

Study and analysis of National Museum of Ras Al Khaimah collection for future generations accessibility

Nagmeldeen Morshed Hamza ^{1, 2, 3}

¹ National Museum of Ras Al Khaimah, Department of Antiquities and Museums, Ras Al Khaimah, United Arab Emirates

² Department of Earth Sciences, Sapienza University of Rome, Rome, Italy

³ Department of Environmental Biology, Sapienza University of Rome, Rome, Italy

ABSTRACT

The National Museum of Ras Al Khaimah reflects an eventful history, displaying a rich diversity of traditional architecture. Today, the 'Late Fort' exhibits historical, ethnographical, and archaeological material relating to the emirate of Ras Al Khaimah and provides an interesting insight into the history and traditions of this area.

The formulation of history through the study and preservation of the museum collection is a dynamic and collaborative process that applies a multidisciplinary approach, ethical considerations, and a commitment to sharing the richness of human history with current and future generations. The research focuses on and sheds light on the role of technology in studying, investigating, and preserving collections, which can extract information that formulates their history. Different cases here represent different time periods: the Daggers, two cases of the Khanjar/dagger, specifically of the Jambiya type, herbarium collections, and pottery from the National Museum of Ras Al Khaimah are valuable resources and crucial evidence for formulating and understanding the history, culture, and for research, education, and inspiration when studying and preserving it. The research offers different methodologies used to approach the three cases. The study of daggers shows that examination prior to treatment can help to understand the historical significance of the objects and their technology. The digitization of the herbarium, allow data sharing of images and make them accessible to botanists and others around the world. Two potteries from a modern excavation, has being subjected to different

analyses if the sediment found inside them. By adopting integrated study and preservation approaches, using technology and the correct methodology, we can extract more information, extend the lifespan of collections, and make them more accessible and sustainable.

Section: RESEARCH PAPER

Keywords: documentation; investigation; analysis; digitization; herbarium; dagger; identification; conservation; pottery; flotation

Citation: N. M. Hamza, Study and analysis of National Museum of Ras Al Khaimah collection for future generations accessibility, Acta IMEKO, vol. 13 (2024) no. 3, pp. 1-6. DOI: [10.21014/actaimeko.v13i3.1797](https://doi.org/10.21014/actaimeko.v13i3.1797)

Section Editor: Fabio Leccese, Università Degli Studi Roma Tre, Rome, Italy

Received February 25, 2024; **In final form** July 27, 2024; **Published** September 2024

Copyright: This is an open-access article distributed under the terms of the Creative Commons Attribution 3.0 License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Corresponding author: Nagmeldeen Morshed Hamza, e-mail: nagm.h@museum.rak.ae

1. INTRODUCTION

Ras Al Khaimah Old Town is situated in the northernmost emirate of the United Arab Emirates (UAE). Ras Al Khaimah is positioned along the eastern coast of the Arabian Peninsula, overlooking the Arabian Gulf (also known as the Persian Gulf). The area is characterized by its historical significance, traditional architecture, and cultural heritage. The National Museum of Ras Al Khaimah was an 'Early Fort' that existed inside Ras Al Khaimah Old Town, near the Mohammed bin Salim Mosque. According to ancient documents and letters, the fort destroyed twice: in 1621 by the Portuguese and in 1820 by the British. Serving as a residence for the ruling family, it was eventually given up around 1920 for a bigger one, just 700 meters to the

south. This 'Later Fort' had originally been built between the British attacks of 1809 and 1819 outside the town wall and Ras Al Khaimah Old Town. Drawn on the ancient British maps as a squarish defence structure strengthened with three round towers and a single big tower; it was eventually developed into a larger fortified complex. It served as the residence of the ruling Quwasim family until 1964, when the late Ruler, H.H. Sheikh Saqr Bin Mohammed al-Qasimi, moved to a modern building in Mamoura. Later, it became a police headquarters and a prison before it was finally converted into the National Museum in 1987 to start a new adventure, but this time with collection [1].

