A Small Step for a Man,
a Giant Leap for a People
—The Coptic Alphabets

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Abstract. The paper looks at the beginnings of the Coptic alphabet in first- and second-century Egypt from different angles. It reviews and builds on the sometimes-contradictory research from the social perspective while also considering practical challenges for the ancient writers. It explores the relevance of cognitive factors regarding the transition to the first alphabetic writing system for the Egyptian language.

In the later Roman period (1st / 2nd c. AD), new writing systems to notate the Egyptian language emerged, which were to suit the needs of the evolved Egyptian language. The Greek alphabet and the Demotic script served as their models and resources. The impetus for this change must be sought in the social setting. The paper pulls together sociolinguistic and empirical past research and adds the cognitive-linguistic angle. This contribution is not a complete account of the argument, but a deeper dive into three issues that sharpen aspects of the argument made and the hypothesis put forward.

Egyptian could be written with three writing systems for most of its history. These were a cursive for day-to-day writing, a script primarily used in religious contexts, and a script used for monumental inscriptions (Houston, Baines, and Cooper, 2003, pp. 440–442). The day-to-day writing system has traditionally lent its name to the stage of Egyptian since Ptolemaic times. Thus, we speak of Demotic in the Ptolemaic and early Roman periods and of Coptic in the later Roman and early Byzantine periods. These labels are solely owing to research traditions; the Egyptian language developed continuously.

Egypt came under Ptolemaic rule in the aftermath of Alexander's victories (4th c. BC) and under Roman rule following Octavian's / Augustus' victory at Actium (1st c. BC). The later Roman period saw a political, societal and cultural turnover. Politically, the central power weakened, as

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evident in the requirements for valid wills after the Constitutio Antonini-ana (AD 212) granted citizenship to many inhabitants of the empire. The requirements related to the distinction between Roman and non-Roman wills disappeared and Egyptian became a permissible language (Garel and Nowak, 2017). Societally, we see mixture. Naming practices regarding double names indicate a thorough mixture of the Greek and Egyptian social brackets in everyday life. Successful individuals such as the notary Hermias (Vierros, 2012) in Ptolemaic Pathyris, and the businessman Phoibammon in early Byzantine Aphrodito (Keenan, 2007, pp. 233–237) confirm Kraus' (2000) hypothesis that social brackets were increasingly determined by wealth rather than ethnicity. Economically, we observe decline. The building activity in villages and cities decreased and the defence system finally crumbled under the Sassanid attacks (7th c. AD) (Foss, 2003; Keenan, 2007; Kiss, 2007; Sänger, 2011; van Minnen, 2007). In this setting, local and clerical, Christian, institutions took on new tasks in the educational and administrative spheres (Fournet, 2019, Chapter 4; Quack, 2017b; Wipszycka, 2007).

The Coptic alphabet emerged as the most salient strand amongst several writing systems, which drew on the Greek alphabet and the Demotic script as models and graphemic resources (Quack, 2017a). Apparently, a range of small communities of practice[1] developed writing systems in this period of time, potentially motivated by the general atmosphere of change. The predominance of the Coptic alphabet results from social factors, whereas the origins of the Coptic alphabets are also linked to the cognitive concept of a best fit between a writing system and the language to be represented.[2]

Socio-linguistically, we notice the imbalance between Greek and Egyptian with regard to Matras' (2009) criteria for a language to be successful in a bilingual setting, which we extend to a writing system: a writing system, educational backing, and political backing. Quack (2017a) and Choat (2012) prove wrong convincingly Bagnall's (1993) hypothesis that there was a gap of about 150 years between the disappearance of the Demotic and the emergence of the Coptic scripts. Nonetheless, at the time, the Greek alphabet was an established writing system with educational and political backing, whereas the Coptic script was in its infancy.

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1. A community of practice is a group of people who is engaging in exchange of knowledge and practices. Prime examples are schools (Unwin, Hughes, and Jewson, 2007).

