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verbs in the first person) and closer to standard Greek prose.

Philo of Byzantium's *Belopoeica* and what remains of his *Mēkhanikè̄ Súntaxis* (early second century CE?) are even more discursive, with a few cases of denotative letters but far less mathematical structure. Mechanics seems thus generally much more concerned with terminology to 'describe' the machines rather than with the syntax to explain them. However, like in medicine, in Hero and Philo terminology is still not unified and monosemous.

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<div align="right">FRANCESCA SCHIRONI</div>

Scribes, Mycenaean

1. INTRODUCTION

Mycenaean scribes are the anonymous individuals (Bennett 1960) who wrote, in the → Linear B script, texts on the clay administrative documents discovered in excavations of important sites (most often *palatial* centers) throughout clearly defined territories of the central and southern Greek mainland and the island of Crete during the period roughly 1450–1200 BCE.

The Linear B texts do not preserve any identifiable words used to denote (a) the acts of writing or reading, (b) individuals who write or read, (c) the materials that are used to write (writing implements, parchment or papyrus scrolls or pages, various forms of clay documents) or (d) the places where written materials are stored (archives, deposits, formal libraries). This sets Mycenaean 'scribes' and scribal systems (→ Mycenaean Script and Language) epistemologically apart from their counterparts in the cuneiform and hieroglyphic cultures of ancient Mesopotamia, Anatolia, the Levant and Egypt.

The English word 'scribe' has many associations from the long history of its use in studying the education, training, work habits, assignments, and the social, economic and political statuses and functions of writers of formal documents within the power hierarchies of different cultures, ancient and modern (Pluta 2011:250–256). Because of these strong associations and the restricted uses of writing attested in the Mycenaean palatial culture, the term 'tablet-writers' has been used lately in discussing the roles of Mycenaean 'scribes' (Palaima 2011:34, 55 n. 39). Sumerian and Akkadian scribes in fact are literally called 'tablet-writers': DUB.SAR and *ṭupšarru*, respectively.

In contrast to Near Eastern scribes, Mycenaean tablet-writers are distinguished by their anonymity and by the limited range of areas of social, political, economic or religious activity for which writing was used. None of the names

recorded in the Linear B documents can be identified securely as the name of a tablet-writer. No tablet-writer wrote his name, or impressed his seal as a personal identifier, upon any of the three standard shapes of clay documents used within Mycenaean economic and political administration. The absence of signatures or seal impressions implies either that the tablet-writers were not required to note their responsibility for the information they recorded upon the tablets or that such information was otherwise known when the texts were of active interest.

2. The Tablets

The texts that the Mycenaean tablet-writers recorded deal with the operation and concerns of the palatial centers and the territories they controlled, directly or indirectly. The surviving documents focus on economic management. There are no literary texts, lexica, compilations of laws or judicial precedents, decrees or proclamations, annals or reign lists, religious hymns, prescriptions of cult ceremonies, standardized versions of prayers, official proclamations, inscribed public monuments (political, dedicatory or burial), or private or diplomatic correspondence. There are also no private contracts, documents of ownership or property transfer, direct records of trade, or any records that were kept in the possession of any of the individuals mentioned in the texts (Palaima 2003:154–155). All extant tablets deal with manufactured items and products, raw and processed materials, and resources (human, animal and inanimate), where they are located, to whom and by whom they are to be or were distributed or from whom they are being or were collected and for what purposes or under what conditions, and what individuals, offices or other responsible agents within the regional palatial systems are interested in these goods and activities.

The three relatively standard shapes of clay accounting documents written by Mycenaean 'scribes' are page-shaped and leaf-shaped tablets and labels (Palaima 2003:161; 2011:100–112). In addition, small pieces of clay each formed around a knot made with a fine string and then impressed with a seal may be inscribed with ideograms and related short written texts. These clay devices are known as sealings or more precisely *nodules*. The information inscribed on nodules consists of personal and place names, descrip-

tions of quality, or technical vocabulary relating to the transactions involved and the obligations pertaining to the materials with which these devices were associated (Palaima 2000).

