DIGITIZATION OF GANDHARAN ARTEFACTS

A DIGITIZATION CONCEPT

Antonio Amato, Frederik Elwert and Jessie Pons
Center for Religious Studies
Ruhr University Bochum

SPONSORED BY THE

Federal Ministry
of Education
and Research

RUHR
UNIVERSITÄT
BOCHUM

RUB

DIGITIZATION OF GANDHARAN ARTEFACTS
A DIGITIZATION CONCEPT

Antonio Amato, Frederik Elwert and Jessie Pons
Center for Religious Studies
Ruhr University Bochum

1 SUMMARY

The aim of the DiGA project is the digitization and cataloguing of a corpus of 1,791 Buddhist sculptures.[1] These originate from 13 Buddhist sites in the north-west of the historical region of Gandhara (present-day eastern Afghanistan/north-western Pakistan) and are currently kept in the Dir Museum in Chakdara and in the Mission House of the Missione Archeologica Italiana in Pakistan (hereafter MAIP) in Saidu Sharif (both in Khyber-Paktunkhwa Province, Pakistan, hereafter KP). The collections are particularly valuable because unlike many other collections of Buddhist art from Gandhara, the archaeological context of the objects is documented. They therefore provide a solid corpus for reassessing crucial research questions pertaining to the history of Buddhism and its visual expressions in the region.

2 DESCRIPTION OF THE COLLECTIONS

The project digitizes 1,791 Buddhist sculptures kept in two collections in KP. The largest is in the Dir Museum in Chakdara (Lower Dir district), and the second, smaller, is in the MAIP Mission House in Saidu Sharif (Swat district) in KP (see table 1). These collections are composed of statues of Buddhas, bodhisattvas, tutelary deities, donors, and devotees, as well as architectural elements and narrative reliefs illustrating events from the previous and last lives of the Buddha Siddhārtha Gautama (*jātakas*).

These sculptures were produced between approximately the second and fifth centuries CE in Gandhara, a historical region in present-day eastern Afghanistan and northwestern Pakistan. They were originally fixed on the various storeys of Buddhist stūpas or in shrines in the sacred area of Buddhist monasteries. The artefacts kept in Chakdara come from twelve ancient Buddhist monasteries located on the left bank of the Swat River (Shahkot-Talash zone):

Chatpat, Andan Dheri, Bambolai, Ramora, Jabagai, Barchoray, Macho, Nasafa, Damkot, Sha Shamsi Khan, Shalizara and Talash. The specimens preserved in the MAIP collection DiGA digitizes were excavated at the Buddhist site of Saidu Sharif, located about 50 km from the first group on the right bank of the Swat River (Jambil-Saidu zone).

Table 1: Overview of the collections

		Dir Museum	MAIP Collection
	Object count	1.444	347
Material	Mica slate	1.319	347
	Painted stucco	125	0
Storage	Exhibition	181 Objects in 23 showcases	—
	Magazine	1,263 objects on 14 shelves	347 objects in 28 baskets

3 SCIENTIFIC RELEVANCE OF THE COLLECTIONS

The bulk of Gandharan Buddhist sculptures was discovered during excavations which were not scientifically conducted and the circumstances of their entry in museum collections are often difficult to reconstruct (Errington 1987; Zwalf 1996). The intractability of archaeological remains is a serious difficulty with which scholars of Gandharan art and Gandharan Buddhism have had to contend. Unlike most collections, the majority of sculptures that this project offers to digitize (90%) are well documented. They were yielded during more systematic archaeological campaigns conducted by the Department of Archaeology, University of Peshawar and the Directorate of Archaeology and Museums of the Province of Khyber Pakhtunkhwa (hereafer KPDOAM) in the late sixties (Dani 1968–1969) and by the MAIP in the late eighties and nineties (Callieri 1989; Faccenna 1995). The archaeological reports provide information on the precise find-spot of most of the pieces (i.e. archaeological unit and stratigraphic layer) and the two registers of accession records of the museum (i.e. the original archive of the University of Peshawar archaeological mission and a new version updated by the museum) give not only archaeological information about the piece but also the date and context of its entry in the collection as well as its storage status within the museum.

Because their archaeological provenance is attested and because they stem from sites which belong to the same geographical area, the middle Swat valley, these sculptures form a coherent corpus which allows reassessing problems central to the study of Gandharan art and Gandharan Buddhism on solid scientific grounds. This project will therefore address three concrete scientific desiderata which are here outlined.

