason for their emergence is the extent of artistic prosperity in the Mamlūk metalwork industry⁴⁷ as well as Persian influence, as previously cited.

⁴² <http://collections.vam.ac.uk/item/069624/vanki-armlet-unknown>.

⁴³ Krishnan –Kuma, *Dance Of The Peacock, Jewellery Traditions Of India*, p.182.

⁴⁴ ‘abd al-Salam, *Al-sijād al-Maghwālī al-Hindī min khilāl al-Tūḥaf al-Taṭbiqīyah w Ṣwūr al-Makḥṭuwāt*, pp.297, 298.

⁴⁵ Prince Tarābāi al-Sharīfy, the Mamlūk sultan al-’ashraf Qāyṭbāy, had many exploits, the last of which was the head of the coup of the deputies during the reign of Sultan al- Ghūri (died in 917 AH / 1511) at the age of seventy. His funeral was famous; Sultan al-Ghūri came down from the castle and prayed for him in the small mosque (mūṣalā Sabīl al-mū’aminī) for his funeral. He left a lot of money, horses and weapons, which was confiscated by al-Ghūri after his death. He was buried in his dome built in bāb al-Wazīr in 909 AH (1503) - Ramadān, “qūbat w Sabīl al-amīr Tarābāi al-Sharīfy, bi-bāb al-Wazīr bil-al-Qāhirah,” pp. 216-220.

- ‘ilwan, “Ribāṭ Uzdāmī bi-mnṭaqat Bāb al-Wazīr-bi-al-Qāhirah 900-909Ah/1494-1503AD, Dirāsah athariāh m’ māriyah mūqarnah”, p.1213.

- Ibn Iyās, *Badā’i’ al-Zuhūr fī Waqā’i’ al-Duhūr*, p. 209.

⁴⁶ The Mamlūk era is considered one of the richest Islamic eras for metalwork manufacturing in Egypt and Syria. This was aided by many factors, including the migration of skilled metal workers from Iraq, Mosul and other East countries to Egypt, a result of the Mongol invasion. In addition, Mamlūk Sultans provided patronage for these craftsmen.

- El-Sayyed , “Tist bi’ asm khūnd al-kabīr jhat Qāyṭbāy”, p. 89.

⁴⁷ The flourishing of the technical metalwork industry in the Mamlūk era was influenced by the metalwork in the Ottoman court. James Allan and Julian Raby suggested that a group of Mamlūk metalmakers had set up a small factory in Bursa during the reign of Sultan Murad II. They made the inlayed artifacts according to the Mamlūk style, and the production of this factory was for royal use and export.

- Khalīfah, “T’thirāt Mamlūkīyah ‘uthmanīyah mutabādalah fī majāl ṣina‘at al-Tūḥaf al-ma’danīyah”, p.56.

The shape of the ellipse as an engineering form, which contains the floral ornaments on the Pandan, is relatively circular, both of the same geometric family, and both of which have many implications associated with the customs and traditions of the people e.g. a mantra against magic, eye and outlook, as well as a symbol of eternity, infinity and continuous movement. As the circle is symbolized by the planets, thus the shape of the ellipse is characterized by smoothness and comfort to the eye, It is noteworthy that the Ottomans, contemporaries of the Mughal Emperors, inherited from Byzantine art the engineering ellipse form, whom in turn inherited it from Sasanian art, famous for circle or medallion patterns.⁴⁸

One researcher mentioned that the ellipse is taken from the flame of the Zardashit fire Whereas the oldest example in Islamic art is a ceramic plate with metallic luster, preserved in the Museum of Islamic Art in Cairo, dating back to the 3th AH/9th AD.⁴⁹

Mughal Indian accessories also used the ellipse, for example the *dālīyah* of India from the 13th c. A.H (19th c.) used gold, diamonds, rubies and pearls, and decorated by inlays, which, incidentally, is to be auctioned as part of the Bonhams collection in London, Lot number 293⁵⁰. The elliptical medallion is engraved with surah Al-Ikhlās, a Qur'anic chapter (Pl. 10).

