

Snake Identification in the Ancient Egyptian Brooklyn Medical Papyrus

A New Study of the Twenty-Four Extant Registers
of the “Snakebite Papyrus”

Gonzalo M. Sanchez, Edmund S. Meltzer, Wolfgang Wüster,
Nicholas R. Casewell, and Gordon W. Schuett

SNAKE IDENTIFICATION IN THE ANCIENT EGYPTIAN
BROOKLYN MEDICAL PAPYRUS

SNAKE IDENTIFICATION IN THE ANCIENT EGYPTIAN BROOKLYN MEDICAL PAPYRUS

A New Study of the Twenty-Four Extant Registers of the "Snakebite Papyrus"

Gonzalo M. Sanchez, Edmund S. Meltzer, Wolfgang Wüster, Nicholas R. Casewell, and Gordon W. Schuett



LOCKWOOD PRESS

Columbus, Georgia

2024

Snake Identification in the Ancient Egyptian Brooklyn Medical Papyrus

All rights reserved. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, or by means of any information storage or retrieval system, except as may be expressly permitted by the 1976 Copyright Act or in writing from the publisher. Requests for permission should be addressed in writing to Lockwood Press, PO Box 1080, Columbus, GA 31902 USA.

ISBN: 978-1-957454-03-0

Copyright © 2024 by Lockwood Press

Cover design by Susanne Wilhelm

Library of Congress Cataloging-in-Publication Data

Names: Sanchez, Gonzalo M., author. | Meltzer, Edmund S., author. | Wüster, W. (Wolfgang), author. | Casewell, Nicholas R., author. | Schuett, Gordon W., author. | Brooklyn Museum. Manuscript. Papyrus no. 47.218.48. | Brooklyn Museum. Manuscript. Papyrus no. 47-218.85.

Title: Snake identification in the ancient Egyptian Brooklyn Medical Papyrus : a new study of the twenty-four extant registers of the "Snakebite Papyrus" / Gonzalo M. Sanchez, Edmund S. Meltzer, Wolfgang Wüster, Nicholas R. Casewell, Gordon W Schuett.

Description: Columbus, Georgia : Lockwood Press, 2024. | Includes bibliographical references and index. | In English; some text in ancient Egyptian (hieroglyphic script and transliteration) with English translation. | Summary: "This book offers a new examination of the Brooklyn Medical Papyrus, better-known as the Snakebite Papyrus, a pragmatic medical treatise from ancient Egypt concerned with snake identification, snakebite, and treatment. Dating to sometime in the seventh through fourth centuries BCE, the document is the first-known structured treatise on snakebites from antiquity. The papyrus was first translated into French by Serge Sauneron and published posthumously in 1989. Major advances in fields such as biogeography, climate and niche modeling, and linguistics in the past thirty years have brought new perspectives. The authors provide a review of Sauneron's and more recent studies and bring their own investigations, results, and comparisons to further clarify this historical document"— Provided by publisher.

Identifiers: LCCN 2024001008 (print) | LCCN 2024.001009 (ebook) | ISBN 9781957454030 (hardcover) | ISBN 9781957454047 (adobe pdf)

Subjects: LCSH: Brooklyn Museum. Manuscript. Papyrus no. 47.218.48. | Brooklyn Museum. Manuscript. Papyrus no. 47-218.85. | Snakes—Egypt. | Snakebites—Treatment—Egypt—History—To 1500.

Classification: LCC QL666.O6 S13 2024 (print) | LCC QL666.O6 (ebook) | DDC 597.960962—dc23/eng/20240202

LC record available at <https://lcn.loc.gov/2024001008>

LC ebook record available at <https://lcn.loc.gov/2024001009>

This paper meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper).

Dedicated to the scribes of yesterday and the researchers of today, with the hope that the following historical and cultural review underscores the vital importance of this papyrus devoted to snake identification for the ancient Egyptian physician.

Contents

Figures	ix
Tables	xii
Foreword	xiii
Preface	xv
Introduction	xvii
Abbreviations	xxiv

CHAPTER 1. VENOMOUS SNAKES IN ANCIENT EGYPT

1.1. The Role of Venomous Snakes in Ancient Egypt	2
1.2. Napoleon's Egyptian Expedition	14

CHAPTER 2. METHODOLOGICAL CONSIDERATIONS

2.1. An Interdisciplinary Approach to Snake Identification	20
2.2. Notes on the Translation	21
2.3. Symbolism of Color in Snake Identification	22
2.4. Regional and Environmental Considerations	23
2.5. Ancient Egypt's Range of Influence	27
2.6. Regional Geographic Listing of Venomous and Nonvenomous Biting Snakes	27
2.7. The Importance of Prognosis in Snake Identification	30
2.8. The Gods Invoked in the Various Registers	34

Chapter 3. SNAKE PAPYRUS REGISTERS 14 TO 37

14: <i>k3-n^cy</i>	42
15: <i>ḥf^c3 n ʿ3pp</i>	48
16: <i>g3ny</i>	53
17: <i>iKḥr</i>	59
18: <i>k3 n-^cm</i>	64
19: <i>ḏw-ḏdw</i>	68
20: <i>sdb</i>	71
21: <i>nbd</i>	75
22: <i>fy ti^cm</i>	79
23: <i>ḥnp</i>	83
24: <i>ḥnpw ḏšrt</i>	88
25: <i>nki</i>	92
26: <i>fy...</i>	97
27: <i>fy nft</i>	99
28: <i>fy ḥr dbwy</i>	103
29: <i>fy šri</i>	108
30: <i>fy</i>	110
31: <i>fy B_y</i>	114
32: <i>ḥf3w ʿr^cr</i>	118
33: <i>ḥf3w ntj</i>	127
34: []	135
35: <i>r3 bdd</i>	137
36: <i>sdbw ḥnd.tw ḥr.f n sḥt</i>	141
37: []	143

Contents

CHAPTER 4. RESULTS AND CONCLUSIONS

4.1. Snake Identification in the Brooklyn Papyrus in This Study: Primary and Alternate Choices	148
4.2. Estimated Snake Identification Confidence and Concordance Results	149
4.3. Incomplete Data by Egyptian Name	153
4.4. Regional Snakes to Consider for the Thirteen Missing Registers	155

APPENDICES

Appendix 1. Clinical rationale in our snake identification choices in relation to specific snakebite prognoses	160
Appendix 2. Discussion of snake identifications by (1) Sydney H. Aufrère and (2) Wendy R. J. Golding	164
Bibliography	169
About the Authors	181

