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# A Historical Geographic Information System (HGIS) of Nubia Based on the William J. Bankes Archive (1815-1822)

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## Abstract

The William J. Bankes Archive, Dorchester, is an impressive collection of original material concerning the archaeological, anthropological and natural heritage of Nubia and was amassed in the years 1815-1822. In the last two hundred years, many geo-human factors caused radical changes in the region. In a landscape almost untouched for centuries, the signs of the interactions between the ancient human communities and the natural environment were much clearer in Bankes' times than now. Digital humanities offer powerful tools to manage and visualize large amounts of data and GIS in particular is an effective form of relational database, where all items of data have a position on the earth. This paper presents the methodology and the preliminary results of a research project that aims at a draft reconstruction of ancient Nubia based on the Bankes Archive. Archaeological, historical, natural history and ethnographic information extracted from the documents will be georeferenced in the GIS. Original maps, landscape views and epigraphic copies will also be made available on-line.

William J. Bankes (1786-1855), an Englishman with conspicuous financial means and a voracious appetite for antiquities, travelled throughout Egypt and the Near East in the years 1815-1819 [Usick 2002]. During and after his stay, he hired a number of skilled draughtsmen to record almost all then-known archaeological sites in Egypt and Nubia. Until 1822, men in his service produced an impressive amount of diaries, accounts, letters, maps, drawings, plans and landscape watercolours that are mostly still unpublished [Macadam 1946]. 1

In the last two hundred years, many geo-human factors caused radical changes in these areas, especially in Nubia. In a landscape almost untouched for centuries, the signs of the interactions between the ancient communities and the natural environment were much clearer in Bankes' times than now. 2

This paper introduces a cross-disciplinary research project in Digital Humanities that ran in the years 2014-2016 at the Dahlem Research School, Freie Universität Berlin.[1] The project attempts to create a reconstruction of ancient Nubia through the study of the Bankes Archive. A historical geographic information system (HGIS) is used both for structuring and presenting on a digital map the information extracted from the Bankes' documents. Once the data are loaded on the HGIS, data interpretation relies comprehensively on ancient written sources and modern archaeological reports, in order to highlight relationships between the different entries in the gazetteer in terms of distance, travel time, climate, ethnicity, polity, environment, water management, and trade resources. The outcome of the research project will be an Internet open HGIS[2], intended as a tool for scholars researching the different historical periods of the region, but also for those interested in ethnographic, geological and biological data. The methodology described here hopes to help researchers interested in using HGIS and dealing with documents that do not allow statistical analysis of microdata such as the census. 3

## Changes and ultimate loss of Nubia (1820-2006)

In this paper, for reasons of simplicity the term Nubia — traditionally intended as the region between the first and the sixth cataract of the Nile — comprises also the state of Sinnar and the northern part of historical Fazogli, corresponding 4

to the area covered by the Bankes papers.

In the last two hundred years, Nubia witnessed radical political changes, from the Turco-Egyptian conquest (1820-22) to the Anglo-Egyptian decolonization (1945-56). The size of these changes is enormous and sometimes difficult to grasp. [3] The region underwent significant variations in trade patterns and exploitation of land and resources, introduction of new cultures, migration and gradual transition from nomadism to sedentary life and from village/tribal to urban life. Finally, the building of new infrastructures and mass tourism strongly reshaped the area. 5

Changes had already started with the conquest of Upper Nubia in the years 1820-1822: the new Turco-Egyptian administration replaced the government of the Mameluke remnants in Dongola and the network of local chieftains within the Funj Sultanate. All aspects of life were heavily affected, including the historical heritage of the region. Many of the monuments recorded by the early travellers had suffered extensive damage already during the 19th century. From the two peripteral chapels at Elephantine (1822) to the portico of the temple of Dabud (1868), countless Nubian archaeological sites suffered destruction or vandalism [Christophe 1967]. Many drawings made between 1815 and 1822 reveal details now missing in the temples of Dandur, Qartassi, Tafa, Kalabsha, Bayt al-Wali, Jarf Husayn, Quban, Qurta, Wadi al-Sibu'a, Amada, Dirr, Qasr Ibrim, Meroe, Nuri, Musawwarat al-Sufra, and Abahuda. 6

The dissolution of this ancient landscape with its many sites, shaped through the centuries by several civilizations, accelerated during the 20th century with the construction of a series of dams on the Nile. The first Aswan Dam was built in 1902, but damage from the rising Nile waters was limited and the area affected extended only for 100 kilometres along the river south of Aswan. The dam was not intended to store water all the year round and the lake that it created was therefore seasonal. The barrage was raised in 1912, extending the lake to 150 kilometres and further damaging cultivation. Census and compensation data for palm trees reveal a dramatic decrease in agricultural potential: 400 palm trees were left in the district of Dabud from over 11,000 before the heightening. Same in Kalabsha, where from 14,000 the number dropped to under 600, and in Mariya from 11,000 to 500. Compensation for 9,376 palms was paid in Sayala [Hopkins 2010, 162]. A third elevation in 1933 extended the lake to 290 kilometres: the Nubians living on the river had to adapt to a higher seasonal inundation, either moving up the sides of the riverbanks or to a new location [Hopkins 2010, 5]. 7

In 1960, the Egyptian government started the construction of a new dam in Aswan; the lake began to rise in 1964 and was operational by 1970. Creating a permanent lake rather than a seasonal one, the effects of the dam on Lower Nubia were enormous: 500 kilometres of Nile valley were permanently flooded. The immediate result was the relocation of around 100,000 people both in Egypt (48,000) and in the Sudan (50,000), with no less than 536 affected villages in Egyptian Nubia only [Hopkins 2010, 155]. The High Aswan Dam literally wiped out the region of all its human and natural landmarks. The area submerged was wide enough to cause the disappearance of much of the fauna, flora, and villages, in addition to much of the peoples' own heritage, memories of and bonds to their traditional space [Okasha 2010]. 8