The ellipse also appeared in the miniatures of manuscripts, used as a frame for some portrait miniatures of Mongol Emperors. For example, a portrait of Emperor Shah Jahan dating back to 1628 and preserved in the Aga Khan Museum in Canada (Pl. 11).⁵¹

Pl. 10. ellipse jewelry *Dallāiyah*
[<http://www.bonhams.com>]



Pl. 11. An Ellipse-frame portrait ►
[<https://www.agakhanmuseum.org>]



It is therefore not surprising that the Mamlūk influence on some of the Mughal metalwork in the era appeared as it had already appeared in the Ottoman court.

⁴⁸ El-Faramawī (Essam), “Dirāsah jadīdah li- ba’ḍ Tṣawīr āl’uthmān fi ḍaw’ mafrash min al-nasīj Dirāsah athariāh faniā”, pp 381, 382,383 ; Ziyn al-‘Abidīn, *al-Maṣāgh al-Sha’bī fi Miṣr*, p.186.

- El-Banna , “Naḥḍān Fiḍiyan min al-‘aṣr al-‘uthmanī maḥfūẓān fi mathf al- Salam bi’Assuit ” Dirāsah w nshr”, p.89.

⁴⁹ ‘afīfi (F. S.), *Fan al-Zakhrafah al-Handasīyah*, pp. 239- 245.

⁵⁰ [http:// www.bonhams.com](http://www.bonhams.com).

⁵¹ <https://www.agakhanmuseum.org>

A comparative study between the betel box (Pandan) under study and other betel boxes preserved in international museums

The shape

The betel box (Pandan) has an elliptical shape resembling a shell, other boxes also had the same shape, but according to our research, we found very few examples of an elliptical shell-shaped brass betel box. However, one is preserved in the Ashmolean Museum in Oxford, which dates back to the 11th c, A.H (17th c.), from northern India (Pl.12).⁵²



Pl. 12. An elliptical shell-shaped betel box



Pl. 13. Octagonal betel box,



Pl. 14. A ball-shaped betel box

Source: Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, pp. 274, 95, 274.

The former betel box (Pandan) preserved in the Ashmolean Museum of Oxford is very similar to our Pandan because of its elliptical shape, the ribs at the base and lid, and because it is also made of brass. However, the Ashmolean Pandan differs from ours in regards to the floral and geometric decoration of both of them, and in the paints used – silver paint was used on our Pandan (from the National Museum of India), whereas the Ashmolean Pandan had red and green lacquer, which became black over time.

It should be noted that the shell form was not the only form, they also had cube, cylinder, and the octagonal forms (Pl.13), some of which had multicolored flowers or were ball-shaped (pl.14). Pandan have also appeared in the miniature of manuscripts, especially the octagonal form, which belonged to a Mughal prince, now preserved in private collection which dates back to 1700 (Pl.15).⁵³



Pl. 15. A miniature of a Mughal prince, (Zebrowski, 57.)



Pl. 16 A betel box like a cone or a warrior's helmet
[<https://www.pinterest.com/pin/292311832039180054/>]



Pl. 17. A Gold glazed betel box, (Zebrowski, 56)

⁵² Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, p. 274

⁵³ Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, pp. 57-95-274

The unique forms of these boxes were confirmed to have been made for the Mughal Emperors of India, for example, the Pandan, which, together with its lid, was shaped like a cone or a warrior's helmet, dating back to the Indian Mughal era (1780), with multi-colored enamel (Pl.16).⁵⁴

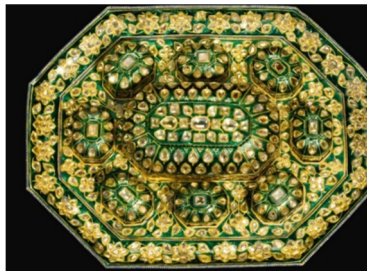
It also draws attention the existence of boxes (Pandan) with a tray to put the boxes (Pandan) on it, the two come as one unit, reminiscent in shape to Islamic mausoleums. One example includes a tray and gold plated Pandan with multi colors enamel preserved in the Hermitage Museum dating back to 11thc. A.H.(17th c.), attributed to northern India (Pl.17).⁵⁵ Another example is a tray of enameled gold with a large box surrounded by eight small boxes, all of which are inlaid with diamonds, dating back to the 12thc. AD and attributed to northern India (Pl.18).⁵⁶

Finally, the shape of our Pandan is distinctive and relatively uncommon. Also, the similarity of both the shape of Betel box and shells pearls are associated with habits and traditions of Indians that they refer to the cycle of fertility and development and its ability to cure some diseases.⁵⁷

Raw materials & Technique styles

Silver-plated brass was used as a raw material used to make our Pandan. Comparative studies between our Pandan and other betel boxes preserved in international museums or published in scientific studies reveal that brass was one of the most common raw materials used to the manufacture of betel boxes. The differences were usually in the coatings, materials, or in the general industrial methods used to produce the betel boxes.