The records that the tablet-writers wrote were of short-term use. They were probably meant to be kept for a single administrative period, rarely longer than a year, perhaps with some overlap into the next or from the preceding period. Related to the 'historical anonymity' of the records of Mycenaean scribes and to the cultural expectation that the information on these documents had a limited time span of relevance or validity is the absence of any dates designated by period of a magistrate's office (e.g. historical Greek 'archonship') or day and month within the year of reign of a royal figure. There are three to five month names within the extant Linear B tablets from Pylos and seven in the larger (in terms of numbers of documents) corpus of tablets from Knossos (Palaima 1995:627–631; 2003:169–173; → Names of Months). The tablets also have references to religious festivals and ceremonial events.

Due to the limited nature of the inscribed data, Mycenologists have been forced to study the textual evidence from a variety of perspectives. Through close study of the signs drawn into moist clay and of other aspects of the written records (including tablet typology, text structure and layout, spelling), it has been possible to assign tablets to different tablet-writers. The tablet-writers are identifiable by their writing styles and habits. Fingerprints on tablets have been studied, too. Mycenologists generally use the term 'scribal hand' to make clear that the tablet-writers have been identified by such means.

Fortunately, the sequence of lines composing individual signs is usually clear in the clay. We can also readily see the *ductus* (the track through the clay) of the stylus. And many of the signs themselves have component elements that vary idiosyncratically according to scribe in length, degree of straightness or curvature, and position and proportion relative to one another. This makes identification of 'scribal hands' fairly secure in most cases.

Linear B texts are difficult to read and understand, especially in isolation and without context. By identifying scribal hands and sets (or 'stylus groups') within scribal hands, we can create an interpretive context (Palaima 2011:46–55, 72–94). These identifications have been used to