More Nile dams were built in Sudan too: the Sinnar Dam in 1922-25, the Jabal Aulia Dam in 1937, the al-Damazin Dam in 1966, and the Merowe Dam in 2005-2009 [Emberling 2012]. As more barrages are under contract in Dal, Sharayk and Kajbar, the Nubian heritage is once again under serious threat; the monuments at Sulb, Sai Island, Sabu and Nauri are among the five hundred sites listed as at risk [Williams n.d.]. 9

## The Bankes Archive (1815-1822)

Although mentioned in Egyptological literature since the 1950s, the Bankes Archive is one of the least known sources on ancient Egypt and Nubia and at the same time one the richest collections of 19th century Egyptological manuscripts. In this article, the use of the term *Bankes Archive*, in fact, includes all the documents that were produced during the expeditions funded by Bankes, but that are held in different institutions and in different countries. 10

The main body of the collection is housed at the Dorset History Centre, Dorchester, United Kingdom. It belongs to the National Trust, which inherited it from the last member of the Bankes family in 1982. It is made of roughly two thousand documents, comprising records from three different Nubian journeys: the first made in 1815 by Bankes in the company 11

of F. Barthow and G. Finati; another made in 1819 with W.H. Beechey, H. Salt. J. Hyde and A. Ricci; a third made by Linant, Finati and Ricci in 1821-22. It is an impressive collection of notes, sketches, epigraphic copies, landscape and monument views, measured plans and elevations, architectural details, maps and drawings of ethnographic or natural subject. The collection includes also around three hundred letters and other items of correspondence between Bankes and various important personalities such as G.B. Belzoni, L. Burckhardt, and J. Hyde. Most letters exchanged between Bankes, Salt and Linant during the expedition also survive. A full catalogue of the Egyptian collection was compiled only in 2011 and made available on-line [Salvoldi 2011][Salvoldi 2012a][Salvoldi 2012b].

12 A small but important part of the original collection is now housed at Kingston Lacy House, the Bankes family mansion. There, twelve drawings by Bankes, Beechey, Linant and Ricci are on public display. More interesting are two manuscripts kept in the library: one is a copy of the famous Meroe travelogue written by Linant for Bankes and already partly published by Margaret Shinnie [Shinnie 1958]. The second manuscript is an unpublished historical-ethnographical account of the Upper Nile region, written in French but with an English title added by Bankes: “General Notices upon all the Principal Countries and Peoples Comprehended in the Journey of A. Linant when Sent by W. J. Bankes to See for Meroe and to Examine the Course of the Nile.” It is a 108-page manuscript divided into forty chapters of different nature: regional descriptions, ethnographic observations, and some historical notes.

13 Two large volumes of notes and copies of Coptic and Greek inscriptions made during the 1819 travel are currently at the British Museum, Department of Ancient Egypt and Sudan.[4] They amount to roughly two hundred pages. As part of the project, the current author was able to digitize the two volumes in the summer of 2014.

14 Alessandro Ricci made some drawings on his own that he did not deliver to Bankes; he also wrote a full account of his travels in Egypt and Nubia. The original manuscript has a long story of discoveries and losses [Salvoldi 2009]; it is now believed to be in the former Royal Library of ‘Abdin Palace in Cairo.[5] For the current project, only two hundred of the original three hundred pages are relevant: they describe a first Nubian journey with Bankes in 1819 and the full Sinnar expedition of 1821-22. The 140 drawings Ricci made for himself are housed in the Florence Egyptian Museum and cover Nubia only partially.[6]

## HGIS Scientific Objectives

15 The Bankes HGIS Project tackles different scientific issues and has several objectives. The main research question addresses the possibility to access ancient Nubia though 19th century sources. It does not imply that the Nubia seen by Bankes’ men was exactly like ancient Nubia, but that it can be a good approximation of it. Sources are obviously not limited to the Bankes Archive: crosschecking early photographs, topographical surveys, and recent archaeological and ethnographic research will help to refine the picture given by the Bankes papers. In fact, the landscape went through little changes during the long period up to the Turco-Egyptian conquest and for some time later. There were unquestionably major innovations, such as the introduction of the waterwheel in Graeco-Roman time, and constant alterations of the Nile course. Islands would disappear or change size according to the flood level and after every flooding season. Nevertheless, the little soil available for cultivation always kept the Nubian population quite low, especially in the northern part of the country. Distance between settlements and the lack of effective transport means increased the relative isolation of the region. The landscape swiftly and dramatically changed in the 20th century with the construction of Nile dams and the consequent relocation of entire populations and the loss of all tangible and intangible heritage. Making any regional research in the area is impossible without the use of historical sources and, if the construction of new dams will further proceed as scheduled, it will be more the case in the future.

16 A second research question addresses the use of Digital Humanities for the display, management and interpretation of archival sources and it does so specifically in a historical and geographical context. For this reason, the project aims at providing a theoretical framework for the use of HGIS in historical research and addresses some issues such as data accessibility and visualization and replication of the HGIS model.

17 On a practical side, the Bankes Nubia HGIS will also be a tool for accessing and browsing part of the Bankes Archive collection. Thanks to an agreement with the Dorset History Centre and the National Trust, all drawings concerning

Nubia — which have already been digitized — will be geo-localized and made available on-line through the HGIS, while a set of metadata will give additional information on the single drawings. This alone is an important achievement, but more will come from the integration of the images with other information extracted from the Bankes Archive.