While our betel box is plated with silver, and most of its decorations have been engraved, another betel box found in the Ashmolean in Oxford museum, is made of brass as well but coated with a lacquer (Pl.12).⁵⁸



Pl. 18. A tray of enameled gold with a large box surrounded by eight small boxes

[<http://www.sothebys.com/en/search-results.html?keyword=betel+nut+box>]



Pl. 19. A brass betel box

[<http://www.christies.com/lotfinder/Lot/a-tinned-brass-pandan-box-rajasthan-17th-century.aspx>]



Pl. 20. A brass betel box

[<http://www.christies.com/lotfinder/Lot/a-figural-brass-pandan-box-rajasthan-17th.aspx>]

⁵⁴ <https://www.pinterest.com/pin/292311832039180054/>

⁵⁵ Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, p. 56

⁵⁶ <http://www.sothebys.com/en/search-results.html?keyword=betel+nut+box>

⁵⁷ Prior (K.)-Admason (J.), *Maharaja's Jewels*, p.12 ; Eisaa , "al-Mar'ah fi al-Taswīr al- Maghūli al-Hindi w al-Mahli al-Mu'asr Dirāsah li-Malāmiḥha – Azīā' iha w Zīnatiḥā ", pp.532: 550 ; Thaban, "Al-Ḥijārah w Fan al-Mūdāwāh", pp. 11: 13.

⁵⁸ Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, p. 274

Other brass betel boxes were painted with different coatings, like the tin plated brass betel box preserved in a private collection attributed to Rajasthan, India, dating back to the 11th AH/17th AD c. (Pl. 19).⁵⁹ There is a silver-plated brass betel box preserved in a private collection attributed to Bhari in India and dating back to the 11th AH / 17th AD c. which has floral decorations as well as engravings of living organisms too (Pl. 20).⁶⁰

There is a gold plated brass with blue enamel preserved in the Victoria and Albert Museum in London, dating back to the 11th AH/ 17th AD c. attributed to northern India which also had engravings. There is yet another gold plated brass betel box but with blue enamel (Pl. 21).⁶¹

There are betel boxes made of brass which employ different industrial methods; unique ways of engraving or slitting or even paint, enamel or inlaying silver, gold among others which appear in Mughal India. , known as Repousse,⁶² is one such unique method which is the hammering on the decorations on the opposite side and executed on the various metalwork, including betel boxes. For example, the betel box made of brass preserved in a private collection, attributed to the Deccan dating back to the 11th c. AH/17th AD with circular engravings of Gods, realistic animals, fantastic animal motifs as well as floral decorations (Pl.22).



Pl. 21. A gold plated brass betel box, (Zebrowski, p.91)



Pl. 22. A brass betel box, (Zebrowski,p.271)



Pl. 23. An octagonal betel box, (Zebrowski, p.311)

The betel box industry is limited to brass; There is an octagonal, gold-plated, silver betel box preserved in the Victoria and Albert Museum, dating back to the first half of the 12th c. AH/18th c. AD and attributed to Lucknow in northern India (Pl. 13).⁶³

Decorations

Our silver-plated brass Pandan from the National Museum of India has an elliptical shape in the form of shell and is engraved with geometric and floral motifs; more geometric than

⁵⁹ <http://www.christies.com/lotfinder/Lot/a-tinned-brass-pandan-box-rajasthan-17th-century.aspx>

⁶⁰ <http://www.christies.com/lotfinder/Lot/a-figural-brass-pandan-box-rajasthan-17th.aspx>

⁶¹ Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, p.91

⁶² The method of Repousse is taken from the French word (Repoussee) and unfortunately this word was transferred without any Arabic term, Therefore, one researcher believes that the word "push" is the most appropriate Arabic term that can be called to this industrial method, because the decorations stand out on the thread of the light by means of sharp tools used for this purpose, whether the knock from inside to the outside and vice versa. Al-ḥārithī, *Tūḥaf al-āwāniy w al-adwāt al-Madinīyah fi al-‘aṣr al-‘uthmanī "Dirāsah fanīyah ḥadarīyah"*, p.72 ; Zahrān, *Funūn āshghāl al-Ma‘ādin w al-tūḥaf (taṭwī‘ -minā -lihām -talwīn)*, p. 202 ; Maryon, & other, *Metal Work and Enameling*, p.113.