Figure 3 Examples of Significant Sign Variations
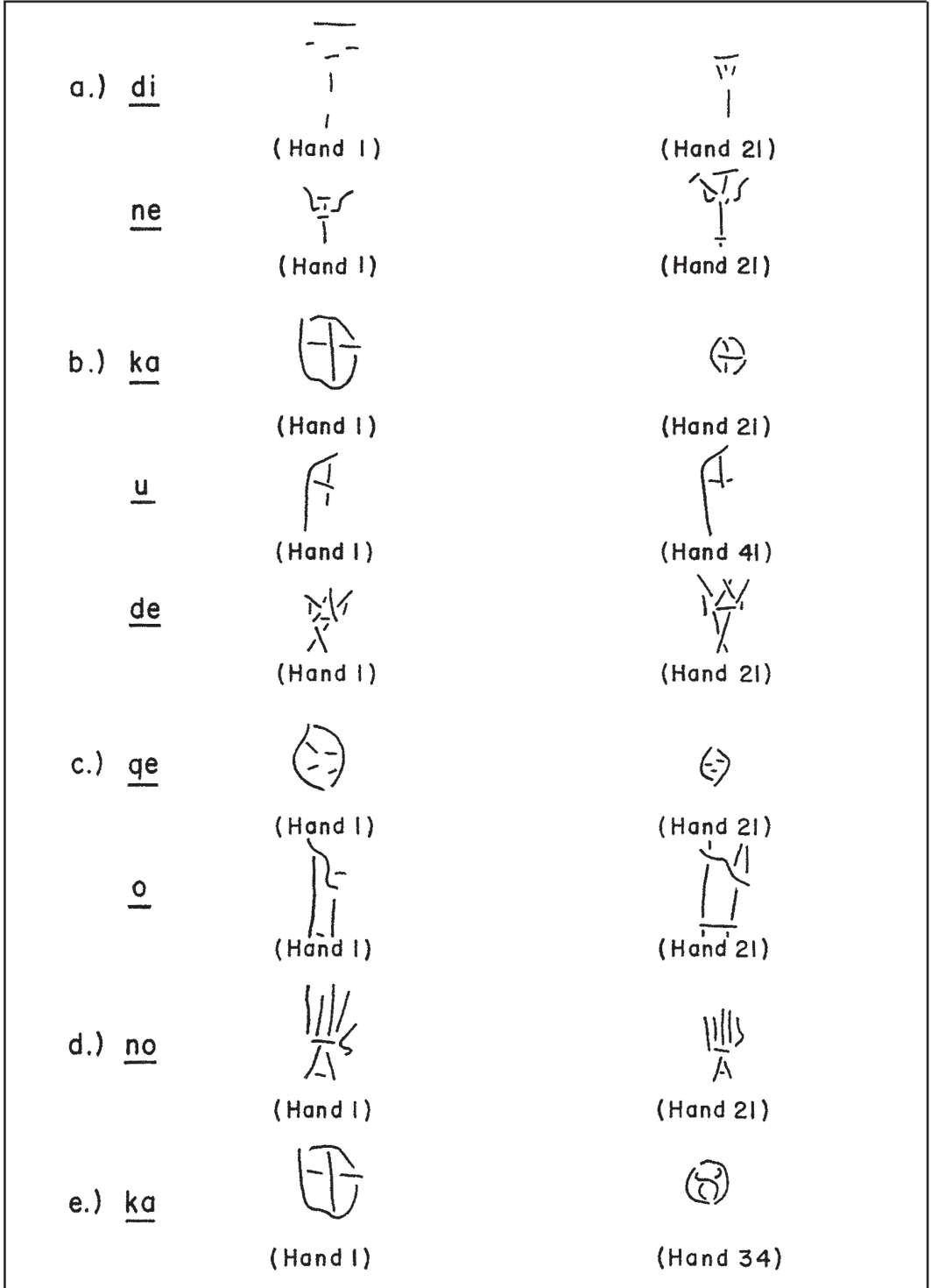
Significant sign variations. Source: Thomas G. Palaima, *The Scribes of Pylos* (Incunabula Graeca LXXXVII: Rome, Edizioni dell'Ateneo 1988), p. 24.
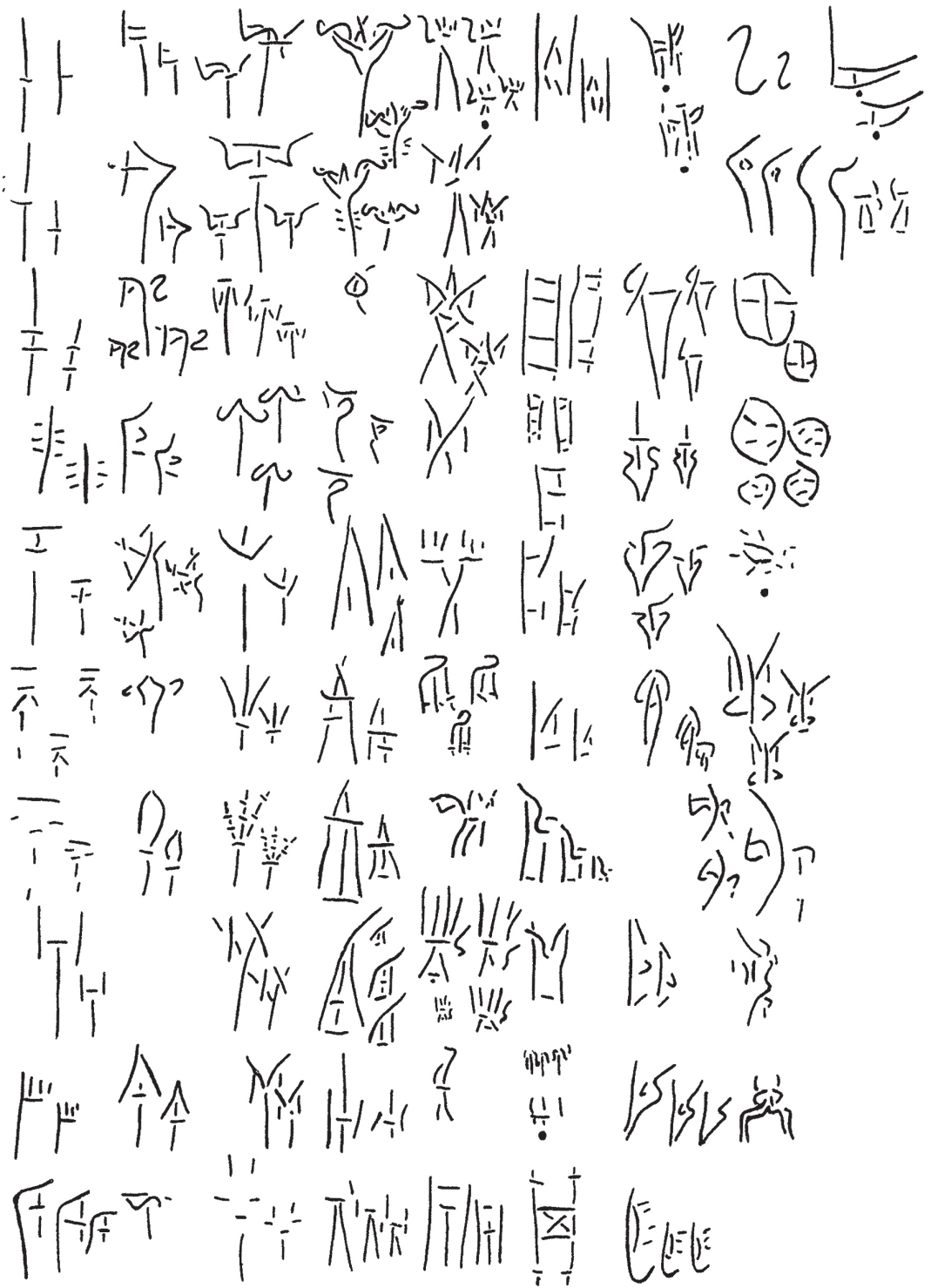
Pylos Hand 1 Sign forms. Source: *The Scribes of Pylos*, p. 229.

