

## CONTENTS

|                                                                                                                                                 |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <i>EDITORIAL BOARD</i> . . . . .                                                                                                                | 3  |
| <i>TEXTS AND MANUSCRIPTS: DESCRIPTION AND RESEARCH</i> . . . . .                                                                                | 5  |
| <b>S. Grigoryev.</b> Afghan Historical Sources on the <i>Khirqā</i> of the Prophet Muḥammad. . . . .                                            | 5  |
| <b>E. Rezvan.</b> On the History of ‘Ishqiyya Brotherhood Sacred Relics. I: the <i>Khirqā</i> of the Prophet . . . . .                          | 10 |
| <b>Val. Polosin.</b> ‘ <i>Unwān</i> Illuminations in Arabic Manuscripts (Part I) . . . . .                                                      | 12 |
| <b>M. Vorobyova-Desyatovskaya.</b> A Sanskrit Manuscript on Birch-bark from Bairam-Ali. II. <i>Avadāna</i> and <i>Jātaka</i> (Part 7) . . . . . | 20 |
| <b>I. Zograph.</b> Mongolian Borrowings in Documents of Yuan Chancellery . . . . .                                                              | 29 |
| <i>TEXT AND ITS CULTURAL INTERPRETATION</i> . . . . .                                                                                           | 36 |
| <b>K. Kepping.</b> “The Autumn Wind” by Han Wu-di in the Mi-nia (Tangut) Translation . . . . .                                                  | 36 |
| <i>PRESENTING THE COLLECTIONS</i> . . . . .                                                                                                     | 52 |
| <b>E. Rezvan.</b> Oriental Manuscripts of Karl Fabergé. IV: Poetry and Miniatures (Part I) . . . . .                                            | 52 |
| <i>ORIENTAL MANUSCRIPTS AND NEW INFORMATION TECHNOLOGIES</i> . . . . .                                                                          | 61 |
| <b>John Tait.</b> Papyri, Digitisation, and the Web: Accessibility and Management of Collections . . . . .                                      | 61 |
| <i>OUR ARCHIVE</i> . . . . .                                                                                                                    | 68 |
| <b>A. Tsendina.</b> A Work on the History of Buddhism in Mongolia . . . . .                                                                     | 68 |
| <i>BOOK REVIEWS</i> . . . . .                                                                                                                   | 71 |

### Front cover:

“Khusraw watching Shīrīn combing her hair after bathing”, miniature from the manuscript *Farhād wa Shīrīn* by Kamāl al-Dīn Bāfiqī Waḥshī and Muḥammad Shafīʿ al-Shīrāzī Wiṣāl in the collection of the St. Petersburg Branch of the Institute of Oriental Studies, call number A 910. Copied by Muḥammad Ismāʿīl al-Anjawī al-Shīrāzī in Rabīʿ I 1284 / July 1867, fol. 51b, 6.4×4.2 cm.

### Back cover:

- Plate 1.** ‘*Unwān* and page decoration, a Qājār style, the same manuscript, fols. 1b – 2a, 14.3×8.8 cm.  
**Plate 2.** “Farhād in the castle of Shīrīn”, miniature, the same manuscript, fol. 48b, 4.9×3.2 cm.  
**Plate 3.** “Shīrīn sees Farhād while coming to see the works at Mount Bīsūtūn”, miniature, the same manuscript, fol. 65b, 4.8×5.1 cm.

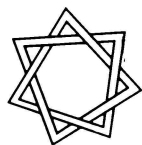
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# **ORIENTAL MANUSCRIPTS AND NEW INFORMATION TECHNOLOGIES**

**W. John Tait**

## **PAPYRI, DIGITISATION, AND THE WEB: ACCESSIBILITY AND MANAGEMENT OF COLLECTIONS**

The aim of this paper is to examine the current state of affairs among collections of textual material from ancient Egypt preserved upon papyrus: the climate of management, and attitudes towards making papyri available upon the web. Do

titudes towards making papyri available upon the web. Do papyri present any issues or problems different from those we face in the case of other types of manuscript material?