Firstly, the focus on the material preserved in the Dir Museum, Chakdara will further amend certain perceptions about Gandharan art. The work of the MAIP at the sites of Butkara I,

Figure 1: Map of Buddhist sites considered

ACCESSION REGISTER DIR MUSEUM CHAKDARA

Acc. No	Reg. No	Date of receipt	Material	Dimension	Source	Provenance	Location	Description	Photo
DMC 001	1	1975-76	Schist	58x43 cm	Purchased from Mr. M. Hashim khan of Ouch	Andan Dheri	Display	Buddha seated in reassurance pose over a small base, Left hand holding hem and right raised in reassurance pose, raised right hand displays a small chakra, hairs combed backward and a prominent ushnisha tied with a fillet halo decorated suggesting radiation of sun rays. Nose damaged, chin, left eye brow and right hand injured.	
DMC 002	2 A	1975-76	Schist	26x33 cm	Purchased from Mr. M. Hashim khan of Ouch	Andan Dheri	Display	Buddha head wearing moustache, open eyes, hairs comb backward in wavy lines and ushnisha tied with a fillet, halo showing incised circles flanked by tree branches hanging downwards.	
DMC 003	2 B	1975-76	Schist	14x10 cm	Exc. 1966	Andan Dheri Between Stupa no. 1 and 2 ②	Reserve No. 2	Detached hand probably in abhaya mudra with a square hole in center.	
DMC 004	3	1975-76	Schist	29x52 cm	Purchased from Mr. M. Hashim khan of Ouch	Andan Dheri	Display	Panel showing four swordsmen and two musicians, heads of two men and both females missing, the female musicians are wearing long dresses, anklets and are playing sitar, the swordsmen are carrying long swords round the waist.	

Figure 2: Accession Register of the Dir Museum, Chakdara
© Directorate of Archaeology & Museums, Government of Khyber Pakhtunkhwa

Saidu Sharif and Pāṇṛ has yielded sculptures displaying a diversity of stylistic expressions (Faccenna 1962–1964, 2001; Faccenna, Khan, and Nadiem 1993). Nevertheless, images displaying strong Hellenistic features are still considered quintessential to the Gandharan School and are still ubiquitous in museum collections, popularization works and scientific publications (Pons 2017). The discourse around the school remains, to a great extent, framed by the dichotomy between the Classical style of the Mediterranean West and the Oriental style of the Indian East. One reason for that is that the images which bear witness to the multiplicity of aesthetic idioms in Gandhara are stored in collections which are difficult to access, such as that of the Dir Museum in Chakdara. The preliminary stylistic analysis of the sculptures coming from the cluster of sites in the Shahkot-Talash zone on the right bank of the Swat River highlighted several local plastic expressions which contrast with the traditional perception of Gandharan art (Pons 2011). By focusing on the collection from the Dir Museum, the project will give visibility to objects that tell an alternative story about Gandharan art.

Secondly, working against weak historical evidence about ancient Gandhara, scholars have often interpreted formal and iconographic variations as chronological markers to reconstruct the history of the school or applied chronological schemes defined for the material from one particular sites (e.g. Butkara I) to the entire Gandharan production. This project proposes to isolate and map formal and iconographic variations in order to gain a better understanding of both the geographical and chronological logics of the school. The collection in the Dir Museum constitutes a coherent corpus to identify stylistic differences and understand their implications. Different levels of plastic expressions can be recognised in the production from the right bank of the Swat River and their relatedness can be reconstructed. It is therefore possible to identify the hand of artisans and circumscribe workshops, production centres, stylistic zones and sub-schools. The close examination of iconographic and formal motifs can provide information on patterns of exchange between the different sites within the Shahkot-Talash zone and beyond. Indeed, the sites in Lower Dir belong to the same network of zonal workshops as sites on the left bank of the Swat River such as Butkara or Saidu Sharif. The material from Saidu Sharif therefore provides a complementary sample to shed light on the art production in the region and to examine which sites are engaged in the exportation or importation of models and how this is telling of their significance as Buddhist centres. The identification of these diffusion patterns can complement the map of ancient communication roads in Gandhara (Pons, forthcoming). When crossed with external historical evidence, they also inform about the chronological sequence of the school. In this respect, the material from Saidu Sharif, which is properly dated, can help to reconstruct the chronological framework for the material in the Dir Museum.