Figures

- Fig. 1.1. Limestone votive of the goddess Meretseger from Deir el-Medina. New Kingdom. Museo Egizio, CC BY 2.5, via Wikimedia Commons.
- Fig. 1.2. Book of Gates Third Hour, Tomb of Ramesses I. Apep being warded off by a deity. Public domain, via Wikimedia Commons.
- Fig. 1.3. The god Ra in his solar barque (left) protected by the serpent Mehen, the goddess Isis, and other gods. The snake Apep lies on the sand bank, fettered and dismembered by Serket and her assistants. Amduat beginning of the 7th hour. Tomb of Seti I (KV-17). Photograph courtesy of Manna4you, via Flickr.
- Fig. 1.4. The "Cat of Heliopolis," a form of the sun god Re, slaying Apep. Tomb of Inherkau (TT359), Twentieth Dynasty. West Wall, middle register, Deir el-Medina. Image CC BY 2.0 via Wikimedia Commons.
- Fig. 1.5. Winged cobra protecting Queen Nefertari's cartouche. Descending corridor, South Wall, QV 66. Photograph courtesy of Manna4you, via Flickr.
- Fig. 1.6. Bronze statue of the goddess Wadjet lion-headed form wearing a uraeus. Buto, ca. 400–250 BCE. Musée d'Art et d'Histoire de Genève. Rama, CC BY-SA 3.0, via Wikimedia Commons.
- Fig. 1.7. Uraeus on the gold mask of Pharaoh Tutankhamun, Cairo Museum. Mark Fischer, CC BY-SA 2.0, via Wikimedia Commons.
- Fig. 1.8. The "Adorer." A god bows between the "Flaming One" and the "Fiery One." Book of the Earth, Ramesses VI burial chamber, North Wall. Photograph courtesy of Manna4you, via Flickr.
- Fig. 1.9. From the Third Hour of the "Book of Gates," Tomb of Seti I (KV17). The sun god Ra in his barque is protected by the serpent Mehen as he traverses the Underworld. Photograph courtesy of Manna4you, via Flickr.
- Fig. 1.10. Book of Gates, 4th Hour, middle register. Burial Chamber J of Ramesses IV. In the renewed life in the hereafter, time is represented by a many-coiled serpent, the passing of hours by twelve goddesses. Photograph courtesy of Manna4you, via Flickr.
- Fig. 1.11. "Book of Gates" ninth hour, lower register. Chamber E, South Wall, Tomb of Ramesses V–VI. The snake "Kethy" Osiris (a good serpent) breathes fire over the enemies of Osiris. Photograph courtesy of Manna4you, via Flickr.
- Fig. 1.12. Examples of snake hieroglyphs showing vipers, long serpents, cobras with and without extended hoods, cobra deities, and a multiheaded spitting cobra. With the exception of the letters *f* and *d*, all other signs are used as determinatives. Image by Gonzalo M. Sanchez, based on Grimal et al. 2000).
- Fig. 1.13. Frequently used Egyptian words for "snake" in hieroglyphs. Composed by Gonzalo M. Sanchez.
- Fig. 1.14. Pharaoh Djet in the First Dynasty (whose name means cobra) took his name from the hieroglyph (*d*) placing it into his serekh. Louvre Museum, CC BY 3.0, via Wikimedia Commons.
- Fig. 1.15. The Fourth Dynasty pharaohs Khufu, Djedefre, and Khafre used the "horned viper." From the Abydos king list with detailed hieroglyphs. Creative Commons license; composed by Gonzalo M. Sanchez.
- Fig. 1.16. Wooden figurine of the goddess Beset with metal snake staffs for protection of the mother and child during childbirth Thebes, Late Middle Kingdom. Acc. No. 1790. Manchester Museum. Photography Courtney McRae, CC BY-SA 4.0, via Wikimedia Commons.

Figures

- Fig. 1.17. *Cippus of Horus of the Crocodiles*, third century BCE. Steatite. Brooklyn Museum, Charles Edwin Wilbour Fund, 60.73. CC BY 3.0; photograph Gavin Ashworth. 10
- Fig. 1.18. Dendera Zodiac, Hathor Temple. (Original zodiac removed to the Louvre Museum). Snakes present in the main constellations (red arrow) and in the Decans (blue arrows). From Jollois and de Villiers (1809–1828), vol. 4. 12
- Fig. 1.19. The death of Cleopatra. 1890. John Collier (1850–1034). Public domain, via Wikimedia Commons. 13
- Fig. 1.20. *Description de l'Égypte*, pl. 6: Top: Eryx de la Thébaidé = *Eryx colubrinus*, based on plate, text description, and stated range (Upper Egypt). Middle: Eryx du Delta = *Eryx jaculus*, based on plate, text description, and stated range (Lower Egypt). Bottom: Vipère céraste = *Cerastes cerastes* (unmistakable). 15
- Fig. 1.21. *Description de l'Égypte*, pl. 8. Top: Coleuvre aux raies parallèles = *Spalerosophis diadema*, evidenced by the four prefrontal scales. Upper middle: Couleuvre à bouquets = *Platyceps florulentus*, first described as *Coluber florulentus* in this work. Lower middle: Couleuvre à capuchon = *Macroprotodon cucullatus*, described in this work. Bottom: Couleuvre oreillard = *Psammodphis sibilans*, identifiable from head and body pattern. 16
- Fig. 1.22. *Description de l'Égypte*, pl. 7. Top: Vipère des pyramides = *Echis pyramidum*, described in this work. Middle left: Vipère haje jeune, actually represents a juvenile *Naja nubiae*, the two dark neck bands being characteristic of this species. Middle right: Couleuvre maillée = *Malpolon insignitus*, described in this work. Top right, sketch middle right and bottom: Vipère haje = *Naja haje*. 16
- Fig. 1.23. *Description de l'Égypte*, pl. 4: “The authors” [the savants] state (p.184) that they did not have the relevant notes and descriptions available, and were therefore unable to describe them or determine what species they represented. 17
- Fig. 1.24. *Description de l'Égypte*, pl. 3. L'Aspic = *Naja haje*. 18
- Fig. 1.25. *Description de l'Égypte*, pl. 5: Top: *Telescopus obtusus*, uniform colour phase, identifiable by the dark bar through the eye, the vertical pupils, and the broad head. Middle: *Malpolon insignitus*; the very long and narrow frontal scale in the line drawing is characteristic, and the pattern is typical of juveniles and females. Bottom: large male *Malpolon insignitus*. 18
- Fig.2.1. Sahara Desert successive southern shifts by changing of North Africa rainfall levels from 8500 BCE to 3500 BCE (yellow =150 mm/yr; green = 450 mm/yr.) Desert displacements correlate with those of the corresponding vegetation southerly shift into the Sahel. Image by Gonzalo M. Sanchez incorporating published data by Kuper and Kröpelin 2006. 24
- Fig. 2.2. Current geographical distribution of boomslang, black mamba, and puff adder in northeastern and southern Sudan and Eritrea. 25
- Fig. 2.3. Pharaonic Egypt geographical areas of influence extending from the 37°N to 13°N, beyond Khartoum in the ancient kingdom of Irem (ca. 2,750 km north–south as the crow flies). Composed by Gonzalo M. Sanchez. 26
- Fig. 2.4. Sobek. 34
- Fig. 2.5. Neith. 34
- Fig. 2.6. Ra. 35
- Fig. 2.7. Ptah. 35
- Fig. 2.8. Hathor. 36
- Fig. 2.9. Geb. 36
- Fig. 2.10. Serket. 37
- Fig. 2.11. Seth. 37
- Fig. 2.12. Horus. 38