### **Papyrus as a writing ground and Egyptian books**

The “papyri” which I wish to discuss are documents and texts — any kind of written material — inscribed upon the traditional pharaonic Egyptian writing-ground, papyrus, manufactured from the central pith of the stalks of the papyrus sedge [1]. Sheets of papyrus were made by laying down side by side thin strips cut from the pith of the plant, and then adding on top of this a second layer of strips, this time running at right angles to the strips of the first layer. Pressure or hammering caused the two layers of strips to cling firmly together, as the individual cells of the papyrus pith possess minute hooks that mechanically interlock. This structure has implications for the way in which papyri survive from the ancient world. Papyrus was the standard writing material in Egypt from the early third millennium BCE, until it was gradually replaced by parchment and paper from the fifth century CE onwards. It was also widely exported, being for example the normal writing — ground for literature in classical Athens [2].

The traditional form of book in Egypt [3], until the rise of the codex book in the Christian period, was the papyrus roll, manufactured by fastening together a series of individual sheets, each sheet overlapping its neighbour by about 1 cm in a pasted join. This was done at the workshop, and papyrus was available only in roll form. A suitable quantity of papyrus for a document, or a letter, or a small slip (for example, in order to write a dinner invitation, or to submit a query to the oracle of a god) were cut from the roll by the user. Occasionally, papyrus rolls are preserved complete and in excellent condition. Copies of the funerary “Book of the Dead” [4] were prepared for the one purpose of being included in the burial of an individual, either within the coffin itself, or in a special container or hollow statuette nearby. Sometimes they were ruined by fluids or resins from the embalmed corpse, but they can survive intact.

When a collection or archive of texts or documents was hidden or carefully stored (sometimes a tomb provided a convenient store — sometimes a buried pot), and then forgotten or abandoned, papyri can be found undisturbed and complete. Papyri stored in antiquity could nevertheless suffer damage from insects or from damp. Papyri as we now recover them may merely show a few insignificant wormholes, or they may have been reduced to a lacework of fragile fragments (*fig. 1*).

The great majority of ancient papyri, however, have been found in deposits of rubbish. Thus they had mostly been discarded as damaged, or as no longer of interest. Before being finally thrown away, they had often been reused as “scrap paper”, or as “wrapping paper”. In dumps of rubbish, they have often suffered further physical or insect damage. Much less numerous — but very significant for their content — are fragments folded and cut up as a reinforcement to combine with plaster and glue in the manufacture of decorated mummy-casings (so-called “cartonage”) (*fig. 2*). Such pieces overwhelmingly survive from the Ptolemaic Period (332—30 BCE). They are a major source for the economic and social history of Ptolemaic Egypt, as town rubbish-dump material becomes common only from the Roman Period. Carbonised rolls are an even rarer phenomenon. The most famous are those from Herculaneum in Italy, one of the towns overwhelmed by Vesuvius in 79 CE: in the eighteenth century a private library was uncovered there, most notably preserving philosophical works in Greek. Both old and recent excavations have found carbonised papyri at Tanis in the Egyptian Delta, although, otherwise, the damp conditions in the Delta have allowed very little papyrus to survive. Similarly, for climatic reasons, there have been very few finds of papyri outside Egypt [5].