The National Museum of Ras Al Khaimah showcases a great range of traditional architecture while reflecting an adventurous past that has been progressively expanded over time. The 'Late

Fort' offers an intriguing look into the past and customs of this region and currently displays historical, ethnological, and archaeological artifacts related to the emirate of Ras Al Khaimah.

The museum design, like all other traditional houses in Ras Al Khaimah Old Town, the 'Late Fort' was originally constructed from coral stone, a fossil building material originating from the sea. The massive rectangular tower represents the oldest part of the 'Late Fort'. It originally served as a single defence tower and, unlike today, stood outside the perimeter wall of Old Town Ras Al Khaimah. While its foundations and lower parts originate from 1809-1819 all further additions took place after the peace treaty was signed with the British in 1820 [2].

Today, the 'Late Fort' is an interesting conglomerate of two-story buildings surrounding a central courtyard. The big rectangular tower is still the most impressive feature, and a smaller tower occupies the opposite corner. Another prominent building is the wind tower, representing the traditional 'air conditioning of the past. Its open sides are designed to catch the breeze from any direction and funnel it down into the room below, keeping it cool and ventilated, especially during hot summer months. Desired, the wind tower could be blocked with matting or specially cut pieces of wood during the winter, when the weather was much cooler with occasional rainfall [3].

The museum gallery in the Late Fort is the rooms situated around the inner courtyard garden with antique wooden doors with traditional carved designs, open to the public. The artifacts and collections were partly donated by members of the ruling Quwasim family and residents of Ras Al Khaimah. Archaeological excavations, surveys, and various scientific research projects undertaken by the Department of Antiquities and Museums have provided further material and significant information about the culture and traditions of the area [4].

2. METHODOLOGY OF CONSERVATION AND PRESERVATION

2.1. Study cases

Three cases are discussed: two daggers, an Herbarium collection, and pottery from a recent excavation. The objects were kept in museum storage and selected to receive preservation, restoration, and conservation treatments for future display in the museum gallery for the first time. The daggers underwent a thorough examination process to determine their material composition, historical significance, and current state of preservation. Digitization of herbarium collection involves converting the physical state of plant specimens and associated data into digital format for preservation and accessibility. The potteries combine different methods of flotation, sieving, handpicking, and microscopic identification, providing valuable insights into the types of remains separated from the pottery's contents.

2.2. Two daggers (RAK 430, RAK 11584)

Daggers in the form of Khanjar or Jambiya are traditionally worn by men for ceremonial occasions. It is a specific type of dagger with a short, curved blade with a medial ridge attached to a belt made of textile and/or leather, usually worn around the lower abdomen. It originated in the Middle East and the Arab world. Craftsmen have excelled in their manufacture and made it full of fine artistic inscriptions and decorations that made it an expensive masterpiece.

The two-dagger consists of a curved, double-edged blade, usually made from fine steel that does not seem to corrode or oxidize to form rust. The hilt or handle is the most important



Figure 1. Two daggers RAK 430, and RAK11584.

part and holds the most value. Being the most valued rhino horn made. The hilt or handle is a flattened and ornamented piece, at the centre of the pommel and on the base, with two small circle disks of copper, silver, or gold that look like old coins. The hilt or handle of horn decorated from the front with many holes inlaid with silver.

The sheath where the steel blade is stored, made of ivory or wood, and covered with metal, cloth, or leather. Sheaths are of two types: Al-Hashidi, which is characterized by the small angle of curvature at the back of the sheath and whose shape resembles the Arabic letter L; and Al-Bakili, which is in the form of the Arabic letter R and is like the scabbard of a sword. the belt on which the scabbard is generally permanently secured. The full jambiya outfit is not considered complete without such a belt. The belt is usually worn around the lower abdomen. The belt is made of leather and decorated with leather strips in different colour while the support is made of textiles and decorated with embroidery.

The main problem with the two daggers is that there is no data about them, and the hilt of the dagger RAK 430 was broken. The methodology started first with the aim of extracting all possible data with the aid of a high resolution digital microscope to search for the significance of the two objects.