Pylos Hand 21 Sign forms. Source: *The Scribes of Pylos*, p. 242.

clarify various archival and linguistic issues in the Linear B texts. Ca. 33 'scribal hands' are identified at Pylos and at least 70 at Knossos.

3. The 'Scribes'

The status of the 'scribes' within Mycenaean society is still a matter of debate (Palaima 2003:173–176; Bennet 2001:31–35; Pluta 2011:254–296). Olivier is right to call them administrative "fonctionnaires" (Olivier 1967:135–136). Palaima (2003:175) asks "whether their status was intimately connected with their ability to write or whether their ability to write was acquired because of their prominence as palatial or provincial administrators or as members of military, economic, or social élites." The answer to this question remains unclear. That the 'scribes' had multiple roles, at first as students, then as members, or at least facilitators, of the palatial administration, is clear. Both Bennet (2001:31–33) and Kyriakidis (1996–1997:220) argue that what we here call tablet-writers must "belong among the performers of the administration, not the 'back-stage' staff." They (and Pluta 2011:284–285) identify persons recorded as playing prominent roles in important texts, e.g., *a-ko-so-ta* (/Alxoitās/ or /Axotās/) and *pu₂-ke-qi-ri* (/Phugeg^wris/ > *Phugebris*), as the tablet-writers of the texts. But Palaima (2003:25–37) lays out the problems with, as Bennet (2001:35) puts it, "collaps[ing] the categories 'scribes' and 'members of the elite'".

Discussions about the training of the 'scribes' (cf. Duhoux 2011) have focused on whether there were scribal 'schools' *per se*. We have no unequivocal traces in the Linear B texts or the Mycenaean archaeological record of scribal schools, although they are identifiable commonly in the clay-tablet cultures of the ancient Near and Middle East (Pluta 2011:56–58). Future tablet-writers may have been trained in apprenticeships within family or clan groups. A site like Pylos (Pluta 2011) would have a need for only a limited number of 'scribes' at any given time. Two to five new scribal trainees per year would be a sufficient number to keep the record-keeping system operating smoothly.