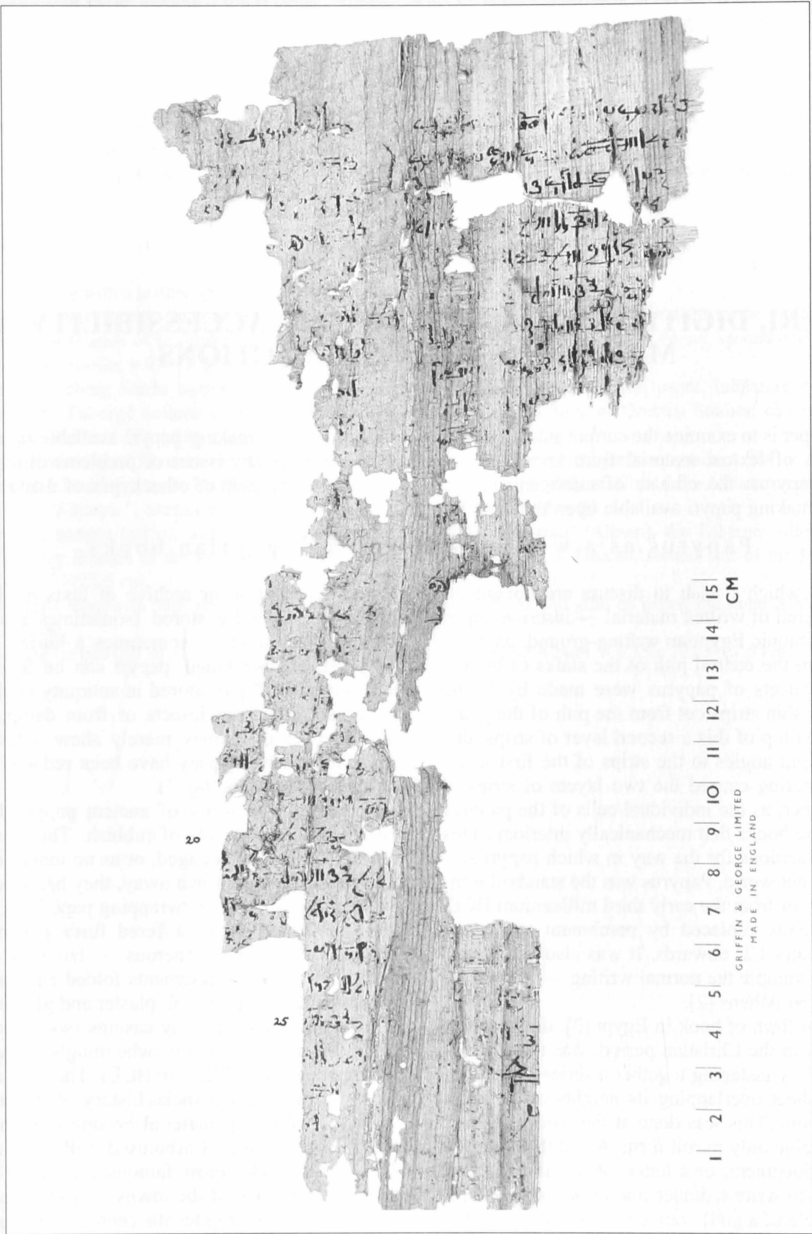


Fig. 1

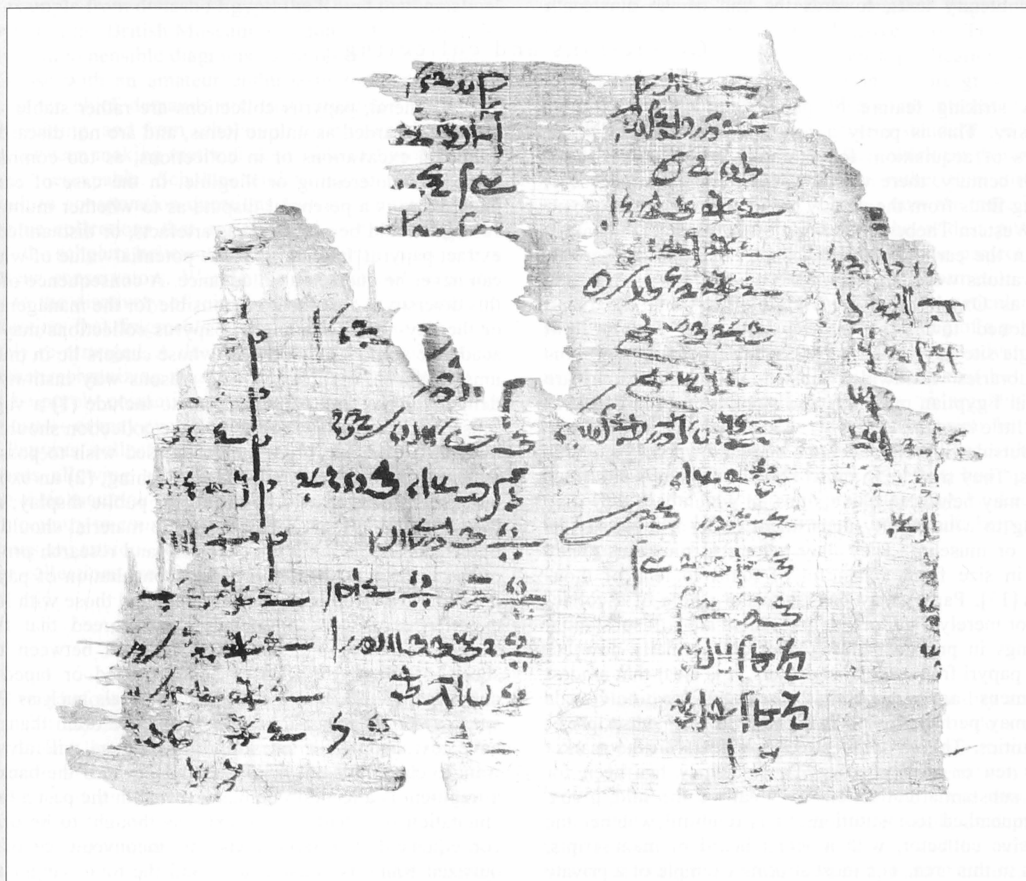


Fig. 2

A large number of languages and scripts were used on papyrus in Egypt. The most numerous papyri are those in the native Egyptian language, whether in Hieroglyphic, Hieratic [6], Demotic [7], or Coptic [8] script; those in Greek [9], after Alexander's conquest of Egypt in 332 BCE; and those in Arabic [10], after the Islamic conquest in 640 CE. Perhaps the next largest group, and one intensively studied, is the Aramaic papyri [11], present because of the Persian occupations of Egypt (525–404 and 341–330 BCE) and the employment of Jewish and Aramean mercenaries.

The term "papyrology" [12] is an umbrella term, usually used to refer to the study of Greek papyri, ever since the scholarly and public excitement at the massive discoveries of papyri, including fragments of biblical and Greek literary texts, towards the end of the nineteenth

literary texts, towards the end of the nineteenth century. It is not a very useful term, as naturally the interests and methods of those studying the text of the Bible differ greatly from those of their colleagues, working, for example, upon Greek philosophy or literature, or social and economic history, or juridical studies. So-called "papyrologists" will naturally study similar texts written upon other writing — grounds than papyrus — for example, ostraca (fragments of pottery or limestone) or wooden boards. Some concentrate upon the skill of making out texts that are hard to read, or upon palaeography and scribal practice; others simply use the evidence of papyri because it is their best source.

### Collections and collecting

A striking feature of papyrus collections is their diversity. This is partly a result of the several distinct phases of acquisition: for example, in the earlier nineteenth century, there was a western enthusiasm for collecting finds from the readily plundered tombs of Saqqara and Western Thebes; at the end of the nineteenth century and in the earlier twentieth century, large-scale foreign excavations were targeted at the rubbish dumps of towns such as Oxyrhynchus in Middle Egypt and the many abandoned towns of the Fayum oasis. Papyri from a single site have often been distributed among museums and libraries worldwide. Substantial finds of papyri are held in Egyptian museums and storerooms, and often remain little known.