Photographic documentation was applied to record the state of preservation of the objects and to document in detail all the jambiya components (Figure 1). Digital documentation was also applied using AutoCAD 2D software to obtain a digital facsimile of the original object (Figure 2 and Figure 3). A microscopic image using a dino-lit portable microscope was able to get deep magnification for the object components in different areas.

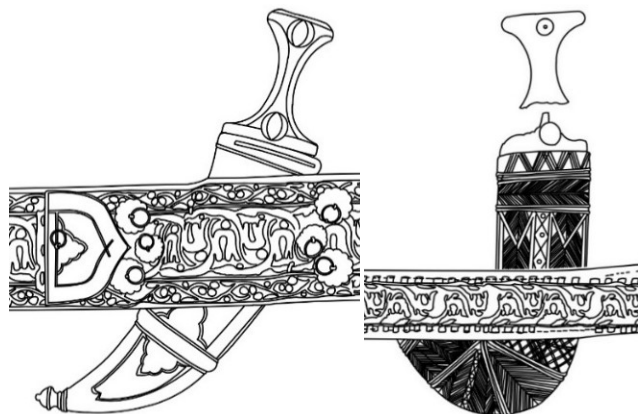


Figure 2. Diagram of object RAK 430, RAK 11584.



a)



b)

Figure 3. a) Gold circle / flower diameter 1.8 cm, Christ standing with sixteen stars around; b) A digital facsimile copy from the visible traces of the golden circle.

Significance of the objects

The study of the decorated gold circle or flower, in the form of circular golden coins, indicated this circle contains a significant sign: Christ standing with sixteen stars around and text in the circle frame: SIT T XPE DAT QTV REGIS ISTE DVCA

This decorated circle may be affected by or come from medieval art (Figure 4 and Figure 5). This metal circle is like a gold coin minted by the Republic of Venice in 13th century. The face of Christ is very simple: a circle with three dots inside an arc above it.

As the hilt or handle is the most significant part of the dagger, it was important to identify the type of material which that hilt is made of. A microscopic image using a dino-lit portable microscope was able to identify the type of horn, which proved that it was made from rhino horn. This was clear from the microscopic images of the internal structure, intertubular matrix, and horn tubules of the rhino horn (Figure 4) [5].

The identification of a rhino horn in the hilt or handle of this jambiya suggests its association with the Al-Saifani type, and an age ranging between 400 and 1500 years typically falls within the late antiquity to the medieval period. and it is invaluable with the passage of time. The other hilt, according to microscopic investigation, is not made from rhino horn. Due to the activities of animal rights organizations to protect rhinos for fear of their extinction and the ban on international trade in rhino horn

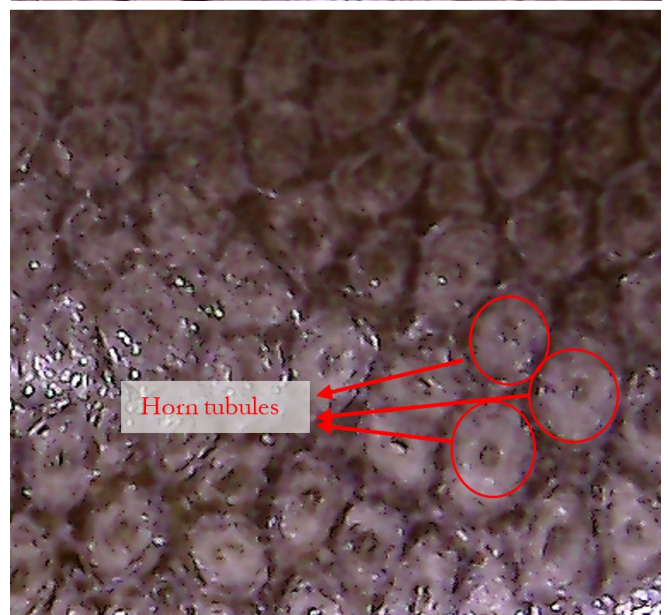
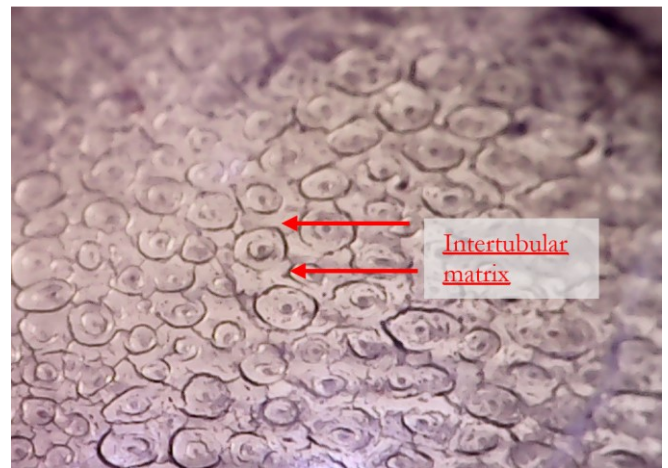