## GIS and HGIS

18 The information carried by a large and diversified collection of sources such as the Bankes Archive needs specific tools for analysis and display. Although relatively a new field, GIS — and even more recently HGIS — has developed to become an excellent tool to manage and use geographic data, where information is linked to an exact geographical representation of it. GIS is also the quickest and easiest way to produce maps, which offer an immediate and synthetic visualization of the information provided by different documental sources and can be easily accessible by a wide range of public. There are different GIS software with an easy-to-use interface for both the researcher and the custom user.[7] This kind of software also allows shaping the outcome of the GIS in different ways: a gazetteer, an on-line zoomable atlas, a set of printed maps, or even a Keyhole Markup Language (KML) file ready for users to download. Nevertheless, to date only few projects in the Humanities effectively use GIS.[8]

19 Use of GIS technology has grown in the last twenty years, especially in the field of archaeology. More recently, HGIS has grown as a separate field of study and some early projects have already delivered interesting results. Looking at a quick survey made by Ian Gregory and Paul Ell, HGIS seems to be mainly used for either urban historical research or statistical macro-regional research (at nation, continent or world level). In the first case, HGIS looks at the development of urban space or the change of allocated land/population and integrates historical maps, photographs, and 3D reconstructions into the database. Such is the case of the “Sydney TimeMap Project” [Gregory 2007, 66], the “Mapping Medieval Chester: Place and Identity in an English Borderland City c.1200-1500” project,[9] or the “Visualizing Urban Geographies” project.[10] The second kind of research involves a quantitative approach to data aggregation and makes extensive use of statistical data from census or parish registers. This is the case of “The North-West Shropshire Tithe Maps and Apportionments”,[11] the “Atlas of the Great Irish Famine”, and the “Visions of Britain through Time Project” [Southall 2006]. This last project in fact included and georeferenced some data from travellers’ tales, thus approaching the kind of sources used in the Bankes HGIS. “The International Dunhuang Project” at the British Library also digitised and georeferenced notes, pictures and maps from the Dunhuang Expedition.[12] Other interesting projects, blending historical and geographical research, maps, a varied amount of sources, and graphic metadata (plans, cross sections, photographs) are the “Mapping the Jewish Communities of the Byzantine Empire” project[13] and the “Mapping Gothic France” project.[14]

20 In the field of Classics, the “Pleiades Gazetteer”[15] and the “Pelagios Project”,[16] which use ancient sources, are definitely worth mentioning. Many other projects, on the other hand, do not offer much historical analysis, but rather use GIS as a means of displaying historical information through animated maps. This is the case of the “Animated Atlas of African History 1879-2002”[17] or the “Salem Witch Trial Documentary Archive and Transcription Project”.[18]

21 Because of the lack of reliable statistical information for Nubia in the early 19th century, the Bankes HGIS relies on documents very different from those used by most of the previous HGIS examples. For this reason, the project is also an occasion to reflect on the possible uses of HGIS in historical research. One of the issues addressed when building up our own HGIS was the way to make comprehensive use of the documents in order to extract and visualise as much information as possible and at the same time reducing input possibilities and error risk. Discussion and negotiation with IT experts proved extremely useful to find a balance between the need for exhaustive documentation and the technical possibilities of the database.

## Accuracy assessment

22 As seen in the previous paragraphs, the Bankes Archive is an extremely rich collection of well-integrated, interconnected sources, produced by different authors with the same objectives in a limited range of time and space. All these features make it a most valuable source of information. Still, one needs to assess accuracy and reliability in order

to assure that the data extracted are scientifically acceptable.

There are different factors that make the Bankes Archive a particularly reliable source of data. Primarily, there are no doubts about the skills of the authors: Bankes was a history graduate from Cambridge with a sound knowledge of history, Latin and Greek; Ricci was a physician, therefore he had a training in chemistry, biology, botany, drawing and classics; Linant was a midshipman with training in cartography, astronomy and drawing. Although none of them was an academic *stricto sensu*, the level of knowledge they possessed was much higher than that of an average traveller of their time. 23

At the same time, they had no artistic goals: they did not aspire to a career in the art establishment nor had a public to show their paintings to; nevertheless, they possessed the technical skills to make accurate architectural plans, epigraphic copies, and landscape views. Since Bankes was funding their activity, there was no interest in making their production more attractive with the prospective of a sale. Furthermore, accuracy can be verified in the case of subjects captured in drawing by different hands from different points of view. 24

The same is true for the travelogues and the notes: they were to be handed over to Bankes, who would dispose of them as he wished. No publisher was to be searched for, no money was to be made out of an exciting travel narrative. Different is the case of Ricci's own travelogue, which in fact he wrote for publication. The text is extremely attractive and clearly manipulated to excite the audience, nevertheless Ricci failed to publish. Comparisons with the travelogues written by Linant, Frediani and D'Athanasi[19] reveal the points were Ricci introduced elements of fantasy for literary purposes. 25

The reliability of the Bankes Archives is enhanced by other factors, such as the adequate scientific knowledge of the period, especially if compared with 16th-18th century travelogues. Bankes, Linant and Ricci also had at their disposal some scientific equipment, such as telescopes, thermometers, and most likely other astronomical and scientific tools, including clocks, barometers, sundials, and perspectival machines (*camera lucida* or *camera obscura*). A last factor is the relatively comfortable conditions of their journey. Despite still running some risks in a country at war or recently conquered by the means of ruthless oppression and violence, Ricci and Linant were able to travel at ease, never lacking the necessary funds and often protected by the army. 26