2. Alternative hypotheses: Demotic was no longer fit for the current stage of the language (Dieleman, 2005, p. 71; Stadler, 2008, pp. 159–160), Coptic evolved as an in-group writing system (Bagnall, 2005; Choat, 2012, p. 588; Quack, 2017a, p. 73; Torallas Tovar, 2004b, p. 59; Torallas Tovar and Vierros, 2019, p. 488), Coptic evolved in the context of local nationalistic uprisings (Choat, 2009, p. 354; Clackson, 2010, p. 94). As the references show, all of these have been refuted.

Socio-culturally, we see, as mentioned, contact in day-to-day life intensify. This is not least evident in the widespread use of loanwords, from Egyptian into Greek and vice versa, referring to everyday realities (Förster, 2002; Torallas Tovar, 2004a,b; 2007; 2017).[3] The use of loanwords is particularly common in the context of Christianity, the rise of which constitutes the most fundamental cultural change of the time (Edict of Milan, AD 313, Edict of Thessalonika, AD 380) (Depauw and Clarysse, 2013; Houston, Baines, and Cooper, 2003). In examples such as 'father', the Egyptian word remained the everyday word, whereas the Greek loanword acquired a specialised Christian meaning.

These sociolinguistic and sociocultural settings make drawing upon the Greek alphabet as a model and resource comprehensible. Yet, they also show how in-groups, such as the early Christians, could promote new writing systems very successfully. By contrast, the origins of the systemic change from a largely supraphonemic to a phonemic writing system is linked to phonological changes affecting the fit of the writing system to the language, conceptualised in the grain size theory. We call supraphonemic a writing system that maps phonological units such as syllables onto graphemes; we call phonemic a writing system that maps phonemes onto graphemes (Perfetti and Verhoeven, 2017, p. 23). The inherited Egyptian scripts were mixed. They combined consonantal, biconsonantal and triconsonantal phonograms, ideogrammatic logograms and determinatives (Gardiner, 1957, paras 6, 17, 22, 23).[4] Some vowels could be indicated (i.e., ȝ ≈ /a/, j ≈ /i/, and w ≈ /u/), but vowel writing was not consistent.

Classical Egyptian 𓇋𓏏𓀀 *jt*
Demotic 𓂋 *it*
Coptic ⲈⲒⲰⲦ (S) *eiōt* / ⲒⲰⲦ (B) *iōt*

FIGURE 1. Non-alphabetic vs. alphabetic writing systems

The absence of a one-to-one correspondence between a script and a writing system makes possible changes in the writing system for any language. Any writing system is a reduction of the acoustic signal it represents based on the principles of economy and practicability. However, in theory, there is a best fit between a writing system and a language

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3. There is no borrowing of inflectional morphology, which would point to renegotiating of identity (Matras, 2015).

4. Some signs can be phonograms or logograms, that is indicate a sound or a meaning. Determinatives are added to a phonologically represented word in order to disambiguate the meaning. For example, *nb* ⌣ 'everyone' vs. ⌣ 'lord' (Ockinga, 2012, p. 2).

based on the size of the unit mapped onto a grapheme, that is the grain size (Baroni, 2011). In reality, this ideal fit might once have existed in the history of a writing system with a language but disappears when the language develops phonologically but the writing system is attached to it for non-linguistic reasons (cf. tradition, etc.).

The eventual Coptic alphabet is an elaborate adaptation of its Greek model. It is based on the Koine Greek alphabet rather than the earlier local Greek alphabets judging by the sound-grapheme mappings and inventory of graphemes (Horrocks, 2014, p. 170; Jeffery, 1990). The initial development was decentralised as not only Quack's (2017) observations regarding the regionalisation of Demotic in the preceding period, but primarily the letter shapes and inventories of Demotic-derived signs show.[5] Quack (2017a) assumes that a functioning version of the Coptic alphabet was in circulation by AD 100, and the relaxation of linguistic norms in AD 212 would have helped promotion of any new script in circulation.