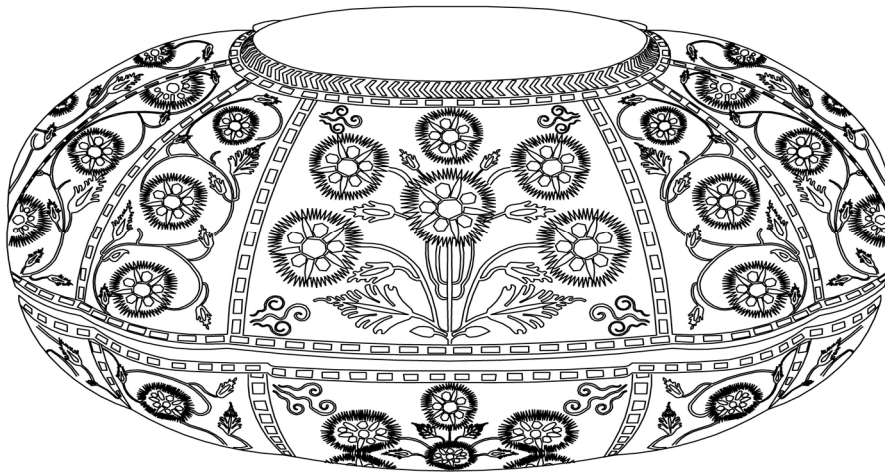
⁶³ Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, p. 95

floral. The most prominent of these geometric motifs have a zigzag pattern found on the base and the lid also found on another octagonal betel box (Pl. 23).⁶⁴

The visible floral motifs are located in the middle of the top of the Pandan lid in an ellipse within which there are five flowers, four of which are parallel and balanced on the vertical and horizontal axes. The fifth flower is located in the middle. On the background of these flowers, emerge from stalks, some leaves are serrated, and others are wrapped.

The inspiration of floral motifs the Indian Mughal artist had come from the Indian natural environment⁶⁵ on the one hand, as well as the function of the betel box, which is for preserving plant leaves on the other hand.

Our Pandan was not the only one with geometric ornamentation (Figs. 1a/1b, 2), rather there are others with similar floral and geometrical ornamentation with varying ratios of floral versus geometric. There is a similar Pandan preserved in the Ashmolean Museum in Oxford, dating back to the 11th c. AH/17th c. (Pl.12) which has a preponderance of floral ornamentation; the surface of the base and the polygonal cover are filled with floral stems; five-petal flowers and leaves emerging from them, while the geometric V pattern is limited to the frames separating the ribs, as well as the frame surrounding the ellipse in the upper half of the lid of the Pandan. (Pl. 11& Fig. 2).



Figs. 2.
A similar Pandan
of the example
under study

There is an example of the gold-plated brass octagonal betel box (with a tray) with a preponderance of realistic floral ornamentation with an arabesques motif from northern India dating back to the 11th AH / 17th AD c. (however, realistic floral motifs were more common in Mughal India). The floral decorations in this betel box were executed by

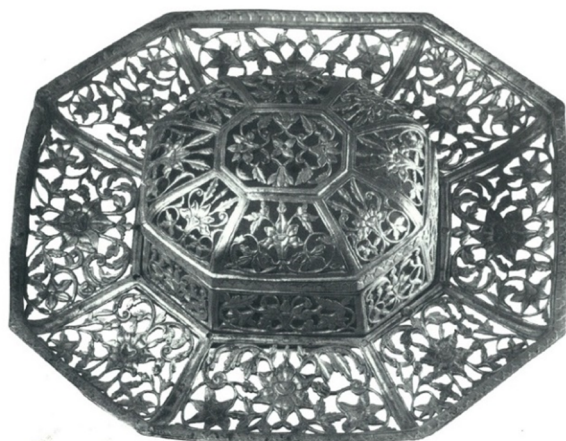
⁶⁴ Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, p.311