## Manuscript Transcription and Data Collection

While some of the documents have been at least partially published, others needed to be transcribed in order to be used and properly quoted. The amount of notes and sketches would make it impossible to transcribe the whole archive, so transcription was essentially limited to the travelogues, in particular the unpublished parts of Linant's diary (version of Kingston Lacy), his "General Notices" (see above), and Ms. XXI.B.58 (a short account on fauna in the so-called Island of Meroe). A transcription of Ricci's travelogue was available as part of the author's PhD dissertation too. These are in fact the core documents, which provide the most important information related to the movements of the expeditions, the toponyms, and the description of the areas crossed. By transcribing them, we made sure that the most important information was not left out. 27

All the geographical and non-geographical information extracted from the documents of the Bankes Archive are divided into categories, as follows: 28

- Nature – Biotic[20]
    - Vegetation
    - Fauna
- Nature – Abiotic
    - Climate
        - Floods, precipitations
        - Winds
        - Atmospheric and Water temperature

    - Geology
        - Types of rocks, soil
        - Topography
- Culture – Biotic
    - Ethnic Groups
        - Tribes (distribution, migration patterns)
        - Immigrated communities
    - Ethnography
        - Rites, customs, religions, etc.
        - Handcrafts
        - Social structures, languages, etc.
    - Traffic
        - Trade routes, river or land ancient routes
        - Roads and dirt tracks
        - River crossings
    - Historical Data
        - Battles, important events, epidemics, etc.
- Culture – Abiotic
    - Archaeological Heritage
        - Ancient Egyptian monuments
        - Medieval sites
        - Post-Medieval buildings
        - (With notation of disappeared monuments, missing or ruined parts, moved buildings, etc.)
    - Settlements
        - Cities, towns and villages with toponyms
        - Temporary settlements (Bedouins, trade, military camps)
        - (With civil, military and religious administrative rank and presence of a specific building, i.e. barracks, depots, cathedrals, etc.)
    - Water management
        - Wells, springs, widian, oases, dams and submerged areas
    - Economy
        - Crops, orchards, agricultural plots, gardens
        - Domesticated animals
        - Market sites, products traded, slave caravanserai, mining sites

## Gazetteer Setup

A starting point for the HGIS is to create a gazetteer for geographical names and features referred to in the documents. This is sometimes challenging because name places are recorded in English, French, and Italian transcription, with many mistakes and misunderstandings due to the lack of knowledge of the local languages/dialects and the unscientific methodology used in the transcription itself. The same name is sometimes spelled differently in the same source. 29

A first step is to collect in a spreadsheet all the toponyms used in the sources, taking care of recording all variations within the source and between the different sources. This is important for it allows the user to use any spelling while querying the database. Some features are described in the sources without giving a name: it is sometimes possible to 30

identify the feature with a modern toponym. In other cases, they will be included in the gazetteer as an anonymous feature, i.e. a castle or a ruined village. There are 1004 entries in the gazetteer, comprising 821 different toponyms and 60 anonymous or unidentified features.

31 A second step is to collect the coordinates of the single features. For this purpose, there are some official gazetteers with coordinates given in degrees and minutes, but these are generally too imprecise to be of use.[21] Some data are collected from the National Geospatial-Intelligence Agency Names Server (GNS),[22] freely available on-line. This also provides the standard spelling according to the US Board on Geographic Names, even though it does not follow the scientific transliteration of Arabic names. Most coordinates given here are also decimal conversions from degrees/minutes-only coordinates, and are therefore approximations. In the project, spelling of names was generally normalized to a scientific transliteration of Arabic.

32 Most of the coordinates were retrieved using Google Earth or through maps georeferenced on a GIS software. Google Earth is ideal for features clearly visible on the satellite imagery, such as mountains, islands, and some settlements. Nametags in Google Earth and Google Maps are often imprecise, so orientation is provided in combination with other printed topographical maps. On the other side, maps georeferenced with a GIS software provide coordinates for features now lost (submerged by the rising waters of the dam lakes) or unidentifiable on satellite imagery. The maps need to be geo-rectified with a given Coordinate Reference System (most often WGS 84/UTM Zone 36N or Egypt 1907/Red Belt). Coordinates capture is possible through simple mouse navigation over the features. Free Nubian maps are available on-line, the most useful sources being undoubtedly the Perry-Castañeda Map Library of the University of Texas at Austin,[23] the “David Rumsey Map Collection”[24] and the “Durham Sudan Archive”.[25] Other maps otherwise not available on-line were consulted and freely scanned thanks to an agreement between the TOPOI Excellence Cluster and the Kartenabteilung of the Staatsbibliothek zu Berlin.[26] Particularly good survey maps can also be found in Weigall [Weigall 1907], “The Archaeological Survey of Nubia”,[27] Roeder [Roeder 1911], Emery and Kirwan [Emery 1935], “Kush”,[28] Hinkel [Hinkel 2002], and Ritter [Ritter 2014].

## Access Database and GIS Database

33 Once the gazetteer has been compiled, data collection can start. For this purpose, a specific structure for a database management system (MS Access in this case) was created. MS Access was chosen because it has a particularly user-friendly Graphical User Interface; at the same time, it is solid enough to handle the Bankes HGIS at this stage of data preparation without the need of a specific GIS software. Most important, a MS Access database can be connected to ArcGIS via Open Database Connectivity: this is a live connection, not a data snapshot, thus enabling to formulate complex SQL queries directly in MS Access. MS Access also allows a single person to work on the entire database with particular ease.