Thirdly, the study of Buddhist manuscripts in Gāndhārī discovered in the 1990s in the region calls for a reassessment of the terms in which the relationship between the visual and literary sources is envisaged. The collection in the Dir Museum provides a valuable case-study to examine the interplay of the visual and textual media at the local level and shed light on

the dynamics of the diffusion of religious semantics such as narratives and belief systems. On the one hand, the comparison between iconographies and texts preserved in manuscripts or inscriptions can help identify enigmatic scenes carved on reliefs, and associate a particular illustration of a legend or sequence of reliefs with the narrative tradition of a specific Buddhist school. Ultimately, this can cast light on various Buddhist traditions coeval in Gandhara. On the other hand, the comparison between images from the middle Swat valley and textual corpora might also make dichotomies between the visual and textual media more apparent (e.g. divinities or stories depicted or mentioned may not always find a correspondence in the other medium). These discrepancies can in turn reveal moments when the visual and the literary narrative traditions follow different lines of development and invite to take into account dynamics other than texts at play in the formation and diffusion of Buddhist iconographies.

Unlike numerous collections of Gandharan sculptures, that of the Dir Museum at Chakdara is composed of objects coming from documented archaeological contexts and which stem from a delimited cluster of Buddhist sites. For these reasons, this collection constitutes a coherent and reliable corpus on which to reassess questions which are central to Gandharan art and to Gandharan Buddhism such as the perception of Gandharan styles, the inner geographic and chronological logics of the school, as well as the relationship between visual and textual media in the diffusion of Buddhist ideas.

4 DIGITIZATION CONCEPT

4.1 REPRESENTATION OF THE SET OF OBJECTS

The 1,791 objects to be digitized range in size from a few centimetres to circa two metres. They consist mainly of grey, blue or green mica-schist. A few are modelled in stucco and painted. The digitization is unproblematic from a conservation point of view. Both collections are manageable in terms of their size and the types of objects they contain. Buddhist artefacts of different types are therefore included in the digitization process.

4.2 DATA MANAGEMENT PLAN

LEGAL STATUS OF THE OBJECTS

The targeted objects are not themselves subject to copyright protection due to their age. Both collections are under the jurisdiction of the KPDOAM. According to a Memorandum of Understanding signed between the KPDOAM and the Ruhr-Universität Bochum in November 2017 and an Agreement signed between the MAIP and the Ruhr-Universität Bochum in April 2018, unrestricted access to both collections is guaranteed. This includes the right to publish the resulting data and make it freely accessible. The digital copies resulting from this project as well as the metadata will be marked as public domain via a CC0 license. Exceptions to this

are the 3D digitization, the production of which requires a significant personal contribution. These will be published under a Creative Commons Attribution (CC-BY) license.

DESCRIPTION STANDARDS AND AVAILABLE CATALOGUING INFORMATION

The digitization of archaeological objects comprises two levels: The digitization of the objects themselves and their indexing via the description of the objects by means of metadata. Some metadata are already available (in analogue form), while others have to be newly recorded in the course of digitization.

The digital copies and the descriptive metadata are recorded in a common infrastructure. After a detailed comparison of available options, the object and multimedia database heidICON was chosen. heidICON is based on the software easydb from the company Programmfabrik GmbH Berlin. heidICON differentiates on the description level between the physically and actually existing object as well as the image, 3D or text digitalisates linked to it. The metadata schema of heidICON for subject indexing is modelled on the harvesting and exchange format LIDO, which in turn is based on CIDOC-CRM as a reference model. This ensures the conceptual connectivity of the indexing to international standards and projects. heidICON is offered by Heidelberg University Library and is also made available to external project partners within the framework of the DFG-funded "Fachinformationsdienst Asien – CrossAsia" (FID Asien). As a high-performance infrastructure institution, Heidelberg University Library is the ideal project partner to make the availability of the project results reliably accessible to the scientific community even beyond the duration of the funding. In addition, the collection is embedded in a South Asian studies context through its integration into the FID4SA (i.e. Fachinformationsdienst Südasien), which increases its visibility in the specialist community and familiarity with the working tools.