Figures

Fig. 2.13. Khonsu.		
Fig. 3.1. Nubian spitting cobra (<i>Naja nubiae</i>). Photograph by Wolfgang Wüster.		
Fig. 3.2. Palestine viper (<i>Daboia palaestinae</i>). Photograph by Wolfgang Wüster.		
Fig. 3.3. Boomslang (<i>Dispholidus typus</i>). Photograph by Wolfgang Wüster.		
Fig. 3.4. The boomslang's four rear fangs. Young female. Photograph courtesy and copyright Johan Marais. African Snakebite Institute.		
Fig. 3.5. Boomslang, green phase. Snake Centre, Ngorongoro Conservation Area, Tanzania. Photograph by William Warby. CC BY 2.0 via Wikimedia Commons.		
Fig. 3.6. Boomslang recorded from these sites in Kassala (Corkill 1935). Map composed by Gonzalo M. Sanchez.		
Fig. 3.7. Black desert cobra (<i>Walterinnesia aegyptia</i>). Photograph Ltshears; public domain.		
Fig. 3.8. Burrowing asp (<i>Atractaspis bibronii</i>). Photograph courtesy of and copyright Johan Marais. African Snakebite Institute.		
Fig. 3.9. Burrowing asp (<i>Atractaspis bibronii</i>). Long erectile front fang. Photograph courtesy of and copyright Johan Marais. African Snakebite Institute.		
Fig. 3.10. Black mamba (<i>Dendroaspis polylepis</i>). Photograph by Wolfgang Wüster.		
Fig. 3.11. Egyptian cobra (<i>Naja haje</i>). Photograph by Wolfgang Wüster.		
Fig. 3.12. Sahara Desert viper (<i>Cerastes vipera</i>). Photograph by Wolfgang Wüster.		
Fig. 3.13. Egyptian carpet viper (<i>Echis pyramidum</i>). Photograph by Wolfgang Wüster.		
38	Fig. 3.14. Burton's carpet viper (<i>Echis coloratus</i>). Photograph by Wolfgang Wüster.	72
45	Fig. 3.15. Rhombic night adder (<i>Causus rhombeatus</i>). Photograph by Wolfgang Wüster.	74
46	Fig. 3.16. Dice snake (<i>Natrix tessellata</i>). Photograph by Wolfgang Wüster.	76
50	Fig. 3.17. Green night adder (<i>Causus resimus</i>). Photograph by Wolfgang Wüster.	78
50	Fig. 3.18. Field's horned viper (<i>Pseudocerastes fieldi</i>). Photograph by Wolfgang Wüster.	80
50	Fig. 3.19. Arabian horned viper (<i>Cerastes gasperettii mendelssohni</i>). Kristol Zyskowski & Yulia Bereshpolova, CC BY 2.0, via Wikimedia Commons.	81
51	Fig. 3.20. Moorish viper (<i>Daboia mauritanica</i>) (contrasted form). Photograph by Wolfgang Wüster.	85
55	Fig. 3.21. Egyptian cobra (<i>Naja haje</i>). Photograph by Wolfgang Wüster.	94
57	Fig. 3.22. Black-necked spitting cobra (<i>Naja nigricollis</i>). Photograph by Wolfgang Wüster.	95
57	Fig. 3.23. Geographical distribution of <i>Echis pyramidum</i> (yellow areas); modified by Gonzalo M. Sanchez after http://apps.who.int/bloodproducts/snakeantivenoms/database/Images/SnakesDistribution/Large/map_Echis_pyramidum.pdf ; Dobiey and Vogel 2007, 138.	98
61	Fig. 3.24. Horned viper (<i>Cerastes cerastes</i>). Photograph by Wolfgang Wüster.	105
62	Fig. 3.25. Left: Horned viper. El Golli Mohamed, CC BY-SA 4.0, via Wikimedia Commons. Right: Hieroglyph I9 equivalent for the letter <i>f</i> showing the horned viper in a limestone relief at the shrine of Pharaoh Sesostris I, Karnak Temple, Luxor. Dida	
65		
69		

Tables

(David Schmid). TCC BY-SA 3.0, via Wikimedia Commons. Image modified and compiled by Gonzalo M. Sanchez.	106
Fig. 3.26. Blunt-nosed viper (<i>Macrovipera lebetina</i>). Photograph by Wolfgang Wüster.	111
Fig. 3.27. Amulet of a crouching bear in green porphyry. Late period Egypt (664–332 BCE). Cleveland Museum of Art.	113
Fig. 3.28. Andesite Porphyry. Jstuby at en.wikipedia, public domain via Wikipedia Commons.	113
Fig. 3.29. Lebanon viper (<i>Montivipera bornmuelleri</i>). Mickey Samuni-Blank, CC BY-SA 3.0 via Wikimedia Commons.	116
Fig. 3.30. Gardiner’s sign I12. The uraeus, the rearing cobra.	119
Fig. 3.31. It is used in this papyrus as a determinative for Snake #32.	119
Fig. 3.32. Uraeus crown and earrings. Tomb of Queen Nefertari. (QV 66, Chamber G, Valley of the Queens, Luxor, Egypt.) Photograph courtesy Manna4you, via Flickr.	120
Fig. 3.33. Uraeus on Pharaoh Tutankhamun’s diadem. The cobra’s throat pattern on the tiara is more akin to that of <i>N. nubiae</i> (right) than to <i>N. haje</i> . The color substitution of blue for white and red for black follows artistic convention. <i>Naja nubiae</i> photo courtesy of Steven Spawls; composition by Gonzalo M. Sanchez.	120
Fig. 3.34. Rearing Egyptian cobra (<i>Naja haje</i>). Photograph by Wolfgang Wüster.	122
Fig. 3.35. Hooded malpolon (<i>Malpolon moilensis</i>). Photograph by Wolfgang Wüster.	124
Fig. 3.36. Puff adder (<i>Bitis arietans</i>). Photograph by Wolfgang Wüster.	130
Fig. 3.37. Puff adder’s rectilinear motion. Photograph by Wolfgang Wüster.	130
Fig. 3.38. Quail chick (<i>Coturex coturex</i>).	131
Fig. 3.39. Map of Khartoum, Sudan, and the area south to the 13th	