The interactions of the 'scribes' are also a matter of some debate. It is known from the Archival Complex at Pylos that certain 'scribes' would modify the information on tablets originally written by other 'scribes'. In particular,

bronze allotment texts written by Hand 21 are used as the basis for final documents by Hand 2 (Smith 1992–1993:203–204) and two of Hand 21's livestock texts (Cn 595 and 599) have been physically altered and/or corrected by Hand 1 (Palaima 1988:51–54). Thus, it is arguable that Hand 21, although a prominent tablet-writer, was somehow still subordinate to Hands 1 and 2. It is still unclear how such relationships played out in the larger scheme of palatial administration intra- and extra-regionally.

4. Variation in Mycenaean Greek (?)

Another unresolved issue relating to tablet-writers is the two purported dialects of Greek found in Linear B, called 'normal' Mycenaean and 'special' Mycenaean (Risch 1966; → Variation in Mycenaean Greek). The distribution in the texts of characteristics of the two 'dialects' bears upon the ethnic, cultural and linguistic affinities of the 'scribes'. The differences are helpfully enumerated in several articles on the subject (Risch 1966, Nagy 1968, Thompson 1996–1997, Palaima 1998–1999). There are at most five diagnostic features:

– Feature 1: The dative singulars in the athematic class spelled with *-e* (normal) vs. *-i* (special), e.g. *po-se-da-o-ne* vs. *po-se-da-o-ni* (dative of *Poseidáōn* = 'Poseidon').
– Feature 2: The reflex of IE sonant nasals in the environment of bilabial consonants, *-o* (normal) vs. *-a* (special), most conspicuously *pe-mo* vs. *pe-ma* (/spermo/ vs. /sperma/, 'seed').
– Feature 3: Occasionally, the use of *-i-* (normal) vs. *-e-* (special) in the environment of a labial consonant, e.g. the toponym *ti-mi-ti-ja* vs. *te-mi-ti-ja*. Also, note well the use of *-i-* in the vase name *di-pa* vs. Homeric *dépas* ('cup').
– According to Nagy (1968) there is a Feature 4, which Risch (1979) rejected: assibilated *-si* (normal) vs. unassibilated *-ti* (special) (→ Assibilation).
– The final Feature 5 is that of the spellings of words such as *thrónos* ('formal chair', 'throne'), the normal spelling of which is *to-no* (/thornos/) and the special spelling is *to-ro-no* (/thronos/).

Although there is much debate concerning the reasons for the varieties of features in the Mycenaean dialect(s), one thing is agreed upon:

no tablet-writer wrote consistently in *special* Mycenaean. All that we see is the use of certain features in certain hands, but without a clear clustering of multiple features in one hand, whether narrowly, i.e., with only features 1–3, or broadly, i.e., features 1–5, defined. Thompson (1996–97) has argued that instead of 'dialects', what we see happening in the Linear B tablets is the early stages of 'lexical diffusion'.

Later Greek dialects show a distribution of a much wider variety of features than is known for Mycenaean Greek. In the words of Thompson (1996–1997:313), "Mycenaean is a weird dialect, or so it is often perceived." This raises the question: how could the 'scribes' of the Linear B texts have spoken and written so homogeneous a version of Mycenaean Greek over such a wide area and for as long as two centuries with so few variations, especially if they were not trained within scribal schools with set curricula and standardized instructional exercises?

Were the 'scribes' speaking and hearing a *lingua franca* that they acquired from their senior predecessors and superiors in the art and profession of tablet-writing? Were they recording (or using) a restricted 'chancellery dialect' that prevailed among elites at palatial and regional centers who may have been related by 'dynastic' or 'social-register' intermarriage? Were the few instances of variant 'special' forms then traces of an *Umgangsprache* or *-sprachen* more generally used among the extra-palatial population at large and in areas away from the palatial or regional centers, with whom tablet-writers sometimes had to interact (cf. Palaima 1998–1999)? Was the use of a standardized and static form of Greek (a kind of bureaucratic Koine, at least in writing and probably in speech) an effort, in a still predominantly oral culture, to facilitate communication between administrative, political, economic and social elites in different palatial territories? Or were the 'scribes' themselves taking the words and phrases of informants and writing them down in the 'dialect' that they, a closed group of writing specialists, used among each other? After all, if the Mycenaean 'scribes' were the only ones capable of *writing* texts, they were also the only ones capable of *reading* them.