Figure 4. Microscopic image for the Internal structure of rhino horn.

regulated by the Convention on International Trade of Endangered Species (CITES) in 1977, imports of rhino horn have been banned [6].

Sheath

The sheath shape in the two daggers was different. The dagger RAK 11584 type of sheath is known as Al-Bakili, which is in the form of the Arabic letter R and is like the scabbard of a sword. The sheath in dagger RAK 430, known as Al-Hashidi shape, resembles the Arabic letter L (Figure 5). The belt decorative motif is similar to the type known as Kepsi (Figure 6). The names given to the sheath and motif are according to the name of the family who created the design.

2.3. Herbarium collection

The Ras Al-Khaimah National Museum Herbarium houses collections acquired through collections of Mrs R. E. Ash and identified by Mr A. G. Miller.

The collections comprise five files, which contain the specimens in alphabetical order according to their family names (Figure 7). Each specimen, mounted on an individual card, shows a pressed example of the flower together with a photograph of the plant in its natural habitat. The details of each specimen include name, family, geographic coordinates of location, and a reference number.

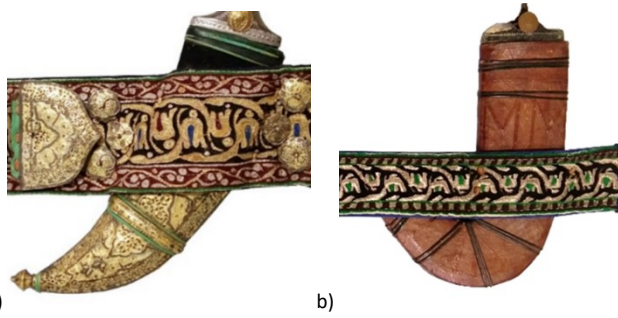


Figure 5. a) Sheath from type of Al-Bakili, shape resembles the Arabic letter R; b) Sheath from type Al-Hashidi, shape resembles the Arabic letter L.



Figure 6. Belt decorative motif are similar from type known as Kepsi.

The primary issue with the collection was the absence of data from the three working notebooks used by the collector. The identification sheets for the specimens created by Mr. A. G. Miller of the Royal Botanical Gardens in Edinburgh, Scotland, were missing from the collector's working notebooks, which provide the following details: collection number, name, Arabic, family, location, coordinates, habitat, description, and usage; this is displayed, for instance, as R. E. ASH 169. As R. E. ASH 169, this is demonstrated. This number appears as REA169 on the specimen and working notebooks on the specimen card.

Duplicates of this collection are held at the royal botanical gardens, Edinburgh, Scotland, the herbarium at the Oman national history museum, the ministry of national heritage and culture, Muscat, the sultanate of Oman, and on the 18th of May 1992 at the national museum of Ras Al Khaimah.

This herbarium collection was kept at the national museum of Ras Al Khaimah from 1992 until 2023 without any sorting for data or preservation.

Collection preservation strategy

The main aim of the preservation of the herbarium collection was to create a computerized catalogue of the collections to make them available for scientific studies and research, allowing scholars from all over the world to obtain information upon their request (Figure 8).