parallel south, showing sites of <i>Bitis arietans</i> identifications by Marno (1873) and Osman-El Sir (1988). Composed by Gonzalo M. Sanchez.	132
Fig. 3.40. A large whip snake (<i>Dolichopis jugularis</i>). Dûrzan Cîrano, CC BY-SA 4.0, via Wikimedia Commons.	139
Fig. 3.41. Eastern Montpellier snake (<i>Malpolon insignitus</i>). Photograph by Wolfgang Wüster.	140
Fig. 3.42. Forskål’s sand snake (<i>Psammophis schokari</i>), head detail. Photograph by Wolfgang Wüster.	145

Tables

Table 1. Prognosis: the victim will die.	31
Table 2. Prognosis: the victim may die.	31
Table 3. Prognosis: the victim will live.	31
Table 4. Prognosis: the victim will live conditioned on treatment.	32
Table 5. Prognosis: the victim will live conditioned on days passed since bite.	32
Table 6. Prognosis: the victim will live conditioned on test results.	32
Table 7. Prognosis: the victim will have fever for a number of days.	33
Table 8. Identifications according to the present study.	148
Table 9. Snake Identification in the Brooklyn Medical Papyrus, Registers 14–37 by various authors, 1989–2024.	150

Foreword

This extensively researched, well-documented, and lavishly illustrated new interpretation of the Brooklyn Museum Medical Papyrus (also known as the Snake Papyrus) is a welcome addition to the literature on ancient Egyptian medicine.

When most Egyptologists and lay people think of snakes in Egypt, the cobra and horned viper readily come to mind. With a little more thought, the fabled asp that allegedly killed Cleopatra comes to mind. The Egyptologist might then think of the dreaded Apep, who nightly threatened the Sun God as he traveled through the night. Then we go blank, so it is somewhat of a shock to find that this ancient manual to recognize and treat snake bites lists thirty-eight different reptiles!

Gonzalo Sanchez, neurosurgeon and independent scholar of Egyptology, together with Edmund Meltzer, a leading philologist, worked through the papyrus to provide a description of each snake and the nature of its bite and the treatment and prognosis. They had previously collaborated to publish the definitive modern interpretation of the Edwin Smith Papyrus. Dr. Sanchez prepared to tackle this work by earning an Advanced Snake Identification Certificate from the African Snakebite Institute of South Africa. Then he recruited a team of three prominent herpetologists to review the translation. Based on their knowledge of the coloration, physical characteristics, loci, behavior, and reported effects of envenomation, they were able to make reasonable

identifications of the species for all but three. They also could show that due to coloration variants, the same snake could be counted as two different snakes by the ancient observers. Most fascinating to me was their compelling evidence for identifying the snake behind the mythological Apep serpent, which I believe is done here for the first time. I will not spoil it by telling you here.

The Snake Papyrus is a pragmatic manual, which would have been an important reference for the doctors on military campaigns and at construction sites. For this purpose, it needed to include snakes that dwelled in territories that the Egyptians conquered as well as those native to the lower Nile Valley. The authors also had to consider the effects of climate change over the millennia. Many animals that graced the Nile in ancient times have been relentlessly forced to move south deeper into Africa. Reptiles are no exception.

This papyrus was first translated into French by Serge Sauneron and published posthumously in 1989. Unfortunately, the papyrus is missing the data on the first thirteen and there are some lacunae in documentation for others, but there is adequate data for the remaining twenty-four. The original was written in hieratic script. Dr. Meltzer transcribed it into hieroglyphs, and for ease of comprehension has published them to read from left to right. He documents the points in which his translation differs and explains his reasoning. This is a useful feature for his fellow philologists. The trio of herpetologists also collaborated well to use all the

Foreword

available clues to identify the most likely snake or snakes that could fit in each case.

Ancient Egyptian medicine showed an extraordinary degree of pragmatism in fields where the cause of illness was obvious, as in the cases of the Edwin Smith Papyrus and in the Snake Papyrus. The difference here is that there was little effective treatment for snake bites, so the physicians invoked magic. Specific gods were called upon to assist with specific snakes in most cases. This

seems to be based on how dangerous the snake was as well as the prognosis. The latter may have been the most useful element of this manual for the ancient physicians.

Those who share my passion for ancient medicine as well as those interested in the environment of ancient Egypt will find much to engage them in this important work.

W. Benson Harer, Jr. MD

Preface

Though most individuals are intrigued by snakes, especially the dangerous ones, often it is a love-hate relationship. Among the 3,700 or so extant species, roughly 600 (16 percent) are classified as venomous. Familiar to most, the vipers and elapid snakes (cobras, mambas) of Africa and Asia typically draw the greatest interest. Why? They can be large, deadly—and exciting. The mambas, which are distributed throughout tropical Africa, are large (the black mamba can exceed twelve feet in total length) and, under some circumstances involving humans, are bold and formidable. Moreover, they have extremely powerful neurotoxic venoms to back up their bravado. Bites from any of the four mamba species are likely to be fatal without medical intervention. Fortunately, human–mamba interactions do not appear to be common.

The African and Asian vipers, some of them called asps, also can attain large sizes (several species can exceed ix feet in total length) and deliver large amounts of powerful venom. Nonetheless, it is the small and abundant species, such as saw-scaled vipers, that often cause the largest loss of life. Curiously, their venom is quite potent and can pack a lethal punch to humans.

But the magnificent and showy cobras are the stars of the show. They are large, alert, and potentially lethal. Despite being a source of death and morbidity, they have played a critical role in human worship and intrigue. They appear as deities and statues, are worshiped and revered, and are often mentioned in ancient

texts. Indeed, it would seem that we humans have had a long and complicated love-hate relationship with dangerous snakes.