Outside Egypt, collections may be owned by governments. They may be in either state or private institutions. They may belong to universities, in which case they may belong to a university department or to a university library or museum. They may belong to museums. They vary in size from a handful of items to tens of thousands [13]. Papyri may constitute the whole of a collection, or merely a minor sideline. There are still substantial holdings in private hands. Collectors normally now acquire papyri from specialist dealers. It is clear that modest specimens are frequently purchased by individuals who may perhaps own a mere handful of manuscripts or antiquities. This material often re-appears on the market every ten or twenty years. The tendency has been for more substantial collections eventually to be sold, given, or bequeathed to institutions. It is doubtful whether the reclusive collector, with a secret hoard of manuscripts, exists in this area. The most striking example of a private collection built up in the twentieth century is the Schøyen manuscript collection, which includes numerous papyri. Scholars have always been welcome to work upon the material, and the collection now has its own web-site.

In general, papyrus collections are rather stable. Papyri are regarded as unique items, and are not discarded, either on excavations or in collections, as too commonplace or uninteresting or illegible. In the case of cartonnage, there is a perennial dispute as to whether mummy-casings should be preserved as artefacts, or dismantled to extract papyrus fragments — the potential value of which can never be guessed at in advance. A consequence of all this diversity is that those responsible for the management or the day-to-day running of papyrus collections may be academic staff or may be staff whose careers lie in museums, archives, or libraries. The reasons why institutions deliberately acquire papyri appear to include (1) a vague sense that a varied and representative collection should be built up — or possibly a more focussed wish to possess material that may be employed in teaching; (2) an expectation that the item will be useful for public display; and (3) an intention that an edition of the material should be published, maintaining the scholarly and research profile of the institution. The storage and consultation of papyri present a few problems. Conservators and those with long experience of work on papyri seem agreed that they should be stored and consulted mounted between two sheets of glass (the glasses being framed or taped or clipped together), and that lighter materials such as Perspex are potentially harmful. Papyri more often than not have text upon both sides, and researchers will always want to check this out for themselves, even if the back of a fragment is alleged to be blank (often in the past a brief annotation or a half-erased text was thought to be of no consequence). For large texts, the inconvenience of an oversized frame is considerable, and the total weight and bulk of a collection can be alarming. Long rolls have regularly been cut into sections for glassing, and there seems to be no realistic alternative.

### Access

In museums, papyri may be publicly accessible in the sense that they are on display. The difficulties of studying a papyrus in a frame screwed to the wall in a busy gallery are obvious. The recently reorganized Egyptian displays at the Louvre in Paris imaginatively place papyri along-

side material culture: leases of land are part of the displays of objects relating to agriculture. In the past, there was little anxiety about exposing papyri to daylight or even direct sunlight over long periods; any conservator would now recommend strict control of lighting. Papy-

rologists, however, would argue that natural daylight is preferable when trying to read difficult papyri — but this fortunately need involve only short periods of exposure. Museums more and more lend items for temporary exhibitions, so that the visitor cannot assume that a text will always be available in its usual home. It is currently an issue in the museum world whether or not curators should be deciding what to put on display and what to hide in the reserves. Traditionally, museum displays are the end of a long line of decisions, made by a small number of people, as to what is important or interesting, and this is now being questioned.

In the case of papyri, who does want to see them? First, there is definitely a demand from the public. A single example from dynastic Egypt: the Rhind mathematical papyrus in the British Museum, London, with its immediately comprehensible diagrams, is an object of pilgrimage for those with an amateur enthusiasm for mathematics. The other chief demands are from students, as part of their training, and from scholars in their research. A conflict between making material accessible and protecting it seems inescapable. Scholars tend to adopt a cruder approach to conservation questions than do curatorial staff. In some collections that are operated as publishing projects, the scholars believe that they are competent to act as amateur conservators. Work upon fragmentary texts can lead to the discovery of joins between fragments, and the realisation that fragments under glass need to be completely re-arranged. A decision then has to be taken as to whether reorganizing fragments — at considerable cost — will be purely cosmetic, or will serve a serious scholarly purpose — or may even be damaging.