The museum organizes guided tours for individual users as well as for schools of all levels to see the collection, design an exhibition, and participate in study days focused on both academic and popular science; it also participates in projects aimed at the dissemination of scientific culture and finally promotes editorial activities aimed at disseminating knowledge of the flora.

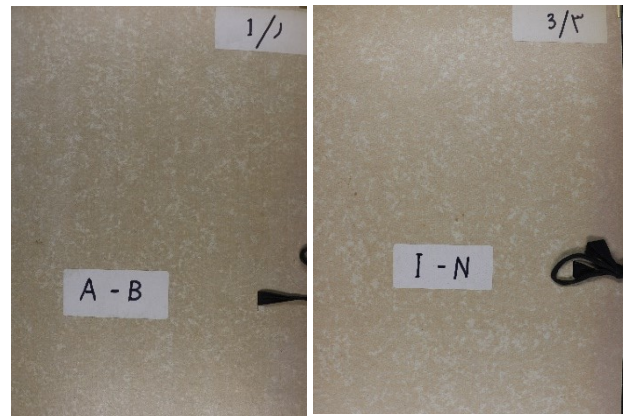


Figure 7. Files in which are contained the specimens.

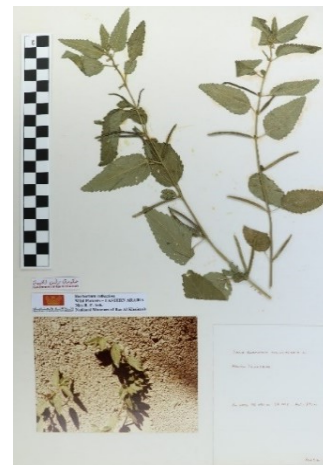


Figure 8. Example of the computerization and digitization of the collections.

Computerization and digitization of the collections

The computerization and digitization of the collections were the first procedures applied. This digitalization allowed us to identify 34 families and 78 species. It was followed by designing a digital sheet for each file in the fifth file (Figure 9). Plants are described, identified, and catalogued using specially prepared cards for each specimen that contain all the information that was lost in the loss of the collection notebooks.

In the designed card for each specimen, an ID number was generated consisting of a serial number, the first alphabetic of the family, the two-starting alphabetic of the specimen, and the date of collection (Figure 10).

Digital innovation will allow the sharing of images and data between countries, making this information more accessible to botanists and others around the world.

Finally, we are building an electronic herbarium Catalog containing images of the specimens, information taken from their collection labels, and some new data that was added for the sustainable development and systematics of collection [7].

2.4. Excavation materials

Two big pottery jars from a recent excavation were discovered at the archaeological site Al Hudaibah, Ras Al Khaimah (RAK), United Arab Emirates (UAE). The two jars were moved from the archaeological site to the museum laboratory to receive conservation. The two jars were filled with sediment from the excavation site. The methodology applied started with an analysis of the preserved sediment and was employed to recover and



Figure 9. Example of the computerization and digitization of the collections.


 National Museum of Ras Al Khaimah Herbarium collection	
Family:	ACANTHACEAE
Barleria Proxima	Lindau
Common name:	
Collector/Expedition:	Mrs R. E. Ash.
Identifier/s:	Mr A. G. Miller
Collection number:	169
Collection date:	6 th October 1984
Filing/ Herbarium region:	Arabian Peninsula
Country of origin:	
Co-ordinates:	16.538 N 53.465 E Alt.s.1
Collecting locality:	
Habitat:	
Description:	
Kind of specimen:	HERBARIUM SPECIMEN/SHEET
Number of sheets:	1
ID:	003-A-Ba-19841006
Name details:	Ann. Ist. Bot. Roma 6: 72 (1896). Ethiopia, Djibouti, N Kenya. Oman, Saudi Arabia, Yemen.

Figure 10. Example of specimen new card.

analyse any materials or remains to be found. Sorting and grouping the samples from the sediments inside potteries was the aim of the initial task (Figure 11).