Our book is about snakebite and snake identification in ancient Egypt. We have attempted to provide a new examination to the first part of the Brooklyn Medical Papyrus, also called the Snake Papyrus, which is a pragmatic medical treatise concerned with snake identification, snakebite and its treatment. Though its place of origin is unknown, it is generally attributed to the area of Heliopolis near Cairo. The dating of this document remains questionable, but generally is considered to be 700 to 330 BCE. It may, however, go back much earlier. It resembles the structure of the medical trauma treatise known as the Edwin Smith Papyrus, ca. 2200–2000 BCE, recently updated by Gonzalo Sanchez and Edmund Meltzer (2012). Importantly, the Snake Papyrus is the first-known structured treatise on snakebite from antiquity.

Serge Sauneron, a French Egyptologist, was commissioned to reconstitute and translate the Snake Papyrus in 1966. His efforts were completed in 1970 and published in French in 1989. The first section describes the snakes and their bites, and the last line states that there have been descriptions of thirty-eight snakes and their bites, of which the descriptions of the first thirteen are lost (unfortunately, this part of the document is missing). Accordingly, owing to the lost section, the papyrus names twenty-four snakes and the appearance of their bites, and sometimes information on their habits. The papyrus was intended to enable the healer to identify the snake from the

Preface

description given by the patient and apply appropriate prognosis and treatment. Given that the translation and interpretation of the Brooklyn Medical Papyrus was done over three decades ago, with renewed attempts for snake identification from 1996 to 2012 by Serge Sauneron (1989), David Warrell (cited by Nunn 1996), Christian Leitz (1997), Nicole Pierrette Brix (2011), Sydney H. Aufrère (2012), and Wendy R. J. Golding (2020), we felt that a fresh perspective was needed, especially with the major advances in fields such as biogeography, climate and niche modeling, and linguistics. Also, snake systematics has grown tremendously over the past thirty years. In all, we provide a critique of Sauneron's opinions of snake identification to further clarify this remarkable historical document. We hope that our new analysis is more than mere embellishment.

Today, not unlike in ancient times, snakebite remains a leading source of human mortality despite technological advances in treatment. This unfortunate outcome is common in tropical regions where bitten individuals may have little or no access to modern medical facilities. Globally, there are an estimated 421,000 envenomations each year (1 in 4 snakebites) and 20,000

deaths, but snakebites often go unreported. The World Health Organization (WHO) considers snakebite as one of the leading neglected tropical diseases (www.statnews.com/2017/06/12/snakebite-who-priority/).

As described by Dr. Harer in the foreword of this book, there was little effective treatment for snake bites in ancient Egypt, so healers often invoked magic. Specific gods were called upon to assist with specific snakes, especially the deadliest cases. In remote tropical villages, incantation practices are still used, perhaps out of fear of modern medicine, though tradition and culture also must play a role. Perhaps this book of ancient snakebites and their treatments will lend insights to the range of responses used today. History is almost always our best teacher.

Gonzalo M. Sanchez, MD
Edmund S. Meltzer, PhD
Wolfgang Wüster, PhD
Nicholas R. Casewell, PhD
Gordon W. Schuett, PhD

Introduction

The Brooklyn Papyrus is a medical treatise from ancient Egypt dealing with snakebite. Its date and place of origin are unknown, but it is generally attributed to the area of Heliopolis near Cairo. Purchased from an unknown source by American journalist and Egyptologist Charles Wilbour in 1889, it was donated to the Brooklyn Museum by Wilbour's daughter Theodora in the 1930s.

This papyrus, also known as The Snakebite Papyrus, was written in the hieratic script. Its proposed date of origin ranges from 2200 BCE (Dynasty 6), to 700 BCE or even later to around 300 BCE (Dynasty 30).

In 1966 French Egyptologist Serge Sauneron was commissioned by the museum to reconstitute and translate the papyrus. The document's translation into French was published posthumously in 1989 by the Institut français d'archéologie orientale du Caire as *Un Traité Égyptien d'Ophidiologie* (TEO) Sauneron recognized the papyrus was in two fragments. It is housed under catalog numbers 47.218.48 and 47.218.85 at the Brooklyn Museum.

The first section of the papyrus (which we deal with in this work) comprises a systematic account of snakes and their bites and originally contained descriptions of thirty-seven snakes and one chameleon and their bites. The information on the first thirteen snakes and the first portion of the fourteenth snake (*k3n5y*) in numbered paragraphs, or registers, is missing.

Sauneron concluded that this was information on snakes that is unfortunately lost but he deduced from the treatment portion of the papyrus the following names of snakes that potentially may have been included: *shṯf*, *ḥby*, *mꜥdy*, *k3dy*, *g3rš*, *ḥf* (3w) *rr*, *msw-bdš*, and *btt* (TEO, 165). With the addition of these names there are a total of thirty-two snakes in need of identification, but the incomplete data make that goal not easily attainable.

An intriguing example is one of the thirteen snakes that is missing at the beginning of this papyrus, named *g3rš*, for which only scattered pieces of information can be found in the Brooklyn Papyrus. Sauneron noted that the name *g3rš* was related to the word "scales" in Ugaritic, and in Akkadian ("*kursimtu*," TEO, 162). He concluded that the Egyptian application of the term *g3rš* to a snake was likely connected to its most prominent physical characteristic, which in this case would apply to the Palestine viper (*Montivipera bornmuelleri*), the blunt-nosed viper (*Macrovipera lebetina*), and the Moorish viper (*Daboia mauritanica*). We consider *g3rš* to be the Lebanon viper (*Montivipera bornmuelleri* (SENAME, 322–23; see fig. 3.29 and ch. 4.3). This example illustrates the level of knowledge the original authors and users of the Brooklyn Papyrus must have possessed in ancient Egypt.

The paragraphs to which we have access in the first section of the papyrus name twenty-four snakes (and one chameleon) providing a brief description of the snake, sometimes its habits, the appearance of its bite and the effects on the victim. Prognosis and recommended treatment usually follow. As indicated in

Introduction

the preface, the papyrus was intended to enable the healer to identify the snake from the description given by the patient and to offer appropriate prognosis and treatment. The format for the remedies is strictly pragmatic, and most are based on the species of snake responsible for the bite, or on the symptoms suffered by the victim.

The rest of this papyrus (which we do not deal with) is devoted to snakebite treatments, ending in Register 100. In this section there are no prescribed treatments for lethal snakebites. Our work deals strictly with the relevant issues of snake identification and how that was determined and utilized. Such identification in the Brooklyn Papyrus is difficult and uncertain in some cases, owing to incomplete information, absence of images, lack of familiarity with ancient terms, and translation idiosyncrasies of the text.