34 All data extracted from the documents according to the previous classification were stored in the database in a structured manner. Metadata were also stored for every item of data, such as author (Bankes, Linant, Ricci, etc.) and source name (reference number of drawing, title of manuscript with page number, etc.). The database contains an entry for every place with its coordinates and an entry for every visit, with dates of arrival. This second characteristic enables the possibility to represent time in the HGIS, in particular it will allow to reckon distances covered by the travellers following certain land routes or sailing up- or down-stream.

35 The project is currently (August 2016) in the stage of transferring the data to ArcGIS as shape files or geodatabase tables. The features will be geo-localised on the map using specific symbology, while all metadata will be available in pop-up tables. The representation through vector data can be in the form of a polygon (e.g. a governmental district), a polyline (e.g. a path, a route followed by a traveller) or a point feature (e.g. a settlement, a well, a tree).

36 Symbology will be structured through different icon sizes, colours and shapes to represent the different nature of the settlements: for example, colour coding can distinguish time phases (e.g. Old Kingdom within the Ancient Egyptian phase). Icon size can mark the position of the settlement in the political hierarchy, from small village to regional capital. Different sets of more elaborate icons can indicate agricultural production and trade traffic.

The issue of unidentified or dubious features, for which exact coordinates are not available because the source does not allow a precise identification (e.g. “Two hours south of the camp there was a village”), specific symbology will be used. A different solution could be the use of fuzzy logic, which allows to georeference a point feature within a given area [Gregory 2007, 84–85] In most cases, nevertheless, a point marked as dubious would be enough, because the progress of travellers is usually very slow, making it easy to georeference a point between a preceding and a following stop. In addition, the accurate description of the surrounding landscape helps a lot in identifying the area. 37

GIS layers will not only be created using data from database tables, geodatabase tables and shape files. Some layers were already directly drawn in ArcGIS with the help of georectified maps: such layers comprise the historic Nile course with its islands and the district areas. 38

## Data Interpretation

Some HGIS projects aim at making data available to the public. They extract a huge amount of data from archival documents, for example census records, and put them on-line on an HGIS: this is definitely a useful result as not always archival documents are easy to consult or even to reach. The amount of data that will be available on-line through the Bankes Nubia HGIS would also justify such an approach. Scholars interested in the documents would not need to travel to the Dorset History Centre anymore and could access them on-line. Moreover, they would be able to perform queries and conduct research according to their personal interests or field of scholarship. 39

Nevertheless, spatial analysis and interpretation are also required. The HGIS will visualize an environment no longer extant and much closer to the ancient landscape, where different populations were making successful choices of exploitation. The HGIS will also help to detect specific relations between different settlements and the natural environment, the concept of space itself and its organization/modification through parameters like distance, river/road practicability, travel time, river flood range, climate, water and trade resources. 40

The 19th century documents are definitely a good source for the general reconstruction of Nubia; still, more sources are required. Data interpretation will then rely comprehensively on two different references: ancient written sources and modern archaeological data. In the first group, we list Ancient Egyptian, Greek, Coptic, Old Nubian and Arabic literary and non-literary texts, religious compositions, and inscriptions, as well as classical historical sources. In the second group, there are archaeological field reports, iconographical and architectural studies, and ethnographic surveys. Archaeological surveys in particular are important for the identification of the different sites of the gazetteer. Starting from the 1905-07 Oriental Institute Expedition[29] and the following Egyptian Antiquities Service survey (1907-1911),[30] many publications were devoted to the monuments of the Middle and Upper Nile Valley, in particular Ancient Egyptian temples,[31] Christian churches,[32] and Medieval Fortresses.[33] Archaeological and ethnographic work in the area intensified in the 1960s before the completion of the Aswan High Dam [Säve-Söderbergh 1987] and produced a rich collection of data (in particular the AUC Nubian Ethnological Survey and the work of Anna Hohenwart-Gerlachstein). Recent works provide very detailed information on regions that were not submerged by the Aswan High Dam in 1970. [34] 41

Whenever possible, comparisons with the current human and environmental situation will highlight the major changes occurred, especially in the relationship between human communities and the environment. 42

## Conclusions

While all societies worldwide in the last hundred years have undergone significant changes both economically and socio-politically, few areas have witnessed more dramatic events than the regions flooded by the many dams along the Nile. With the physical annihilation of the area, cultures and traditions were also eradicated, economic systems were disrupted, and historical landscapes wiped out. 43

Ancient sources are useful to reconstruct the whole region as a system and a network, still they are insufficient because of lacunae, inaccuracies and wide openness to interpretations. Since the landscape and its landmarks have been 44

relatively stable for hundreds of years, it seems that historical sources dating back to the early 19th century can offer an appreciable amount of data that are sufficiently accurate and historically close to the past that scholars try to reconstruct. For this reasons, the large documentation amassed by William J. Bankes and his men in the period between 1815 and 1822 could provide a bounty of information, if used correctly. Managing and displaying such a rich variety of sources is not easy, unless one recurs to Digital Humanities. Technology offered by GIS software has the potential to improve historical research, dissemination of data and their interpretation. Imperfect and open to suggestions and improvements as it is, the Bankes HGIS is a small contribution in this direction.

## Notes

[1] Dahlem Research School POINT Fellow 2014-2016, Dahlem Humanities Center. The project is based at Research Unit of Prof Dr Klaus Geus (Historical Geography of the Ancient Mediterranean, Friedrich-Meinecke-Institut), whom I want to thank for his constant support. I would also like to thank Mr Rainer Streng, who designed the MA Access Database and provided invaluable suggestions, and Mrs Undine Lieberwirth, TOPOI, for sharing her GIS expertise. My thanks also to Prof Dr Jochem Kahl, Egyptology Seminar, Freie Universität Berlin, who read a preliminary version of this paper.