⁶⁵ It is worth mentioning that the floral decoration was common to all the Indian Mughal applied works, especially the rugs, where the floral decoration found heavily on the Indian Mogul rugs. The Indian artist filled the field of the rug and the outer border with a variety of floral motifs. Indian artists also painted the rugs in the miniature of manuscripts and sometimes depicted them in realism, as in nature, sometimes escaping from realism, and tend to change the appearance of creativity, diversity and artistic imagination. 'abd al-Salam, *Al-sijād al-Maghwūl al-Hindī min khilāl al-Tūḥaf al-Taṭbiqīyah w Ṣwūr al-Makḥṭuwāt*, pp.287-288.

interlace, this has a functional aspect where palm leaves remain fresh due to the presence of air (Pl. 24).⁶⁶

In addition to floral and geometric motifs (whether they appeared together or overlapping), there were also betel boxes with drawings of living beings as well as pictorial scenes as in the brass betel box plated with tin preserved in a private collection in Rajasthan, India, dating back to 11th AH c. (17th c.). Between the harmonious living beings motifs and floral ornamentation there is banquet scene, around the body, of men and women holding and drinking huge glasses of wine with pleasure and sitting on a simple rug and cushions – a scene from the Rajput region⁶⁷ – separated by cypress trees around the body (Pl. 19).⁶⁸

There is another example of combining living beings and floral motifs on a betel box, with a round tray, used for spices. It had a lid, that resembles a helmet, made of gilded silver and colored Champlevé enamel, preserved in the Museum of Country Arts in Los Angeles, USA, dating back to 1780, northern India. The betel box's surface is filled with brilliant symmetrical floral leaves; flowers and branches interlocking, as well as ducks, geese, pigeons, peacocks (Pl.16).⁶⁹



Pl. 24. An octagonal brass betel box with a tray, (Zebrowski, p.277)



Pl. 25. A brass betel box (Zebrowski, p.267)

⁶⁶ Zebrowski, *Gold, Silver and Bronze from Mughal Indian*, p. 277

⁶⁷ The Rajput is a term for the Rajput species, which includes about 11 million landowners organized by tribes of loyalty to the father, and their first home in northern and central India, especially in the ancient Rajputana province. They are considered as the successors of the warrior class in India. For more details see: - 'ukāsha(Th.), *al-Tṣawir Maghūlī al-Islāmī fi al-Hind*, footnote 7 p.42.

As for the Rajputi paintings, these paintings were executed by Hindus from the fifteenth century to the nineteenth century in the Rajputana region of Punjab and Himalayas. The paintings of this school were confused with the paintings of the Mogul school for many reasons, among them the remaining works of art Of this school converge with the Mogul school in the size of its paintings and the paintings of the schools are medium and close, As well as the presence of Persian and Mongolian influences in both schools. Although paintings of Rajput school have some Persian features, they are very different from the paintings of the contemporary Mughal school. Rajput's painters combine their ancestors' traditions with their Indian folk painting, so they invented a new model of Indian folklore. See: Coomaraswamy(Ananda K), "Rajput Paintings", p.315 ; 'ukāsha(Th.), *al-Tṣawir Maghūlī al-Islāmī fi al-Hind*, p.42. As for the serious scientific studies that deal with the paintings of the Rajasthan region depicted on the walls and its artistic methods and how to implement them and the Indian traditions and customs visible on these paintings see: Seth (M.), *Wall Paintings of Rajasthan*, National Museum, New Delhi, 2003

⁶⁸ <http://www.christies.com/lotfinder/Lot/a-tinned-brass-pandan-box-rajasthan-17th-century.aspx>

⁶⁹ <https://www.pinterest.com/pin/292311832039180054/>

Through these examples, it is clear that Mughal artists who designed the drawings executed on the betel boxes excelled in mixing the floral ornaments and living creatures, which derived inspiration from the natural Indian environment. Zaki Hassan says: "The Indian artist excelled in the drawing of animals and plants and was very clever in this field to a great degree of representation of nature and portraying the movement."⁷⁰

As for inscriptions, our betel box does not have any, the same is true for most betel boxes preserved in international museums and private collections, however, this does not mean that they never appeared. One example is a Tombak style betel box decorated with gold, preserved in a special collection dating back to 11th AH c. (17th c.), with arabesque floral decorations next to the inscriptions on the top of the lid (Pl. 25). The inscription reads:

Invoke Ali the manifestation of wonders.
Thou wilt find him a refuge in misery.
All grief and sorrow will soon disappear.
By the friendship [with God] Oh Ali!
Oh Ali! Oh Ali!