The snake identification results from the Brooklyn Medical Papyrus by Sauneron, Leitz, Brix, Aufrère, and Golding are highly variable, likely due to employed methodologies and personal bias. Aside from the intrinsic interest of its subject matter, this papyrus claims our attention for several reasons and compels us to devote a new study to the snake identification, despite the various works already available, starting with the excellent edition by Sauneron, *Un Traité Égyptien d'Ophidiologie* (1989). Our rationale is based on lessons learned in our prior work on the medical trauma treatise known as the Edwin Smith Medical Papyrus (ca. 2200–2000 BCE; Sanchez and Meltzer 2012)—namely, the advances in understanding from both the scientific and the Egyptological-

linguistic points of view. The Brooklyn Papyrus bears structural resemblances to the Edwin Smith Papyrus. In its manner of presentation and organization of cases it invites comparison with the trauma treatise of the Edwin Smith Papyrus, which survives in a much earlier manuscript.

The other major reason for us to engage in further work on this project is recent developments in scientific-herpetological research. An example is the new identification of a snake mentioned in the papyrus text with a species that has only been discovered fairly recently by herpetologists, the *Naja nubiae* (see Register 32).

The general approach taken to translating the Egyptian text is the same used for the Edwin Smith Papyrus, as explained in the philological introduction to our edition of that work.

Our work on snake identification based on the ancient Egyptians' descriptions raises the question of whether to trust in their assessment of the individual snake's physical characteristics and behavior. In her study on animal behavior in Egyptian art, Linda Evans (2010, 1656–66) notes that animals were a primary feature in Egyptian life, using their images to “illustrate and inform,” often rendering considerable morphological details, including reptile scales and feather patterns, sufficiently accurately to identify individual species, thus “capturing the definitive physical attributes of the many creatures with which they interacted.” Animal behavior was learned by observation, particularly as related to dangerous snakes sharing their habitat.

Introduction

This recording of the behavioral repertoire of dangerous species, often being species-specific, can be used toward identification.

Symptom analysis of each snakebite and the prognosis in each case has facilitated our identification process. We have also observed that the deity in which the patient trusted for help ("stands in need of"; see ch. 2.8), may have had a geographical and environmental connection with certain snake types. As tenuous as these relationships are, together they provide valuable hints contributing to snake identification.

Prior published results of snake identification in the Brooklyn Papyrus by Serge Sauneron (1989), David Warrell (cited by Nunn 1996), Christian Leitz (1997), Nicole Pierrette Brix (2011), Sydney H. Aufrère (2012), and Wendy R. J. Golding (2020) are listed in table 9.

Serge Sauneron identified snakes in the Brooklyn Papyrus (*TEO*, 164–65) by classifying them as "probable" or "possible"; as venomous or inoffensive; and sometimes simply as being in the snake family. Table 1 summarizes Sauneron's primary identifications. From his results, we surmise an overall confidence level of "probable" species identification in 55 percent and identification level as to family in only 20 percent.

Various later studies aimed at further elucidation of the snakes' identities emerged based on Serge Sauneron's translation of the Brooklyn Papyrus. The conclusions of David Warrell, professor of tropical medicine and infectious diseases, Oxford University, are cited in John F. Nunn's *Ancient Egyptian Medicine* (pp. 185–

86). From his results, we can surmise an overall identification confidence level of 50 percent, but agreeing with Sauneron in only 20 percent of his choices.

Christian Leitz in 1997 published his work on snake names in the Egyptian and Greek venom books (*Die Schlangennamen in den ägyptischen und griechischen Giftbüchern*) with the assistance of Prof. Dr. Heinz-Josef Thissen, who encouraged the author to analyze the ancient texts, and of Dr. Wolfgang Böhme, head of the herpetological department of the Zoological Research Institute Museum König in Bonn. He also credited the work of Serge Sauneron. Leitz acknowledges the two most important classical texts about poison, the *Alexipharmaca* of Nicander and Philumenus's *On Poisonous Animals and Their Remedies* (Wellmann 1908), as well as subsequent works by various authors through 1986. From Leitz' results we can surmise his confidence level of snake identification as 83 percent as to species. Leitz agrees with Sauneron in only 24 to 37 percent of cases, attributing such discrepancy to his death before he was able to complete his edition.

Nicole Pierrette Brix's 2011 study included current herpetological information coupled with ancient Egyptian iconography and texts, and considered snake species that had been modified by the disappearance of a variety of biotopes and human population expansion. She claimed to be able to prove that there were ophidian species in ancient Egypt that herpetologists did not know were in northeast Africa at one time. Her combined