[2] A preliminary reference page with complementary information, images, updates, and data can be found at the following address: http://www.palamedes.eu/bankes/

[3] For a general description of the events and the historical background, see Robinson [Robinson 1925], Holt [Holt 1961], Cornevin [Cornevin 1966], and Fahmy [Fahmy 1998].

[4] Reference Number BM/AES 125.

[5] A faithful transcription of the manuscript was found in the National Archives of Egypt in 2009 and is being published [Salvoldi 2018].

[6] Usick [Usick 1998].

[7] The project makes use of ESRI's ArcGIS and of Quantum GIS.

[8] See http://www.hgis.org.uk/, (accessed 20 March 2015) and http://www.aag.org/cs/projects_and_programs/historical_gis_clearinghouse/hgis_projects_programs, (accessed 10 September 2016).

[9] "Mapping Medieval Chester: Place and Identity in an English Borderland City c.1200-1500", http://www.medievalchester.ac.uk/index.html, (accessed 8 September 2016).

[10] "Visualizing Urban Geographies", http://geo.nls.uk/urbhist/, (accessed 12 September 2016).

[11] "The North-West Shropshire Tithe Maps and Apportionments", http://gisweb.massey.ac.nz/nwshropsresearch/intro.htm, (accessed 8 September 2016).

[12] Gregory and Ell [Gregory 2007, 150]; "The International Dunhuang Project", http://idp.bl.uk (accessed 20 March 2015).

[13] "Mapping the Jewish Communities of the Byzantine Empire", http://www.byzantinejewry.net/, (accessed 9 September 2016).

[14] "Mapping Gothic France", http://mappinggothic.org/, (accessed 9 September 2016).

[15] "Pleiades", http://pleiades.stoa.org/ (accessed 20 March 2015).

[16] "Pelagios Project", http://pelagios-project.blogspot.com/ (accessed 20 March 2015).

[17] "Animated Atlas of African History 1879-2002", http://www.brown.edu/Research/AAAH/index.htm, (accessed 8 September 2016).

[18] "Salem Witch Trial Documentary Archive and Transcription Project", http://salem.lib.virginia.edu/home.html, (accessed 8 September 2016).

[19] Giovanni D'Athanasi, *A brief Account of the Researches and Discoveries in Upper Egypt, made under the direction of Henry Salt Esq*. (London: John Hearne, 1836).

[20] Classification of human-environment interactions according to Redman (1999).

[21] *Gazetteer of Egypt. Names Approved by the United States Board on Geographical Names* (Washington DC: Defense Mapping Agency, 1987).

[22] “National Geospatial-Intelligence Agency Names Server (GNS)”, http://geonames.nga.mil/gns/html/index.html (accessed 20 March 2015).

[23] “Perry-Castañeda Library Map Collection”, http://www.lib.utexas.edu/maps/ (accessed 20 March 2015); most maps are those in scale 1:250,000 published by the US Defence Mapping Agency Topographic Service (1975) or the US Army Map Service, Series Y502 (1953-1960) and P502 (1953-1959).

[24] “David Rumsey Map Collection”, http://www.davidrumsey.com/ (accessed 20 March 2015).

[25] “The Sudan Archive”, Durham University, https://www.dur.ac.uk/library/asc/sudan/ (accessed 20 March 2015); Sudan Survey maps in scale 1:250,000, published between 1901 and 1937.

[26] Particularly useful was the General’nyj Štab 1:200,000 K 4020 series (1978). I should like to thank Dr Wolfgang Crom, director of the Kartenabteilung of the Staatsbibliothek zu Berlin for his patience and support, and the Freundeskreis für Cartographica for funding my research there.

[27] Reisner [Reisner 1910b], Firth [Firth 1912b].

[28] Most useful are Adams [Adams 1961], Adams [Adams 1962], Säve-Söderbergh [Säve-Söderbergh 1962], Adams and Nordström [Adams 1963], Mills [Mills 1965], Mills and Nordström [Mills 1966], Säve-Söderbergh [Säve-Söderbergh 1967], and Donner [Donner 1967].

[29] “The 1905-1907 Breasted Expeditions to Egypt and the Sudan”, http://oi.uchicago.edu/collections/photographic-archives/1905-1907-breasted-expeditions-egypt-and-sudan (accessed 29 April 2015).

[30] Reisner [Reisner 1910a], Reisner [Reisner 1910b], Firth [Firth 1912a], Firth [Firth 1912b], Firth [Firth 1915], and Firth [Firth 1927].

[31] Weigall [Weigall 1907], Roeder [Roeder 1911], Emery and Kirwan [Emery 1935].

[32] For example Mileham [Mileham 1910], Somers Clarke [Somers Clarke 1912], Andriolo and Curto [Andriolo 2000], and Adams [Adams 2009].

[33] Crawford [Crawford 1961], Drzewiecki [Drzewiecki 2012].

[34] Welsby [Welsby 2003], Żurawski [Żurawski 2003], Adams [Adams 2005a], Adams [Adams 2005b], Osman and Edwards [Osman 2012], Anderson and Welsby [Anderson 2014], and Nordström [Nordström 2014].