Papyrus collections have widely differing attitudes towards allowing scholars (let alone students) to work upon their material — and expectations seem also to vary from country to country. While the managers of some collections are anxious to be seen to be allowing free access, other collections are viewed as long-term publishing pro-

jects — a kind of research investment. In such cases the curators' attitude may appear almost secretive. If a collection includes unpublished groups or archives of connected material, there is often a real fear that unrestricted access will mean that the most attractive items will be seized upon for publication, leaving a rump of texts that no one can be persuaded to edit. A complication is that many coherent archives of papyri, whether discovered in the nineteenth or the twentieth century, have been scattered among a variety of collections, often world-wide. Working upon such bodies of material can involve negotiating a great variety of curatorial policies.

An expectation has grown up over the last hundred years that publications of papyri will more or less follow a standard format [14]. Even the smallest fragments are presented in the same comprehensive way. The advantages of this consistency — within a publication, and to a certain extent between publications — are great. However, the view that papyri are either of no interest and not worth publishing, or should receive a standardized treatment, is easily challenged. Scholarly work on papyri has often been driven by the evidence, rather than directed at a research question. Many scholars now are more interested in being able to interrogate the widest possible data-set of papyri. Perhaps for a particular project they may wish to extract just one item of information from each text (for example, the rate at which a particular tax-payment was set, or variations in the spelling of a particular personal name). Although there may be advantages in working from a full, published edition, that has been scrutinised by many colleagues, this is arguably not necessary. Thus there is an inevitable tension between the goal of comprehensive publication, and accessibility: a scholar who delays publication of a text, hoping first to solve all the problems it presents, may be keeping it from the attention of colleagues who could help in its interpretation.

## The web

Long before the web was thought of, Greek papyrologists felt the need of tools to assist in finding their way among the great but scattered mass of material. For generations the subject has been very fortunate in the checklists of published editions, dictionaries, bibliographies, collected editions, collections of corrected readings, and prosopographies that have been published. Current versions of the first two of these have already migrated to the web. In the last decades, the complete Greek text of most published documentary papyri has been available on CD-rom, and this too is now an ongoing web project. These new resources mean that new research questions arise — or old questions may be addressed anew. The latest development has been an explosion of images of papyri on the web. Some collections offer only a few impressive examples; others show only items already published, while others again plan, at least, to put all their material on the web. These last tend to be institutions that feel a need to be seen to be providing wide access to their resources; of course, funding is available towards such projects. Sometimes a compromise

is adopted that images of relatively poor quality are offered on the web, so that anyone wishing to do serious work upon a text still needs to apply to the collection.

A difficulty is that very fragmentary material can be of little use until it has been worked on and some sense has been made of it. Providing long lists of small, unidentified fragments can even be counterproductive, and the same can be said of images. This was already apparent in the case of one or two published catalogues long before the computer age. It has to be said also that outside specialised research institutions, very few of us have the equipment to view images to good effect (for example, to check doubtful readings), never mind to manipulate them in the exciting ways that can aid the rearrangements of fragments and the reading of barely visible writing. The demand from scholars to see the actual text with their own eyes is not likely to evaporate.

Also, papyrus collections are moving in the same direction as museums in general: making papyri available on the web is seen as a way of saving staff time, and easing the burden of curating awkward material. It is paradoxical that

while many academics are anxious to bring their students more and more in contact with the original artefact, they

are increasingly urged — instead — to use and develop web resources.