ⲁ	ⲃ	Γ	ⲇ	Є	Ϛ	Ⲍ	ⲏ
/a/	/b/ (S) /v/ (B, A)	/g/	/d/	/e/		/z/	/ē/

Θ	ι	Κ	ⲗ	Ⲙ	Ⲛ	Ⲝ	Ο
/t/+/h/	/y/	/k/	/l/	/m/	/n/	/k/+/s/	/o/

Π	Ρ	Ⲥ	Ⲧ	Ⲩ / ⲞⲨ	Ⲫ	Ⲭ	Ⲯ
/p/	/r/	/s/	/t/	/w/	/p/+/h/	/k/+/h/	/p/+/s/

ⲱ	ⲱ	ϥ	ⳉ (B) /ⲋ (A)	ⳃ	ϫ	ϭ	ϯ
/ō/	/š/	/f/	/x/	/h/	/č/	/kʸ/	/t/+/y/

Figure 2. The Coptic alphabet (cf. Layton, 2011, paras 8, 13)

Here, we turn to the three deeper-dive issues concerning the societal, phonological and cognitive aspects of the argument.

1.   Society—Literacy Rates:
   Were Literacy Rates Favouring the Greek Alphabet?

The short answer to this question is yes, literacy rates were most probably favouring the Greek alphabet. The Greek alphabet was an estab-

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5. Demotic-derived signs are those that are based on Demotic signs but likened to the other alphabetic signs, for instance with regard to filling roughly a rectangle on the line (Quack, 2017a).

lished writing system in the Roman period. There was full educational and political backing for it. By contrast, Egyptian writing was on the way back up. Educational facilities were in the making (cf. monasteries); educational centres had to be established for the new writing system as the old temples, which were the educational centres for Demotic, were losing funding and status (Cribiore, 2001; Houston, Baines, and Cooper, 2003; Maehler, 1983). Different writing systems were still competing, and thus none of them had yet attained the status of a standard writing system. Political backing was still lacking (Fournet, 2019).[6] Furthermore, the contexts for use of writing were more extensive for Greek than for Egyptian due to the administrative apparatus. Depauw (2009; 2012) has described extensively how Greek had taken over from Demotic.

Given the educational situation as well as the predominance of Greek in administrative circles, it is likely that literacy rates in Greek were significantly higher than literacy rates in Egyptian. This is where Stadler's (2008, pp. 166–167) critical mass argument comes in. According to this, a writing system needs to be used by a significant number of people not only to stay alive as it were but also in order to be useful—sender and addressee need to be able to operate in the same writing system. This situation may have favoured the Greek alphabet.

2.   Phonology—Vowel Writing: Was There Pressure to Start Writing Vowels?

Overall, the impression is that there was some pressure to start writing vowels.

Firstly, earlier Egyptian already notated vowels occasionally in the form of the *matres lectionis*. *Matres lectionis* are signs that indicate a vowel in writing systems that do not notate vowels consistently. The relevant signs in Egyptian are aleph, iod and waw. They can represent a consonant or a vowel, but as *matres lectionis* always indicate vowels (Hornkohl and Khan, 2020; Werning, 2016).

Secondly, several systems experimenting with vowel writing in Egyptian competed in the early Roman period. Quack (2017a) lists (i) the Greek alphabet / Graeco-Egyptian, (ii) Demotic syllabic signs / syllabic writing, (iii) the Greek alphabet with some Demotic signs, (iv) Demotic mono-consonantal signs / alphabetic Demotic, and (v) the Greek alphabet with Demotic-derived signs / Old Coptic.

Thirdly, changes in the Egyptian syllable structure, such as an increase in open syllables and the development of biconsonantal onsets

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6. Political backing refers to the acceptability of a language and writing system in all registers including highly formal ones.

(Allen, 2013, pp. 13, 24; Loprieno, 1995, pp. 36–37), had made it increasingly difficult to use a supraphonemic writing system. The Universal Phonological Principle states that phonological information is accessed before lexical information when reading (Baroni, 2011; Gleitman, 1985), including in shallow orthographies such as Hebrew (Frost, 1994). Thus, we prefer a writing system that represents the phonology of a language at least approximately.

Finally, practically speaking, Greek loanwords were frequent in everyday and Christian contexts. They were difficult to transcribe into Demotic as their small number proves (Clarysse, 1987; 2013; Ray, 1994). In essence, one had to delete the vowels while ensuring that the string remained a unique signifier of the meaning and choose a determinative (Crellin, 2018). This seems disadvantageous in a thoroughly bilingual environment.