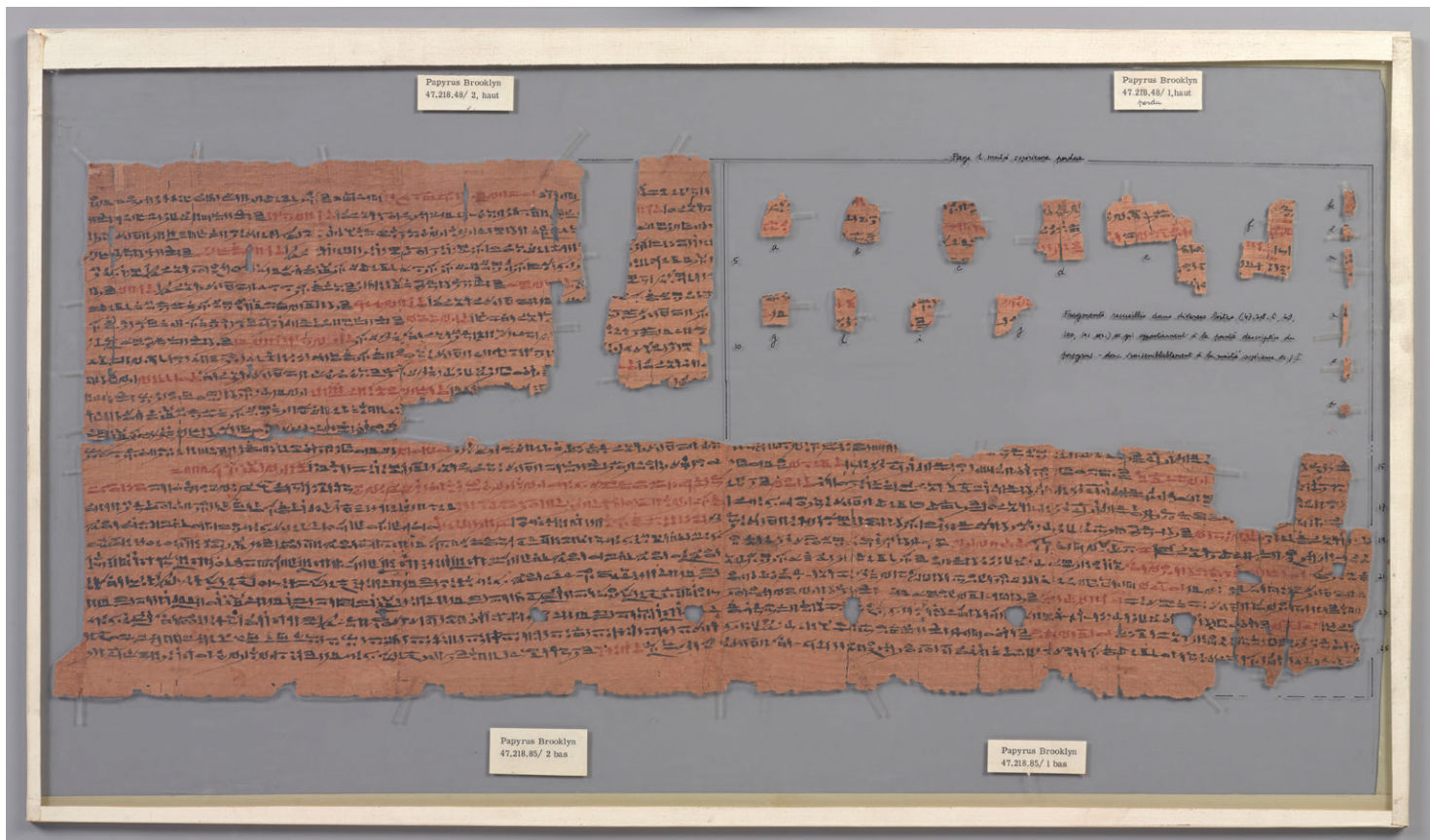
Introduction

methodology, she believed, allowed for better understanding of the Egyptian drawing conventions in snake representations and of their religious significance. Brix postulated that snakes were represented close to their real appearance in Old Kingdom Egypt, evolving into “composites,” which acquired new characteristics as mythological ophidians. Such is the case with the snake Apep. In her snake identification she lists several snakes that have disappeared from the territory of modern Egypt. From Brix’s results we surmise a confidence level of 95 percent. Brix’s concordance with Sauneron’s identifications is only 29 percent.

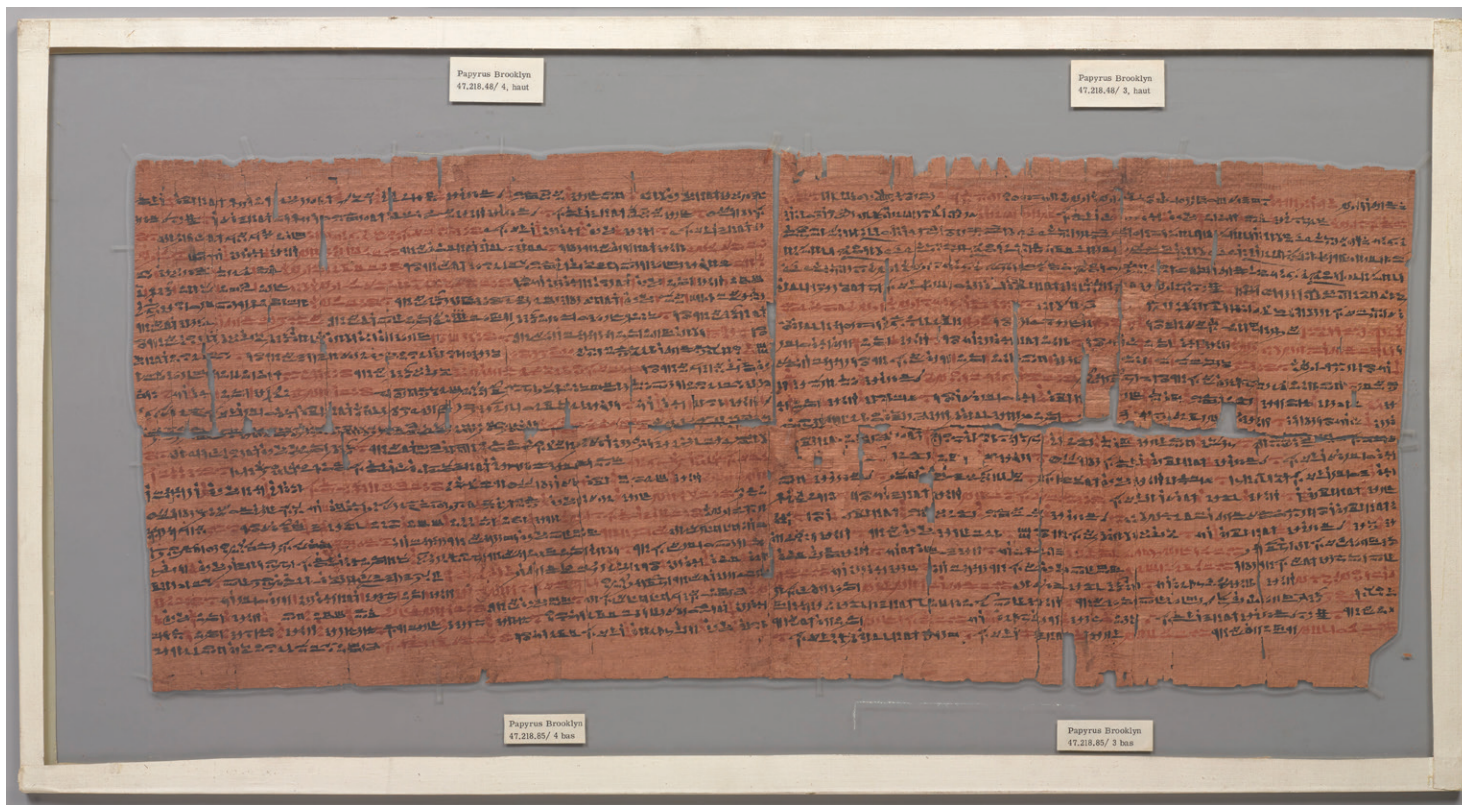
Sydney H. Aufrère carried out his 2012 epistemological study of the symptomatology of the snake bites described in the Brooklyn Papyrus. He described: (1) the snake; (2) the symptoms of the bite; (3) prognoses; (4) medico-magical techniques; and (5) the associated divine force between the animal and a deity. He stressed that snake identification can only be expressed in terms of probability, from very large to zero. From Aufrère’s results

we surmise an identification confidence level of 70 percent: 33 percent with regard to species and 37 percent with regard to family. His concordance agreement with Sauneron is 46 percent, of which 17 percent is in snake species and 29 percent is in snake family.