### Web sites for papyrology

The list is deliberately highly selective, and concentrates upon (i) sites that provide numerous links to other relevant sites, and (ii) sites that have taken a particular ini-

tiative in placing images on the web — thus many excellent sites devoted to individual collections are not listed, as they may easily be accessed via those given here.

|                                                                                                                                                  |                                                                                                                                                                     |
|--------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| American Society of Papyrologists:                                                                                                               | <a href="http://www.papyrology.org/">http://www.papyrology.org/</a>                                                                                                 |
| Apis: Advanced Papyrological Information System:                                                                                                 | <a href="http://www.columbia.edu/cu/lweb/projects/digital/apis/">http://www.columbia.edu/cu/lweb/projects/digital/apis/</a>                                         |
| Arabic Papyrology:                                                                                                                               | <a href="http://www.princeton.edu/~petras/">http://www.princeton.edu/~petras/</a>                                                                                   |
| Association Internationale de Papyrologues:                                                                                                      | <a href="http://www.ulb.be/assoc/aip/">http://www.ulb.be/assoc/aip/</a>                                                                                             |
| Berkeley — Centre for Tebtunis Papyri:                                                                                                           | <a href="http://sunsite.berkeley.edu/APIS/">http://sunsite.berkeley.edu/APIS/</a>                                                                                   |
| Centre for the Study of Ancient Documents<br>(includes link to POxy — Oxyrhynchus Papyri Project):                                               | <a href="http://www.csad.ox.ac.uk/">http://www.csad.ox.ac.uk/</a>                                                                                                   |
| Checklist: Checklist of Editions of Greek, Latin,<br>Demotic, and Coptic Papyri, Ostraca and Tablets,<br>Web Edition; by John F. Oates [et al.]: | <a href="http://scriptorium.lib.duke.edu/papyrus/texts/clist.html">http://scriptorium.lib.duke.edu/papyrus/texts/clist.html</a>                                     |
| Demotic Texts Published on the World Wide Web<br>(Alexandra O'Brien):                                                                            | <a href="http://www-oi.uchicago.edu/oi/dept/ra/abzu/demotic">http://www-oi.uchicago.edu/oi/dept/ra/abzu/demotic</a>                                                 |
| Duke Papyrus Archive (Duke Data Bank of<br>Documentary Papyri):                                                                                  | <a href="http://www.perseus.tufts.edu/Texts/papyri.html">http://www.perseus.tufts.edu/Texts/papyri.html</a>                                                         |
| Egyptology Resources (Nigel Strudwick):                                                                                                          | <a href="http://www.newton.cam.ac.uk/egypt/">http://www.newton.cam.ac.uk/egypt/</a>                                                                                 |
| Heidelberg Papyri:                                                                                                                               | <a href="http://rzuser.uni-heidelberg.de/~gv0/">http://rzuser.uni-heidelberg.de/~gv0/</a>                                                                           |
| International Association for Coptic Studies:                                                                                                    | <a href="http://rmcisadu.let.uniroma1.it/~iacs/">http://rmcisadu.let.uniroma1.it/~iacs/</a>                                                                         |
| The Leuven homepage of papyrus collections world wide,<br>and the Leuven database of ancient books:                                              | <a href="http://lhpc.arts.kuleuven.ac.be/">http://lhpc.arts.kuleuven.ac.be/;</a><br><a href="http://ldab.arts.kuleuven.ac.be/">http://ldab.arts.kuleuven.ac.be/</a> |
| Michigan Papyrus Collection:                                                                                                                     | <a href="http://www.lib.umich.edu/pap/welcome.html">http://www.lib.umich.edu/pap/welcome.html</a>                                                                   |
| Perseus: 'an evolving digital library' (several mirror sites):                                                                                   | <a href="http://www.perseus.tufts.edu/">http://www.perseus.tufts.edu/</a>                                                                                           |
| The Schøyen Manuscript Collection:                                                                                                               | <a href="http://www.nb.no/baser/schoyen/">http://www.nb.no/baser/schoyen/</a>                                                                                       |