So far, basic indexing information is available on the objects. It is recorded in excavation reports as well as in the form of registers which are kept in the Dir Museum and the MAIP Library. This information is of great importance for object-related research, as it contains details about the provenance and, in most cases, the archaeological find context. This allows to examine the geographic distribution of iconographic and formal motifs.

When recording the individual objects, the respective information from the registers is compared with the excavation reports and transferred to the metadata form of heidICON and mapped to the corresponding standardized fields. Table 2 shows an example of this, including the mapping in LIDO.

Table 2: Mapping of register information, heidICON fields, and LIDO paths

Register	Field: heidICON	Path: LIDO descriptiveMetadata/…
Serial No.	Registration number/Shelf mark	objectIdentificationWrap/repositoryWrap/ repositorySet/workID
Acc./Old No.	Former registration number/ Shelf mark	objectIdentificationWrap/repositoryWrap/ repositorySet/workID
Type of acquisition	Form of acquisition	eventWrap/eventSet/event/eventMethod/term
Provenance	Findspot	eventWrap/eventSet/event/eventPlace/place/ {placeID,namePlaceSet/appellationValue}
Dimension	Size/Dimensions	objectIdentificationWrap/objectMeasurementsWrap/ objectMeasurementsSet/displayObjectMeasurements
Description	Object description	objectIdentificationWrap/objectDescriptionWrap/ objectDescriptionSet/descriptiveNoteValue
Location	Context of discovery	eventWrap/eventSet/event/eventDescriptionSet/ descriptiveNoteValue
Remarks	multiple; e.g., Context (Provenance)	eventWrap/eventSet/event/eventDescriptionSet/ descriptiveNoteValue

FURTHER CATALOGUING OF CONTENT

The further indexing and preparation of the content of the objects has two dimensions: On the one hand, the addition of metadata on the objects themselves, and on the other hand, the art-historical description of the elements and motifs depicted.

The available indexing information from the museum inventory only covers a part of the relevant metadata, so that further metadata must be added when recording the objects. The classification of the pieces is based on the established conventions in the field, especially the *Repertorio terminologico per la schedatura delle sculture dell'arte gandharica* (Faccenna and Filigenzi 2007, hereafter *Repertorio*). Other sources are also drawn upon in order to constitute the controlled vocabularies for the project (Elwert and Pons 2020). This work can only be carried out by persons with expertise in the field of Gandharan art history. The information to be supplemented concerns, in particular: object/work type, classification (genre, subject group, stylistic classification, geographical classification, form), format/dimensions, material, technique, condition, date of origin and bibliographical references.

In addition to the descriptive metadata, the indexing of content is a special focus of the project. The focus here is on art-historical perspective. The iconographic and formal elements depicted are to be made accessible as comprehensively as possible in order to facilitate the

analysis across the whole collection and to enable linkage with other databases. An important element is the identification of the protagonists depicted, which is based on typical clothing and attributes. The identification of entire narrative scenes is also a focus of the standardised description. Technically, this is realized on two levels:

Firstly, the corresponding information is stored with the object-level metadata. For this purpose, the section "theme/subject" of the heidICON schema is used. This allows a formalized object description via controlled vocabularies. The following fields are particularly relevant: theme/subject, subject actor, subject place, and subject object.

Secondly, the elements of representation (i.e. persons, characteristic objects, architectural framing elements, decorative motifs) in the facsimiles themselves are annotated. For this purpose, regions on the digitized image are marked and annotated with controlled vocabularies. This is particularly important for the subsequent analysis of motifs, as it allows us to identify not only entire scenes but specific details in the image. This facilitates the comparison of stylistic features between various corpora.

Eventually, this enables the linkage of meta-data related to images with that of collections of Buddhist texts, such as those maintained by Stefan Baums and Andrew Glass on the website Gandhari.org. Shared vocabularies can be used to identify figures, but also entire scenes of narratives which have been handed down in both literary and visual form. For this purpose, we collaborate with the members of corresponding projects.

USE OF EXTERNAL LINKED OPEN DATA VOCABULARIES

The infrastructure of heidICON uses the *Gemeinsame Normdatei* (GND) for all fields that support a controlled vocabulary. This applies to location, subject term/object type, classification, material, technique, subject/image content as well as subject person/group/location/object. For geographical information, GeoNames is also used as a reference vocabulary. Iconclass is also available for art-historical indexing.