ἀποχή *apok^b ē* 'receipt'
(a) 3pwg^c [bookroll determinative] (P. Berl. 8043 verso 3.20; 4.10)
(b) pg^c [bookroll determinative] (JEA 55, 1969, 187)

FIGURE 3. Loanwords (cf. Clarysse, 2013)

Overall, there is no complete change of systems, but a move from some vowel writing to consistent vowel writing. Competing systems evolved around the same idea. The changing political and societal settings may have offered opportunities for smaller groups to experiment with an until then traditional 'untouchable' writing system. These same political and societal settings allowed the Coptic alphabet to win out eventually.

3.   Cognition—Best Fit: Is One Script More Suitable for Representing a Language Than Another?

According to the grain size model, there is a better (if not a best) fit between a language and a writing system. The grain size of a writing system is determined by (i) pressures towards smaller and orthographically less complex units (i.e., granularity), (ii) pressures towards larger and phonologically more accessible units (i.e., availability), and (iii) pressures towards maximally consistent units (i.e., consistency) (Asfaha, Kurvers, and Kroon, 2009; Ziegler and Goswami, 2005). The phonolog-

ical structure of a language will favour one or the other type of writing system.[7]

However, there are pressures towards hanging on to a writing system even if the fit between language and writing system is not perfect. Firstly, users are familiar with the mapping principles of their writing system (Perfetti and Dunlap, 2008) and have to acquire new mapping principles when learning a new writing system (Bassetti, 2016; Hirshorn and Fiez, 2014; Keiko, 2002; Lallier and Carreiras, 2018). Secondly, cultural, social and political pressures impact on updating vs. preserving and switching vs. retaining a writing system. Some relevant aspects include the readability by regular interlocutors[8], access to training, the prestige and cultural significance attached to a script[9], and the resources using this script that would have to be modified.[10] In fact, Thomason's (2001) argument that attitudinal factors override linguistic factors with regard to language change could be transferred onto script change. Her claim has been variously contested, yet attitudinal factors are far from irrelevant.

A prime example of a writing system people hung on to is Demotic, which is often described as conservative (Depauw, 1997, p. 36; Oréal, 1999, p. 295; Richter, 2009, p. 403; Thompson, 2009, p. 399), yet remained the Egyptian writing system until Coptic emerged.

References

Allen, J. (2013). *The ancient Egyptian language: An historical study*. Cambridge: Cambridge University Press.

Asfaha, Y., J. Kurvers, and S. Kroon (2009). "Grain Size in Script and Teaching: Literacy Acquisition in Ge'ez and Latin." In: *Applied Psycholinguistics* 30, pp. 709–734.

Bagnall, R. (1993). *Egypt in late antiquity*. Princeton: Princeton University Press.

———— (2005). "Linguistic Change and Religious Change: Thinking about the Temples of the Fayoum in the Roman Period." In: *Christianity and Monasticism in the Fayoum Oasis: Essays from the 2004 International Symposium of the Saint Mark Foundation and the Saint Shenouda the Archimandrite Coptic Society in Honor of Martin Krause*. Ed. by G. Gabra. Cairo: American University in Cairo Press, pp. 11–19.

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7. Perfetti and Verhoeven (2017, p. 23) list syllabic, morpho-syllabic, alphasyllabic, abjad and alphabetic writing systems.

8. A modern example is transcriptions of Chinese (Chappell, 1980).

9. A modern example might be the Greek alphabet in modern-day Europe.

10. A literary example is Orwell's 1984.

Baroni, A. (2011). "Alphabetic vs. Non-alphabetic writing: Linguistic fit and natural tendencies." In: *Rivista Di Linguistica* 23.2, pp. 127–159.

Bassetti, B. (2016). "Learning second language writing systems." LLAS—Centre for Languages, Linguistics and Area Studies `https://www.llas.ac.uk/resources/gpg/2662.html`.

Chappell, H. (1980). "The Romanization Debate." In: *The Australian Journal of Chinese Affairs* 4, pp. 105–118.

Choat, M. (2009). "Language and Culture in Late Antique Egypt." In: *A Companion to Late Antiquity*. Ed. by P. Rousseau and J. Raithel. Chicester: John Wiley & Sons, pp. 342–356.