### Notes

1. B. Leach and J. Tait, "Papyrus", in *Ancient Egyptian Materials and Technology*, eds. P. T. Nicholson and I. Shaw (Cambridge, 2000), pp. 227—53.
2. N. Lewis, *Papyrus in Classical Antiquity* (Oxford, 1974).
3. J. Černý, *Paper & Books in Ancient Egypt* (London, 1952); repr. (Chicago, 1977).
4. W. Forman and S. Quirke, *Hieroglyphs and the Afterlife in Ancient Egypt* (London, 1996).
5. For a brief survey, see H.-A. Rupprecht, *Kleine Einführung in die Papyruskunde* (Darmstadt, 1994), pp. 7—10.
6. Both are attested from the early third millennium BCE: for a listing, see M. Bellion, *Catalogue des manuscrits hiéroglyphiques et hiératiques* ([Paris], 1987).
7. From the eighth century BCE onwards. See M. Depauw, *A Companion to Demotic Studies* (Bruxelles, 1997).
8. From the third century CE onwards. See M. Krause, "Papyrus discoveries", in A. S. Atiya (ed.), *The Coptic Encyclopedia* (New York, 1991), vi, pp. 1898—900; cf. preceding entries there.
9. See below under web sites: *Checklist*.
10. A. Grohmann, *Einführung und Chrestomathie zur arabischen Papyruskunde*, 1 (Praha, 1954); *idem*, *Arabische Papyruskunde* (Leiden, 1966); R. G. Khoury, *Chrestomathie de papyrologie arabe* (Leiden, 1993).
11. B. Porten, *Textbook of Aramaic Documents from Ancient Egypt*, 3 vols. (Winnona Lake, 1986—93); *idem*, *The Elephantine Papyri in English* (Leiden, 1996).
12. General introductions include: E. Gardner Turner, *Greek Papyri: an Introduction* (Oxford, 1968). Rev. Paperback ed., 1980; O. Montevecchi, *La papirologia* (Torino, 1973). Ristampa, riveduta e corr. [ed.] con addenda, Milano, 1988; and H.-A. Rupprecht, *op. cit.*



13. Possibly the most extensive holdings are those of the Vienna papyrus-collection: Helene Loebenstein, "Vom 'Papyrus Erzherzog Rainer' zur Papyrussaammlung der Österreichischen Nationalbibliothek: 100 Jahre Sammeln, Bewahren, Edieren", in *Papyrus Erzherzog Rainer (P. Rainer Cent.)* (Wien, 1983), pp. 3—30.

14. The first volume of the papyri from Oxyrhynchus — B. P. Grenfell and A. S. Hunt, *The Oxyrhynchus Papyri*, 1 (London, 1898) — has widely been seen as a model: yet in that first volume the editors included a section of "Descriptions of papyri not printed in full" (pp. 239—43), a style of publication now often designated "descripta", and occasionally imitated. Another admirable feature of that first volume was that, as the editors stated (p. v) "...we have, at the request of several subscribers to the Graeco-Roman Branch, in most cases given translations"; publishing editions of ancient papyri without a modern-language translation restricts access in yet another way.

### Illustrations

**Fig. 1.** Caption to image first sent "Inaros". Fragment of a papyrus roll, from Tebtunis (Fayum); fragments of this torn, rubbed, and worm-eaten roll are in at least two European collections, and several other manuscripts of the same text survive. P. Tebt. Tait 2 second century CE Egypt Exploration Society papyrus collection, housed within the Ashmolean Museum, Oxford 28.5 cm high × 13.0 cm wide Demotic Egyptian narrative: the story of an 'epic' armed contest for possession of the sacred boat of the god Amun at Thebes (Upper Egypt).

**Fig. 2.** Caption to image sent second "cartonage" Papyrus fragment, possibly from Tebtunis (Fayum); the cuts, tears, and roughly semi-circular top strongly suggest that the piece derives from cartonage. P. Carlsberg 23 second century BCE Carsten Niebuhr Institute, University of Copenhagen 16.4 cm high × 19.75 cm wide Demotic Egyptian lexicographic text: a listing of temple and royal-court occupations; see <http://www.hum.ku.dk/cni/papcoll/pc23.jpg>

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