The established vocabularies such as GND and Iconclass are still inadequate in many areas with regard to Buddhist art. In order to ensure that indexing remains compatible, the project adopts conventions established in the field, such as the terminology published in the *Repertorio* (Faccenna and Filigenzi 2007). In order to define principles for the application of Linked Open Data to collections of Gandharan art and texts, Frederik Elwert and Jessie Pons established a Pelagios Working Group "Linked Data Methodologies in Gandhāran Buddhist Art and Texts". The group endeavours to expand the terminology that the *Repertorio* provides and focuses on four core vocabularies: Places, motifs, narratives, and persons (Elwert and Pons 2020). This controlled vocabularies is being published as Linked Data vocabularies and linked to existing vocabularies (e.g. GND, Getty Art & Architecture Thesaurus, Iconclass) via relevant mechanisms (such as SKOS or Linked Places). These vocabularies are then referenced from heidICON.

DIGITIZATION TECHNOLOGIES

When choosing the digitization technology for the selected collections of Gandharan art, 2D (photography) and 3D techniques (laser scanning, structured light scanning (SLS), structure from motion (SfM)/photogrammetry) can be considered. Technical, economic and pragmatic factors have to be taken into account when making a decision.

The majority of objects consist of reliefs, which can be regarded as 2.5-dimensional objects: Although they have a depth structure, they have a main, frontal view. Therefore, essential information can also be captured via a 2D digital image. This also facilitates data exchange: tools and protocols for annotation are well-established and standardized for 2D data, for example via the IIIF standard. For additional analysis, 3D digitization can be potentially advantageous. A complete 3D digitization of both collections within a reasonable time frame would require extensive automation with a corresponding technical set-up. The local situation on site does hardly allow this.

The project is therefore pursuing a hybrid approach: all objects are documented in two dimensions using digital photography. The reliefs in the collection are generally rectangular objects. They have a clear main view (from the front), which is added to the object record as the primary digital record. In addition, the five remaining sides (left, right, top, bottom, back) are documented photographically in order to be able to identify tool marks and sequences of reliefs. In addition, selected pieces will be digitized in 3D. There are on the one hand objects such as statues, whose shape can only be inadequately reproduced via 2D images, and on the other hand objects that are particularly representative of the various sites and stylistic groups. The latter can be used to examine characteristic features such as the rendering of perspective and production techniques. These features are of significant potential for understanding the production process of Gandharan sculptures and for identifying workshops (Vidale 2015; Brancaccio and Olivieri 2019). A maximum of 100 objects are planned for the 3D digitization.

Photogrammetric methods (SfM) are used to create the 3D models, as they do not require expensive special hardware on site and at the same time depict the shape as well as the texture of the object in great detail. This allows the application even under difficult field conditions. Agisoft Metashape is the leading software solution used for this purpose.

FILE FORMATS

The digitized files themselves are available as image files. A digital reference copy is produced from the original RAW format for further processing and archiving, in accordance with the DFG *Praxisregeln Digitalisierung* as uncompressed baseline TIFF in 24-bit color depth. This format is suitable for long-term archiving. Compressed versions are created from the master for end users (JPEG, compression 90). In addition to reduced versions for display, a full-resolution JPEG copy is available for download. For the 3D models created by SfM, the

Figure 3: Statue of the Buddha from Chatpat, Dir Museum, Chakdara, no. DMC-736

Figure 4: Statue of the Buddha from Chatpat with toolmarks on the back, Dir Museum, Chakdara, no. DMC-736

OBJ file format has become established for archiving. It is also important to archive the photographs on which the 3D reconstruction is based. From these, 3D models can be generated again as soon as technical advances in photogrammetry support this. The metadata are provided and archived in XML format according to the LIDO schema. heidICON also implements the provision of digitized files and metadata via IIIF APIs, which will enable cross-inventory applications in the future.

EVIDENCE IN NATIONAL AND INTERNATIONAL PORTALS

The digitized material created in the project will be made available to a wider user group via the relevant presentation and reference portals (in particular the German Digital Library (DDB) and Europeana). heidICON exports metadata in the XML standard LIDO, which is accepted by the DDB, and provides an OAI-PMH interface for harvesting. The data can also be forwarded to Europeana via the DDB so that the digitized material is also accessible internationally.