————— (2012). "Coptic." In: *The Oxford handbook of Roman Egypt*. Ed. by C. Riggs. Oxford: Oxford University Press, pp. 581–593.

Clackson, S. (2010). "Coptic or Greek? Bilingualism in the papyri." In: *The multilingual experience in Egypt: From the Ptolemies to the cAbbasids*. Ed. by A. Papaconstantinou. Farnham, Surry, UK: Ashgate Publishing, pp. 73–104.

Clarysse, W. (1987). "Greek loan-words in Demotic." In: *Aspects of Demotic lexicography: Acts of the second international conference for Demotic studies*. Ed. by S. Vleeming. Leiden: Peeters, pp. 9–33.

————— (2013). "Determinatives in Greek loan-words and proper names." In: *Aspect of Demotic orthography; Acts of an International colloquium held in Trier*. Ed. by S. Vleeming. Peeters. Leiden, pp. 1–24.

Crellin, R. (2018). "Measuring ambiguity and the invention of vowel-writing in Greek." In: *Proceedings of International Colloquium of Ancient Greek Linguistics ICAGL 9*. Ed. by M. Leiwo, M. Vierros, and H. Halla-aho. Helsinki.

Cribiore, R. (2001). *Gymnastics of the mind: Greek education in Hellenistic and Roman Egypt*. Princeton: Princeton University Press.

Depauw, M. (1997). *A companion to demotic studies*. Vol. 28. Papyrologica Bruxellensia. Brussels: Fondation égyptologique reine Élisabeth.

————— (2009). "Bilingual Greek-Demotic Documentary Papyri and Hellenization in Ptolemaic Egypt." In: *Faces of Hellenism. Studies in the History of the Eastern Mediterranean (4th century BC-5th century AD)*. Ed. by P. Van Nuffelen. Vol. 48. Studia Hellenistica. Leiden: Peeters, pp. 120–139.

————— (2012). "Language use, literacy and bilingualism." In: *The Oxford Handbook of Roman Egypt*. Ed. by C. Riggs. Oxford: Oxford University Press, pp. 493–506.

Depauw, M. and W. Clarysse (2013). "How Christian was Fourth Century Egypt? Onomastic Perspectives on Conversion." In: *Vigiliae Christianae* 67.4, pp. 407–435.

Dieleman, J. (2005). *Priests, tongues, and rites: The London-Leiden magical manuscripts and translation in Egyptian ritual (100–300 CE)*. Vol. 153. Religions in the Graeco-Roman World. Leiden, Boston: Brill.

Förster, H. (2002). *Wörterbuch der griechischen Wörter in den koptischen dokumentarischen Texten*. Vol. 148. Texte und Untersuchungen zur Geschichte der altchristlichen Literatur. Berlin: Mouton De Gruyter.

Foss, C. (2003). "The Persians in the Roman near East (602–630 AD)." In: *Journal of the Royal Asiatic Society* 13.2, pp. 149–170.

Fournet, J.-L. (2019). *The rise of Coptic: Egyptian versus Greek in late antiquity*. Princeton: Princeton University Press.

Frost, R. (1994). "Prelexical and postlexical strategies in reading: Evidence from a deep and a shallow orthography." In: *Journal of Experimental Psychology. Learning, Memory, and Cognition* 20.1, pp. 116–129.

Gardiner, A. (1957). *Egyptian grammar: Being an introduction to the study of hieroglyphs*. 3rd ed. Oxford: Oxford University Press.

Garel, E. and M. Nowak (2017). "Monastic Wills: The Continuation of Late Roman Legal Tradition?" In: *Writing and Communication in Early Egyptian Monasticism*. Ed. by M. Choat and M. Giorda. Brill. Leiden, Boston, pp. 108–128.

Gleitman, L. (1985). "Orthographic Resources Affect Reading Acquisition—If They Are Used." In: *Remedial and Special Education* 6.6, pp. 24–36.

Hirshorn, E. and J. Fiez (2014). "Using artificial orthographies for studying cross-linguistic differences in the cognitive and neural profiles of reading." In: *Journal of Neurolinguistics* 31, pp. 69–85.