The materials collected from the flotation of sediments from potteries were carefully transferred to trays or containers for further analysis. The collected botanical materials are dried and sorted under controlled conditions. The materials are classified as follows: pottery shards, fragments of glazed pottery, glass fragments, archaeobotanical remains, seashells, and large group of bones (Figure 12).

The investigated and analysed remains provide valuable insight about past societies and the site itself. The glazed fragments identified seem to have a relationship with the glazed dishes from the RAK collection, and the bone remains identified as fish bones might be for SCORPAENIDAE and/or SALMONIDAE most probably for *Sebastes marinus* and *ncorbynchus keta* [8], [9]. Although the excavation site was far from the sea, these findings can indicate that the site was close to the sea in the past or that jars were used to store food. The methodology of conservation for the two jars was not only preserving the objects but also more deeper into an important idea about their historical context. This is linked to the idea that integrated conservation approaches promote interdisciplinary collaboration.



Figure 11. The separated and classified remains from the potteries content.

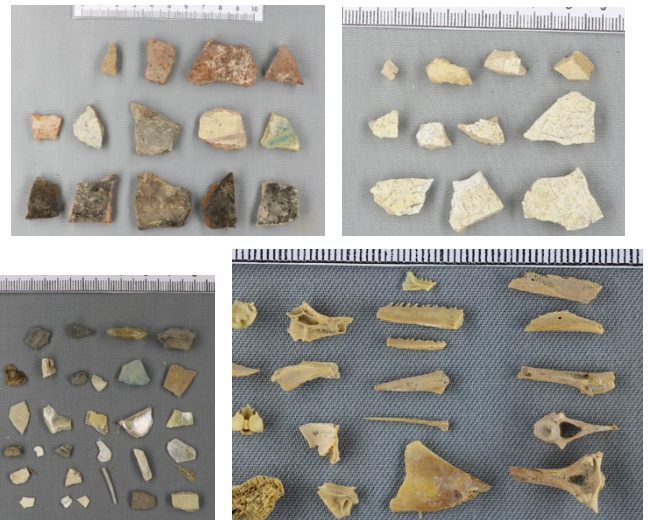


Figure 12. The separated remains after flotation.

3. DISCUSSION

Preservation and conservation of collections involves not only on practices to mitigate risks and maintain the integrity of collection, but also to disseminate of knowledge and facilitate the exchange of ideas, fostering collaborations within the scientific community. Make research findings accessible. serve as an archival record of scientific progress and research developments over time. providing a reference point for future researchers. This discussion explores the importance of the preservation and extraction of data about heritage collections with limited resources. In the study cases presented, the two daggers allow to demonstrate how conservation is important when you identify the significant value of collections.

In herbarium collection, technological advancements offer new tools and methods for preserving collections, such as digitalization, which allows for the creation of high-quality replicas, reducing the handling of fragile objects while providing access to a wider audience.

The preservation of Ras Al-Khaimah's national museum collection presents a significant challenge. Working in direct contact with the objects and studying the debates and practices of the past while reviewing our own practices revealed that present-day conservation decisions integrate decisions for the collection's future sustainability. It was discovered that limited devices and materials, in combination with the condition or state of an object and past trends in scientific approach, affect an object's characteristics, even becoming part of it [10].

Our present-day conservation of the collection is not only the remedial intervention that was applied, but scientific

methodologies and laboratory applications are both advancing and have different approaches. The challenge for discovering a new information about collection and sorting its data can add more value to it.

4. CONCLUSION

Preservation and conservation efforts help safeguard collections, ensure their physical existence, and protect their unique stories and knowledge for future generations. Collections serve as valuable resources for research, education, and inspiration. By preserving and conserving collections, we can ensure that future scholars, students, and enthusiasts have access to these materials, enabling them to deepen their understanding of history, culture, science, and various disciplines.

Digitization initiatives make collections accessible to a broader audience, transcending physical boundaries. Online platforms, virtual exhibitions, and digital archives provide easy and remote access, ensuring future generations can explore and learn from collections.