## Works Cited


**Adams 1961** Adams, W. Y. “Archaeological Survey of Sudanese Nubia,” Kush, 9 (1961): map facing p. 8.

**Adams 1962** Adams, W. Y. “Archaeological Survey of the West Bank of the Nile,” Kush, 10 (1962): map facing p. 12.

**Adams 1963** Adams, W. Y., Nordström, H-Å. “The Archaeological Survey on the West Bank of the Nile: Third Season, 1961-62,” Kush, 11 (1963): map facing p. 12.

**Adams 2005a** Adams, W. Y. *The West Bank Survey from Faras to Gemai. 2. Sites of Meroitic and Ballaña Age*. Oxford: British Archaeological Reports (2005).

**Adams 2005b** Adams, W. Y. *The West Bank Survey from Faras to Gemai. 3. Sites of Christian Age*. Oxford: British Archaeological Reports (2005).

**Adams 2009** Adams, W. Y. *The Churches of Nobadia*. Oxford: British Archaeological Reports (2009).

**Anderson 2014** Anderson, J. R. Welsby, D. (eds.) *The Fourth Cataract and Beyond. Proceeding of the 12th International Conference for Nubian Studies*. Leuven, Paris, Walpole: Peeters (2014).

**Andriolo 2000** Andriolo, D., and Curto, S. Catalogo delle Chiese della Nubia. Torino: Accademia delle Scienze (2000).

**Christophe 1967** Christophe, L. A. “Sanctuaires nubiens disparu”. In *Nubie, Cahiers d’Histoire Egyptienne X*. Cairo: Imprimerie Costa Tsoumas and Co. (1967), pp. 109-21.

**Cornevin 1966** Cornevin, R. *Histoire de l'Afrique. Tome II. L'Afrique précoloniale du tournant du XVIe au tournant du XXe siècle*. Paris: Payot (1966), p. 261.

**Crawford 1961** Crawford O. G. S. *Castles and Churches in the Middle Nile Region*. Khartoum: Sudan Antiquities Service (1961).

**Donner 1967** Donner, G. "Preliminary Report on the Excavations of the Finnish Nubia Expedition 1964-65", Kush, 15 (1967-68): 71.

**Drzewiecki 2012** Drzewiecki, M. *Fortresses of Sudan*, 2012: Preliminary Report. Khartoum (2012), https://www.academia.edu/1963261/Fortresses_of_Sudan_2012 (accessed 9 September 2016).

**Emberling 2012** Emberling, G. "Archaeological Salvage in the Fourth Cataract, Northern Sudan (1991-2008)". In M. Fisher et al. (eds), *Ancient Nubia. African Kingdoms on the Nile*. Cairo, New York: The American University in Cairo Press (2012), pp. 71-77.

**Emery 1935** Emery, W. B., Kirwan, L. P. *The Excavations and Survey between Wadi es-Sebua and Adindan 1929-1931*. Cairo: Government Press (1935).

**Fahmy 1998** Fahmy, K. "The Era of Muhammad 'Ali Pasha, 1805-1848". In Martin W. Daly (ed), *The Cambridge History of Egypt. Volume Two. Modern Egypt from 1517 to the end of the Twentieth Century*. Cambridge: Cambridge University Press (1998).

**Firth 1912a** Firth, C. M. *The Archaeological Survey of Nubia. Report for 1908-1909. Volume I: Part I. Report on the Work of the Season , 1908-1909. Part II. Catalogue of Graves and Their Contents*. Cairo: Government Press (1912).

**Firth 1912b** Firth, C. M. *The Archaeological Survey of Nubia. Report for 1908-1909. Volume II: Plates and Plans Accompanying Volume I*. Cairo: Government Press (1912).

**Firth 1915** Firth, C. M. *The Archaeological Survey of Nubia. Report for 1909-1910*. Cairo: Government Press (1915).

**Firth 1927** Firth, C. M. *The Archaeological Survey of Nubia. Report for 1910-1911*. Cairo: Government Press (1927).

**Gregory 2007** Gregory, I. N., Ell, P. S. *Historical GIS. Technologies, Methodologies and Scholarship*. Cambridge: Cambridge University Press (2007), pp. 66-67.

**Hinkel 2002** Hinkel F. W. *The Archaeological Map of the Sudan Supplement 5, Centennial Edition: Zwei baltendeutsche Reisende in Ägypten und Nubien, 1815 und 1823*. Berlin: Verlag Monumenta Sudanica (2002).

**Holt 1961** Holt, P. M. *A Modern History of the Sudan, from the Funj Sultanate to the Present Day*. London: Weidenfeld and Nicolson (1961), pp. 35-37.

**Hopkins 2010** Hopkins, N. S., Mehanna, S. R. *Nubian encounters. The Story of the Nubian Ethnological Survey 1961-1964*. Cairo, New York: The American University in Cairo Press (2010).

**Macadam 1946** Macadam, M.F.L. "Gleanings from the Bankes Manuscripts," Journal of Egyptian Archaeology, 32 (1946): 57-64.

**Mileham 1910** Mileham, G. S. *Churches in Lower Nubia*. Philadelphia: University Museum (1910).

**Mills 1965** Mills, A. J. "The Reconnaissance Survey from Gemai to Dal: A Preliminary Report for 1963-64," Kush, 13 (1965): map facing p. 2.

**Mills 1966** Mills, A. J., Nordström, H-Å. "The Archaeological Survey from Gemai to Dal: Preliminary Report on the Season 1964-65," Kush, 14 (1966): map facing p. 4.

**Nordström 2014** Nordström, H-Å. *The West Bank Survey from Faras to Gemai. 1. Sites of Early Nubian, Middle Nubian and Pharaonic Age*. Oxford: British Archaeological Reports (2014).