LONG-TERM STORAGE AND ADDRESSABILITY

The Heidelberg University Library, the operator of heidICON, ensures that the data is made available for a minimal period of ten years. In order to secure long-term archiving for 25 years, the data will also be published via a research data repository at the end of the project. RADAR is currently planned for this, but the results of the NFDI process will be taken into account. The long-term addressability of the digitized material and the metadata records is ensured via the DOI system. A separate DOI is assigned in heidICON for each object dataset and each digital record.

REFERENCES

Brancaccio, P., and M.-L. Olivieri. 2019. "Regional workshops and small stupas in the Swat Valley: an analy sis of the evidence from Gumbat, Saidu Sharif, and Panr." In *The geography of gandharan art*, edited by W. Rienjang and P. Stewart, 121–42. Oxford: Archaeopress.

Callieri, P. 1989. *Saidu sharif I (swat, pakistan). The buddhist sacred area. The monastery*. IsMEO reports and memoirs 23.1. Rome: IsMEO.

Dani, A.H. 1968–1969. "Excavation at Andhandheri/Ramora/Bambolai/Chatpat/Damkot." *Ancient Pakistan* 4: 33–151.

Elwert, Frederik, and Jessie Pons. 2020. "Linked Data Methodologies in Gandhāran Buddhist Art and Texts. Pelagios Working Group Final Report." Bochum: Ruhr-Universität Bochum. https://doi.org/10.13154/rub.148.125.

Errington, Elizabeth. 1987. "The Western Discovery of the Art of Gandhāra and the Finds of Jamālgarhī." London: School of Oriental and African Studies. https://ethos.bl.uk/OrderDetails.do?uin=uk.bl.ethos.262251/.

Faccenna, Domenico. 1962–1964. *Sculptures from the sacred area of Butkara I, Swat, Pakistan.* IsMEO reports and memoirs 2.2/2.3. Rome: IsMeo.

———. 1995. *Saidu Sharif I (Swat, Pakistan). 2. The Buddhist Sacred Area. The Stūpa Terrace.* IsMEO Reports and Memoirs 23.2. Rome: IsMEO.

———. 2001. *Il fregio figurato dello stūpa principale nell'area sacra buddhista di Saidu Sharif I (Swat, Pakistan).* IsMEO reports and memoirs 28. Rome: IsIAO.

Faccenna, Domenico, and Anna Filigenzi. 2007. *Repertorio terminologico per la schedatura delle sculture dell'arte gandharica – Sulla base dei materiali provenienti dagli scavi della Missione Archeologica Italiana dell'IsIAO nello Swat, Pakistan.* Rome: IsIAO.

Faccenna, Domenico, Ahmad Nabi Khan, and Ihsan H Nadiem. 1993. *Pāṇr I (Swāt, Pakistan).* IsMEO reports and memoirs 28. Rome: IsMEO.

Pons, Jessie. 2011. "Inventaire et Étude Systématiques des Sites et des Sculptures Bouddhiques du Gandhāra: Ateliers, Centres de Productions." Ph.D. dissertation, Paris: Paris-Sorbonne.

———. 2017. "Archaeology in Gandhāra: A Review of Research at the Crossroads of Disciplines." In *The diversity of classical archaeology*, edited by Achim Lichtenberger and Rubina Raja, 199–219. Studies in Classical Archaeology 1. Turnhout, Belgium: Brepols Publishers.

———. Forthcoming. "Gandhāran Arts and Tracks: A Reappraisal of the Stylistic Ties between the Swat Valley, Zar Dheri and Taxila." In *Proceedings of the 24th conference of the European Association for South Asian Archaeology and Art, 26 July 2018#.* Rome: ISMEO.

Vidale, M. 2015. "Trace di instrumenti e organizzazione del lavoro su elementi scopiti gandharici di Shaidu Sharif e Panr (Swat, Pakistan) conservati nel MNAO." In *Gandhara. Tecnologia, produzione e conservazione. Indagini preliminary sus culture in pietra e stucco del Museo Nazionale d'Arte Orientale ‚Giuseppe Tucci‘*, edited by S. Pannuzi, 35–45. Rome: Gangemi Editore.

Zwalf, Wladimir. 1996. *A Catalogue of Gandhara Sculptures in the British Museum.* 2 volumes vols. London: British Museum.