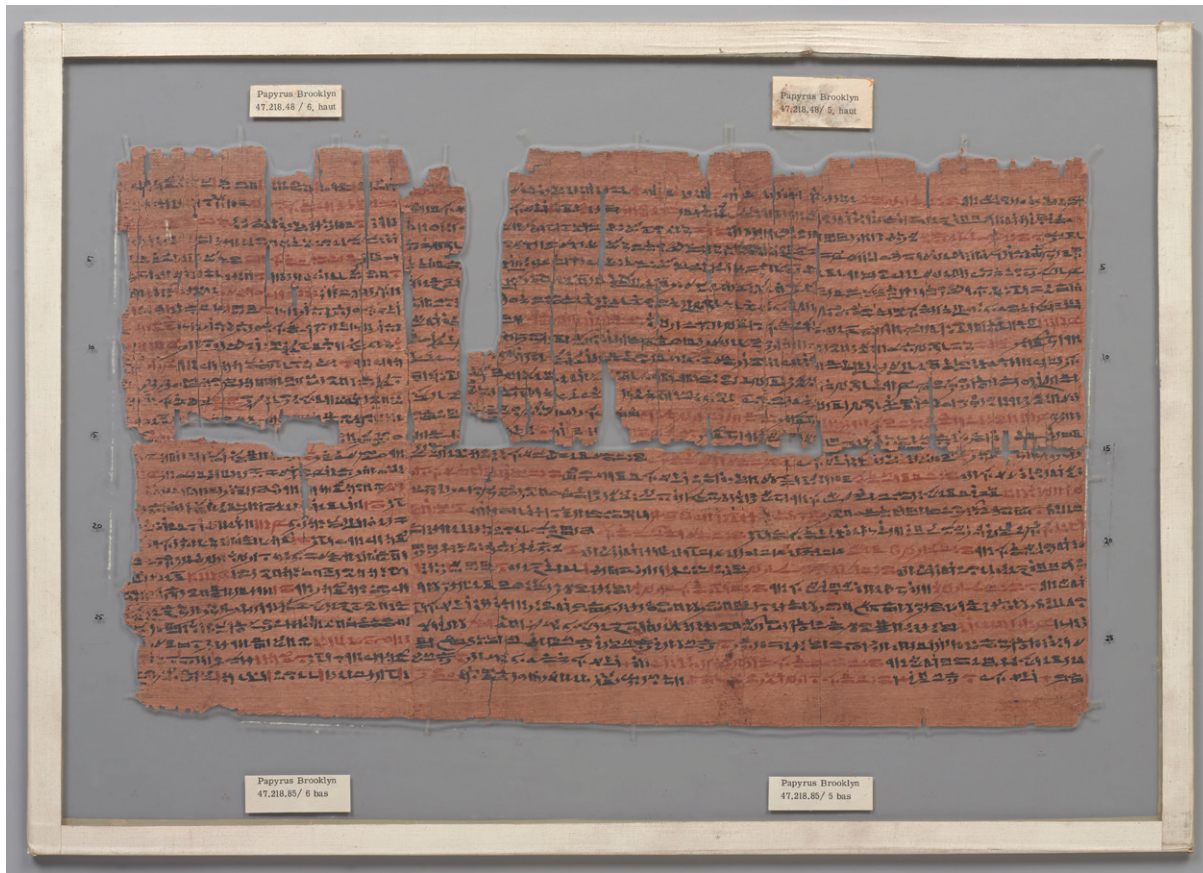
Wendy R. J. Golding published her doctoral thesis at the University of South Africa (2020) entitled “The Brooklyn Papyrus (47.218.48 And 47.218.85) and Its Snakebite Treatments.” This work included all one hundred Registers in the Papyrus. Chronologically Golding’s work and ours overlapped. Both Golding’s work and ours employed similar methodologies for our respective studies in snake identification. Dr. Golding’s results reveal the highest level of concordance with ours as compared with those of the other authors publishing on this subject. An analysis of her work is the subject of appendix 2(2).



Papyrus Brooklyn 47.218.48/ (above); 47.218.85 (below); 1&2 (right to left). Via Wikimedia Commons.



Papyrus Brooklyn 47.218.48 (above); 47.218.85 (below); 3&4 (right to left). Via Wikimedia Commons.



Papyrus Brooklyn 47.218.48 (above); 47.218.85 (below); 5&6 (right to left). Via Wikimedia Commons.

Abbreviations

<p><i>AEM</i> Nunn, John F. <i>Ancient Egyptian Medicine</i>. Norman: University of Oklahoma Press, 1996.</p> <p><i>CDME</i> Faulkner, Raymond O. <i>A Concise Dictionary of Middle Egyptian</i>. Oxford: Griffith Institute, 1962.</p> <p><i>DSA</i> Spawls, Stephen, and Bill Branch. <i>The Dangerous Snakes of Africa</i>. London: Southern Book Publishers, 1995.</p> <p>Gardiner Gardiner, Alan H. 1957. <i>Egyptian Grammar: Being an Introduction to the Study of Hieroglyphs</i>. 3rd ed. London: Griffith Institute.</p> <p><i>JAC</i> <i>Journal of Ancient Civilizations</i></p> <p><i>JARCE</i> <i>Journal of the American Research Center in Egypt</i></p> <p><i>JSSEA</i> <i>Journal of the Society for the Study of Egyptian Antiquities</i></p> <p><i>NS</i> new series</p> <p><i>OEAE</i> Redford, Donald, ed. <i>The Oxford Encyclopedia of Ancient Egypt</i>. 3 vols. Oxford: Oxford University Press, 2001.</p>	<p><i>SENAME</i> Geniez, Philippe. <i>Snakes of Europe, North Africa and the Middle East: A Photographic Guide</i>. Translated by Tony Williams. Princeton: Princeton University Press, 2018.</p> <p><i>TEO</i> Sauneron, Serge. <i>Un traité égyptien d'ophiologie: Papyrus du Brooklyn Museum No 47.218.48 et .83</i>. Cairo: Institut français d'archéologie orientale, 1989.</p> <p><i>Wb.</i> Erman, Adolf, and Hermann Grapow, eds. <i>Wörterbuch der ägyptischen Sprache</i>. 12 vols. Berlin: Akademie, 1926–1961.</p> <p><i>Wb. der med.</i> Texte Deines, Hildegard von, and Wolfhart Westendorf. <i>Wörterbuch der medizinischen Texte</i>. 2 vols. Grundriss der Medizin der Alten Ägypter 7. Berlin: Akademie, 1961</p> <p><i>WCH</i> "WCH Clinical Toxinology Resources." University of Adelaide. http://www.toxinology.com.</p>
--	--