**Okasha 2010** Okasha, S. "Rameses Recrowned: The International Campaign to Preserve the Monuments of Nubia, 1959-68". In S.H. D'Auria (ed), *Offering to the Discerning Eye: An Egyptological Medley in Honor of Jack A. Josephson*. Leiden and Boston: Brill (2010), pp. 223-43.

**Osman 2012** Osman, A., Edwards, D. N. *The Archaeology of a Nubian Froentier: Survey on the Nile Third Cataract, Sudan*. Leicester: Mauhaus (2012).

**Redman 1999** Redman, C. L. *Human Impact on Ancient Environments*. Tucson: University of Arizona Press (1999), p. 35

**Reisner 1910a** Reisner, G. A. *The Archaeological Survey of Nubia. Report for 1907-1908. Volume I: Archaeological Report*. Cairo: National Print Department (1910).

**Reisner 1910b** Reisner, G. A. *The Archaeological Survey of Nubia. Report for 1907-1908. Plates and Plans Accompanying Volume I*. Cairo: National Print Department (1910).

**Ritter 2014** Ritter, M. "A New Topographic Map of Mograt Island," Der Antike Sudan. Mitteilungen der Sudanarchäologischen Gesellschaft zu Berlin e.V., 25 (2014): 123-126.

**Robinson 1925** Robinson, A. E. "The Conquest of the Sudan by the Wali of Egypt, Muhammad Ali Pasha, 1820-1824", Journal of the Royal African Society, 25/97 (1925): 48-49.

**Roeder 1911** Roeder G. *Les temples immergés de la Nubie. Debod bis Bab Kalabsche*. Le Caire: Imprimerie de l'Institut Français d'Archéologie Orientale (1911).

**Salvoldi 2009** Salvoldi, D. "Alessandro Ricci's Travel Account: Story and Content of his Journal Lost and Found", Egitto e Vicino Oriente, 32 (2009): 113-119.

**Salvoldi 2011** Salvoldi, D. *Catalogue of William John Bankes (1786-1855): Egyptian Drawings*. Dorchester: Dorset History Centre (2011), http://archives.dorsetforyou.com/adlibwebapp/detail.aspx (accessed 20 March 2015), and https://www.academia.edu/3723242/Catalogue_of_William_John_Bankes_1786-1855_Egyptian_Drawings (accessed 29 April 2015).

**Salvoldi 2012a** Salvoldi, D. "A Treasure House of Egyptology. The Catalogue of William John Bankes' Egyptian Portfolio (1815-1822)", National Trust Arts, Buildings, Collections Bulletin (Summer 2012): 11-12.

**Salvoldi 2012b** Salvoldi, D. "The Catalogue of William John Bankes' Egyptian Portfolio (1815-1822)", Bulletin of the Association for the Study of Travel in Egypt and the Near East 51 (2012): 20.

**Salvoldi 2018** Salvoldi, D. *TFrom Siena to Nubia: Alessandro Ricci in Egypt and Sudan, 1817-1822.*. Cairo-New York: The American University in Cairo Press, 2018.

**Shinnie 1958** Shinnie, M. *Linant de Bellefonds, Journal d'un Voyage à Meroe dans les années 1821-1822*. Khartoum: Antiquities Service Occasional Papers (1958).

**Somers Clarke 1912** Somers Clarke, F. S. A. *Christian Antiquities in the Nile Valley: A Contribution Towards the Study of the Ancient Churches*. Oxford: Clarendon Press (1912).

**Southall 2006** Southall, H. R. "A Vision of Britain through Time: Making Sense of 200 Years of Census Reports", Local Population Studies, 76 (2006): 76-84.

**Säve-Söderbergh 1962** Säve-Söderbergh, T. "Preliminary Report of the Scandinavian Joint Expedition: Archaeological Survey between Faras and Gamai, January-March 1961," Kush, 10 (1962): figs. 1-2.

**Säve-Söderbergh 1967** Säve-Söderbergh, T. "Preliminary Report of the Scandinavian Joint Expedition: Archaeological Investigations between Faras and Gemai, November 1963-March 1964," Kush, 15 (1967-68): 215-220.

**Säve-Söderbergh 1987** Säve-Söderbergh, T. *Temples and Tombs of Ancient Nubia: The International Rescue Campaign at Abu Simbel, Philae and Other Sites*. London, Paris: Thames and Hudson (1987).

**Usick 1998** Usick, P. "The Egyptian drawings of Alessandro Ricci in Florence. A list of drawings from a portfolio in the Museo Egizio di Firenze", Göttinger Miszellen, 162 (1998): 73-92.

**Usick 2002** Usick, P. *Adventures in Egypt and Nubia. The Travels of William John Bankes (1786-1855)*. London: The British Museum Press (2002).

**Weigall 1907** Weigall, A. E. P. *A Report on the Antiquities of Lower Nubia (The First Cataract to the Sudan Frontier) and Their Condition in 1906-07*. Oxford: University Press (1907).

**Welsby 2003** Welsby, D. *Survey above the Fourth Nile Cataract*. Oxford: British Archaeological Repotrts (2003).

**Williams n.d.** Bruce Williams, "An Appeal to Stop the Destruction of Nubia"; http://www.iae-egyptology.org/uploads/Appeal%20Nubia.pdf; (accessed 20 March 2015)

**Żurawski 2003** Żurawski, B. *Survey and Excavations between Old Dongola and ez-Zuma: Southern Dongola Reach of the Nile from Prehistory to 1820 AD Based on the Fieldwork Conducted in 1997-2003 by the Polish Archaeological Joint Expedition to the Middle Nile*. Warsaw: Neriton (2003).