Hornkohl, A. and G. Khan (2020). *Studies in Semitic vocalisation and reading traditions*. Cambridge: Open Book Publishers.

Horrocks, G. (2014). *Greek: A history of the language and its speakers*. 2nd ed. Chichester: Wiley Blackwell.

Houston, S., J. Baines, and J. Cooper (2003). "Last Writing: Script Obsolescence in Egypt, Mesopotamia, and Mesoamerica." In: *Comparative Studies in Society and History* 45.3, pp. 430–479.

Jeffery, L. (1990). *The local scripts of archaic Greece: A study of the origin of the Greek alphabet and its development from the eighth to the fifth centuries BC*. Oxford: Clarendon Press.

Keenan, J. (2007). "Byzantine Egyptian villages." In: *Egypt in the Byzantine world*. Ed. by R. Bagnall. Cambridge: Cambridge University Press, pp. 300–700.

Keiko, K. (2002). "Writing Systems and Learning to Read in a Second Language." In: *Chinese Children's Reading Acquisition: Theoretical and Pedagogical Issues*. Ed. by L. Wenling, J. Gaffney, and J. Packard. Boston, MA: Springer, pp. 225–248.

Kiss, Z. (2007). "Alexandria in the fourth to seventh centuries." In: *Egypt in the Byzantine world*. Ed. by R. Bagnall. Cambridge: Cambridge University Press, pp. 300–700.

Kraus, T. (2000). "(Il)literacy in non-literary papyri from Graeco-Roman Egypt: Further aspects of the educational ideal in ancient literary sources and modern times." In: *Mnemosyne* 53.3, pp. 322–342.

Lallier, M. and M. Carreiras (2018). "Cross-linguistic transfer in bilinguals reading in two alphabetic orthographies: The grain size accommodation hypothesis." In: *Psychon Bulletin Review* 25, pp. 386–401.

Layton, B. (2011). *A Coptic Grammar*. Porta Linguarum Orientalium. Wiesbaden: Harrassowitz.

Loprieno, A. (1995). *Ancient Egyptian: A linguistic introduction*. Cambridge: Cambridge University Press.

Maehler, H. (1983). "Die griechische Schule im ptolemäischen Ägypten." In: *Egypt and the Hellenistic world: Proceedings of the international colloquium Leuven—24–26 May 1982*. Ed. by E. van't Dack, P. van Dessel, and W. van Gucht. Vol. 27. Studia Hellenistica. Leuven: Peeters, pp. 191–203.

Matras, Y. (2009). *Language contact*. Cambridge: Cambridge University Press.

———— (2015). "Why is the borrowing of inflectional morphology dispreferred?" In: *Borrowed Morphology*. Ed. by F. Gardani, P. Arkadiev, and N. Amiridze. Berlin: Mouton de Gruyter.

Ockinga, B. (2012). *A concise grammar of Middle Egyptian: An outline of Middle Egyptian grammar*. 3rd ed. Mainz, Germany: Philipp Von Zabern.

Oréal, E. (1999). "Contact linguistique. Le cas du rapport entre le grec et le copte." In: *Lalies* 19, pp. 289–306.

Perfetti, C. and S. Dunlap (2008). "Learning to read: General principles and writing system variations." In: *Learning to Read Across Languages: Cross-Linguistic Relationships in Firstand Second-Language Literacy Development*. Ed. by K. Koda and A. Zehler. Abington-on-Thames: Routledge, pp. 13–38.

Perfetti, C. and L. Verhoeven (2017). "Introduction: Operating Principles in Learning to Read." In: *Learning to Read across Languages and Writing Systems*. Ed. by C. Perfetti and L. Verhoeven. Cambridge: Cambridge University Press, pp. 1–30.

Quack, J. (2017a). "How the Coptic script came about." In: *Greek influence on Egyptian-Coptic*. Ed. by E. Grossman et al. Vol. 17. Lingua Aegyptia. Hamburg: Widmaier, pp. 27–96.

———— (2017b). "On the Regionalization of Roman-Period Egyptian Hands." In: *Scribal Repertoires in Egypt from the New Kingdom to the Early Islamic Period*. Ed. by J. Cromwell and E. Grossman. Oxford: Oxford University Press, pp. 184–211.