Preservation and conservation are crucial for ensuring the sustainability and accessibility of collections for future generations. Conservation and preservation in museums have changed to adapt to changing technologies, scientific development, and philosophical approaches. By adopting integrated preservation approaches, using technology and the right methodology of preservation and conservation, we can extend the lifespan of collections and make them more sustainable.

5. FUTURE RESEARCH

The author suggests further investigation and analysis techniques, such as an optical microscope, for the identification of fibers and leather. X-ray fluorescence (XRF) is a non-destructive technique for measuring the elemental composition of metal parts and pottery shards. Spectroscopic techniques with the aid of high-performance liquid chromatography for the identification of dyes on textile parts and radiocarbon dating for the bone remains can establish a chronological framework for the site and gain insights into the temporal context of human occupation and activity. These techniques will enhance the accuracy and reliability of the results interpretation but will also contribute to its scientific dissemination and outreach policies. By incorporating cutting-edge scientific methods into the research and exhibitions, the museum can engage the public in a deeper understanding of archaeology, history, and cultural heritage. This approach fosters a greater appreciation for the significance of archaeological findings.

ACKNOWLEDGMENT

The authors would like to thank the National Museum of Ras Al Khaimah. I express my gratitude to General manager Mr. Ahmed Obaid Alteneiji General manager of (Department of Antiquities and Museums), Ms. Noemi Aniko Prazsmay and Ms. Fatema Almarzooqi.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

REFERENCES

- [1] A. M. Beisaw, Identifying and interpreting animal bones: A manual (Vol. 18). Texas A&M University Press.
- [2] K. Exell, Modernity and the Museum in the Arabian Peninsula. Routledge.
- [3] N. M. A. M. Hamza, M. Ishii, E. Shaheen, Conservation between scientific methodology and laboratory application: An integrated approach to past and present challenges, ICOM-CC 19th Triennial Conf., Beijing, China, 17-21 May 2021, pp. 1-7.
- [4] R. Haza, Ras Al Khaimah National Museum to reopen after six months. The National Museum of Ras Al Khaimah. Online [Accessed 19 November 2021] <https://rakheritage.rak.ae/en/pages/rakmuseum.aspx>.
- [5] T. L. Hieronymus, L. M. Witmer, & R. C. Ridgely, Structure of white rhinoceros (*Ceratotherium simum*) horn investigated by X-ray computed tomography and histology with implications for growth and external form. *Journal of Morphology*, 267(10), pp. 1172-1176. DOI: [10.1002/jmor.10465](https://doi.org/10.1002/jmor.10465).
- [6] J. A. J. Eikelboom, R. J. M. Nuijten, Y. X. G. Wang, B. Schroder, I. M. A. Heitkönig, W. M. Mooij, F. van Langevelde, H. H. T. Prins, Will legal international rhino horn trade save wild rhino populations? *Global Ecology and Conservation*, 23, Article e01145. DOI: [10.1016/j.gecco.2020.e01145](https://doi.org/10.1016/j.gecco.2020.e01145)
- [7] The Royal Botanic Gardens, Kew, Kew Herbarium Catalogue. Online [Accessed 22 August 2024] <http://apps.kew.org/herbcat/navigator.do>
- [8] Ras Al Khaimah Government Media Office. (n.d.). National Museum of Ras Al Khaimah Set to Reopen with Tamra (Date Palm) Exhibition - Ras Al Khaimah Media Office. Online [Accessed 19 November 2021] <https://www.rakmediaoffice.ae/en/media-center/press-releases/national-museum-of-ras-al-khaimah-set-to-reopen-with-tamra-date-palm-exhibition>
- [9] Department of Antiquities and Museums, National Museum of Ras Al Khaimah. Online [Accessed 19 November 2021] <https://rakheritage.rak.ae/en/pages/rakmuseum.aspx>
- [10] D. Yee Cannon, *Marine Fish Osteology: A Manual for Archaeologists*, Simon Fraser Univ Library, ISBN-13: 978-0864910837.