It is clear from the content that this is most likely a Shiah text, presumably attributed to the Shiite Sultans in Deccan, written in a Persian style⁷¹. The Indians used Arabic characters after the Islamic conquest of India under the first Umayyad Caliphate, by the leader Muhammad ibn al-Qasim, which replaced their Sanskrit characters⁷². Muslims in India did take an interest in Arabic calligraphy⁷³, however, the meaning of these inscriptions varied between religious, historical and theological.⁷⁴ Nevertheless, inscriptions on metal betel boxes were few in comparison to inscriptions found elsewhere in religious and/or civil buildings which date back to the same period.

Thus, we can conclude that the floral motif was very common for betel boxes, subsequently followed by geometric designs, then living creatures, and inscriptions.

Conclusion

This publication, on a silver-plated brass betel box preserved in the National Museum in New Delhi, India, is the first of its kind.

-It draws a clear and specific definition of pan or betel chewing, defined as a mixture consisting of many components, of which the most important are betel leaves, with varying proportions (based on the manufacturer and/or region) of areca seeds with lemon, spices, nuts, tobacco, and other substances. Pan has many benefits, with the exception of tobacco or narcotics. In all cases it is a part of the Indian culture and heritage. It was customarily placed inside metal betel boxes.

- Our research determined that the function of betel boxes, or Pandan, was limited to storing betel leaves or other components of betel nut, such as tobacco, nuts, spices and other substances. Because the main component preserved in these boxes was the pan or betel leaves, the name of

⁷⁰ Hassan, *Rūsūm al-Ḥayawān w al-Nabāt fī al-Taṣwīr al-Hindī al-Islāmī*, p. 565.

⁷¹ Zebrowski, *Gold, Silver and Bronze from Mughal India*, p.267.

⁷² al-Jabūrī, *Jamālyāt al-khaṭ w al-zakhrafah al-‘arabīyah*, p.65.

⁷³ Dāwud, *Al-Kitābāt al-‘arabīyah ‘ala al-‘athar al-islāmīyah*, p. 180

⁷⁴ Rajab, *Al-‘imārah al-Islāmīyah fī Madīnat Ajrā bi-al-Hind fī ‘aṣr ‘Abāṭirat al mughūl*, p. 299

these boxes is based on what they contain – Pandan in Hindi. Incidentally, there is a large number of these boxes, from Mughal India, still unpublished despite their prevalence.

-The paper concludes that the conch or shell like elliptical shape of our Pandan is relatively rare. One may assume that this form is related, perhaps, in some ways to the customs and Indian genetics in general, where the shell is associated with the Indians by the moon, which is linked to the cycle of fertility and the ability to heal diseases.

- It was established through the study that most of the betel boxes were made of brass with the use of other raw materials and industrial methods such as gold, silver, enameling, engraving and interlace and others. Brass was not the only material used to manufacture betel boxes, some betel boxes were made of silver, for example.

- The research determined the use of various industrial methods such as casting with molds, engraving, incising, enameling with silver, as well as other industrial methods in used on many betel boxes preserved in international museums and private collections.

This study showed the predominance of floral and geometric decorations on betel boxes. It also states the existence of animal motifs and inscriptions used by other betel boxes. In addition, we found that the floral motifs are similar to Mughal Indian rugs, as well as miniatures of the Mughal Indian manuscripts. We also found that geometric designs were popular with Indians, a practice dating back to ancient times, and reached a high degree of excellence apparent in their architecture and applied arts. Our betel box also reflected this skill with geometric designs; the oval shape, zigzag, and chevron also found on accessories, and rugs of the same era.

Recommendations

The article recommends the officials of the National Museum in New Delhi to work out a diorama method that shows how to grow the betel plant and collect it, and to clarify the stages of its manufacture and processing as well as chunum paste, and even put it in the Pandan.

In the same context it also recommends to create a diorama showing how to make and decorate Pandans, and lastly, to display miniatures of manuscripts showing such boxes.

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