Ray, J. (1994). "How demotic is Demotic?" In: *Egitto e Vicino Oriente* 17, pp. 251–264.

Richter, T. (2009). "Greek, Coptic and the 'language of the Hijra': The rise and decline of the Coptic language in late antique and medieval Egypt." In: *From Hellenism to Islam: Cultural and Linguistic Change in the Roman Near East*. Ed. by H. Cotton. Cambridge: Cambridge University Press, pp. 401–446.

Sänger, P. (2011). "The Administration of Sasanian Egypt: New Masters and Byzantine Continuity." In: *Greek, Roman, and Byzantine Studies* 51.4, pp. 653–665.

Stadler, M. (2008). "On the Demise of Egyptian Writing. Working on a Problematic Source Basis." In: *The Disappearance of Writing Systems: Perspectives on literacy and communication*. Ed. by J. Baines, J. Bennett, and S. Houston. Oxford: Equinox, pp. 157–181.

Thomason, S. (2001). *Language contact*. Edinburgh: Edinburgh University Press.

Thompson, D. (2009). "The multilingual environment of Persian and Ptolemaic Egypt: Egyptian, Aramaic and Greek documentation." In: *The Oxford Handbook of Papyrology*. Ed. by R. Bagnall. Oxford: Oxford University Press, pp. 395–417.

Torallas Tovar, S. (2004a). "Egyptian lexical interference in the Greek of Byzantine and early Islamic Egypt." In: *Papyrology and the history of early Islamic Egypt*. Ed. by P. Sijpesteijn and L. Sundelin. Vol. 55. Islamic history and civilization. Leiden: Brill, pp. 163–198.

———— (2004b). "The context of loanwords in Egyptian Greek." In: *Lenguas en contacto: El testimonio escrito*. Ed. by P. Bádenas de la Pena et al. Vol. 46. Manuales y anejos de "Emerita". Madrid: Consejo Superior de Investigaciones Científicas, pp. 57–67.

———— (2007). "Egyptian loanwords in Septuaginta and the papyri." In: *Akten des 23. Internationalen Papyrologenkongresses, Wien*. Ed. by B. Palme. Wien: Verlag der Österreichischen Akademie der Wissenschaften, pp. 687–692.

———— (2017). "The Reverse Case: Egyptian Borrowing in Greek." In: *Greek Influence on Egyptian Coptic: Contact induced change in an ancient African language*. Ed. by E. Grossman et al. Vol. 17. Lingua Aegyptia. Hamburg: Widmaier, pp. 97–113.

Torallas Tovar, S. and M. Vierros (2019). "Languages, Scripts, Literature, and Bridges Between Cultures." In: *A Companion to Graeco-Roman and Late Antique Egypt*. Ed. by K. Vandorpe. Chichester: Wiley Blackwell, pp. 483–499.

Unwin, L., J. Hughes, and N. Jewson (2007). *Communities of practice: Critical perspectives*. London: Routledge.

van Minnen, P. (2007). "The other cities in Later Roman Egypt." In: *Egypt in the Byzantine world*. Ed. by R. Bagnall. Cambridge: Cambridge University Press, pp. 300–700.

Vierros, M. (2012). *Bilingual notaries in Hellenistic Egypt: A study of Greek as a second language*. Vol. 5. Collectanea Hellenistica. Leiden: Peeters.

Werning, D. (2016). "Hypotheses on glides and matres lectionis in earlier Egyptian orthographies." In: *Coping with obscurity: The Brown workshop on earlier Egyptian grammar*. Ed. by J. Allen, M. Collier, and A. Stauder. Vol. 4. Wilbour Studies in Egyptology and Assyriology. Atlanta, GA: Lockwood Press, pp. 29–44.

Wipszycka, E. (2007). "The institutional church." In: *Egypt in the Byzantine world*. Ed. by R. Bagnall. Oxford: Oxford University Press, pp. 300–700.

Ziegler, J. and U. Goswami (2005). "Reading Acquisition, Developmental Dyslexia, and Skilled Reading Across Languages: A Psycholinguistic Grain Size Theory." In: *Psychological Bulletin* 131.1, pp. 3–29.