Finally, it is important to note that there is a widespread and systematic uniformity of language features across scribal hands over two hundred years, from the earliest tablets at Knossos on Crete until the latest tablets from Thebes in north central Greece, in how to represent spoken language in the visible speech of syllabic writing. Take, for example, the graphic problem of consonant clusters. In writing clusters such as the /rg/ between the first two syllables in the word *árguros* ('silver') with an open-syllabic script, Mycenaean tablet-writers everywhere did not represent the /r/ that is pronounced before the /g/, spelling *a-ku-ro*. By contrast, in later historical open-syllabic Cypriote Syllabic script (→ Cypriot Syllabary), very akin in basic structure to → Linear B, the natural Greek perception of the word leads to a spelling that distinguishes the /r/ clearly: *a-ra-ku-ro*.

A possibility suggested by Palaima (2008) (cf. also Sharypkin 2008), with modern documented parallels (Peperkamp et al. 2008), is that the Mycenaean tablet-writers did not represent such consonants graphically because they did not perceive them. This would be understandable if the tablet-writers grew up and lived within a social milieu where the primary language spoken and heard was open-syllabic in structure and lacked such consonant clusters, namely the Minoan language.

Stephens and Justeson (1978:278), in their study of universals in writing systems as applied to Minoan phonology (→ Linear A), stress that in 82% of the syllabaries they studied, graphic underrepresentation is "due to borrowing from a model that does not fit the phonological structure of their languages". Thus the long-term peculiar conservatism of both the Mycenaean dialect and the 'rules' that guided Mycenaean scribes in representing contemporary speech might derive from the fact that tablet-writers from the time of creation of the Linear B script onward were Minoan in ethnicity and kept control of the narrowly applied art of writing within their kin groups from generation to generation.

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Secondary Articulation

→ Palatalizations

Secret Language/Codes/Magical Language

1. INTRODUCTION

As soon as three people have gained knowledge of reading and writing, there is a fair chance that two of them will need to send messages to each other that the third cannot read. Steganography and cryptography develop ways to keep written words secure from prying eyes. Both terms are compounds of learned origin whose second part *-graphy* reflects the Greek noun *graphḗ*, 'writing'. Moreover, the first part of *steganography* contains the Greek adjective *steganós* 'impermeable, covered', while the *crypto-* of *cryptography* is Greek *kruptós* 'hidden, concealed'. Steganography is the art and science of writing secret messages in such an expedient manner that no one, except for the sender and the addressee, has an idea of the existence of the message. Put differently, steganography is a form of security by way of obscurity. Cryptography makes use of linguistic and mathematical techniques for securing information. Steganography has the advantage over cryptography, as steganographic messages, which are disguised and may appear to be something else, do not attract attention to themselves, while messages which have obviously been encrypted never fail to arouse suspicion. Therefore, cryptography covers the content of a message, whereas steganography protects both the message and the communicating parties. Historically, cryptography was interested in encryption alone, *viz.* a means to change the usual comprehensible form of information into an incomprehensible format, which should ideally remain illegible in the absence of secret knowledge.

2. SECRET LANGUAGE IN ANCIENT GREECE

A great deal more is known about cryptological systems in Greece, both steganographic and cryptographic, than those of earlier civilizations. Herodotus mentions the first recorded uses of steganography in his *Histories* (5.35). Histiaeus was the former tyrant of Miletus and an ally of Darius of Persia, who had invited him to be a 'king's companion' at Susa. Yet Histiaeus was unhappy about having to stay in Susa, and devised a plan to return to his position as tyrant