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# Guidelines for Contributors

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## Guidelines for Contributors

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### Final Submission

- 1- The final text (following amendments recommended by the editor or referees) must be provided on disk preferably CD, using MS Word, composed in 14 point font for Arabic and 12 point font for other languages.
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- 3- Please do not employ multiple typeface styles or sizes.
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*Reports* VI, *EES Occasional Publications* 10 (London, 1995), 218-220.

- Cite subsequently as: Mathieson, in Kemp (ed.), *Amarna Reports* VI, 218-220.

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## Introduction

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The tenth issue of *Abgadiyat*, an annual journal issued by the Center for Calligraphy Studies, expresses the continuity of the Center and its constant aspiration to win the trust of scholars and researchers who are interested in its publications of refereed scientific material and specialized works in the field of writing and inscriptions. Since its first issue in 2006, *Abgadiyat* has assumed the responsibility of bridging the gap between the different fields of calligraphy and writing studies. The Journal seeks to achieve the Center's major objective of providing specialists with the rare information they need for their studies in writing and inscriptions, as well as raising the awareness of this field amongst non-specialists.

Followers of this Journal will find a variety in its published topics. Yet, the topics focus on one, mutual field: writings and inscriptions; the papers tackle the same topic from different perspectives. *Abgadiyat*, which promotes the values of difference, diversity, and accepting the other, includes in its tenth issue a selection of Arabic and English researches that cover a wide range of topics for scholars all over the world. In this issue, some papers focus on the study of Islamic writings, such as those inscribed on Yemeni coins dating back to the period between 696 AH and 721 AH or on the walls of an Ayyubid mosque in Damascus; and the writings that emerged during the era of the Companions of the Prophet Muhammad. Other papers study Ancient Egyptian writings—including the astronomical and cosmic symbols—on the quarries of Wadi al-Hudi, and also the writings on a funerary stela dating back to Middle Kingdom of Egypt. Topics related to the Greco-Roman civilization; the ceremonies held for goddess Neith in the towns of Sais and Esna in Egypt during the Greco-Roman period; and the inscriptions of Constantine city, east Algeria, that date back to the period from the end of the third century BCE to the fourth century CE are also tackled. All this proves the universality of *Abgadiyat*, which tends to cover all the alphabets and writings ever witnessed in history in a way that creates a balance among different themes of research.

The Center for Calligraphy Studies is always keen to emphasize the continuation of this Journal in order to fill in an obvious shortage in scientific research, in spite of what this dedication entails of increased, ample efforts exerted by editors to deal with various languages, inscriptions, and their different writing methods.

**Essam Elsaed**

Director of the Center for Calligraphy Studies

# Astronomical and Cosmographic Elements in the Corpus of Mining Inscriptions of Wadi 'el-Houdi

## العناصر الفلكية والكونية في نقوش محاجر وادي الهودي

Alicia Maravelia\*

### ملخص

اشتهرت الصحاري الغربية وشبه جزيرة سيناء والصحاري الشرقية جميعها بوفرة المعادن والأحجار الكريمة (وشبه الكريمة)؛ ولذا كان لها أهمية عظيمة في مشروع التعدين الفرعوني الذي كان دائم الخير والثراء رغم صعوبة مهامه. ومن بين نجاحاته، كانت تلك المنافع الثروة التي عادت على الملك والدولة، مؤكدةً مكانة الملك كسيد للطقوس والأفعال *nb irt-ht*. وهو الأمر الذي أسهم بدوره في حفظ وتعزيز النظام السياسي والاجتماعي كصدى بعيد للتناغم الكوني الأولي *m3rt*. نشر الدكتور أشرف صادق النص الكامل لنقوش محاجر الجمشت بوادي هودي. تضمنت النقوش مصطلحات فلكية وواصفة للكون، وهي موضوع هذا البحث. استنتجنا بإصدارتنا السابقة من كتب أو مقالات شيوع استخدام تلك المصطلحات الفلكية والكونية في نصوص متنوعة غير فلكية؛ لكنها كانت في سياقات غير علمية أو فلكية خالصة لشرح مفاهيم الحياة اليومية التي تشير إلى دورية الظواهر السماوية المرتبطة بأغراض تقويمية، وأعياد دينية، ومراسم ملكية، وأمور جغرافية كونية أخرى. وعلى سبيل المثال، نجد المصطلح *w3rt* بمعنى حي أو جهة في نقوش محاجر وادي الهودي (ثلاث مرات)، إلا أنه ورد أيضاً بنصوص الأهرام (ثلاث مرات)، وفي نصوص التواييت (خمسين مرة)، لكن مشيراً إلى منطقة القطب السماوي الشمالي. ونجد أيضاً في نقوش محاجر الجمشت مصطلحات مثل *3bd*، و *itn*، و *rnpt*، و *3ht* وغيرها. وسيتناول هذا البحث القصير هذه الأمور كلها بالتفصيل، مصحوباً ببعض الاستنتاجات الأولية.

## 1. Introduction: Deserts as Cradles of Minerals

In the ancient Egyptian *forma mentis* minerals<sup>1</sup> were always considered as materializations of the divine presence, wealth and also of (secular) royal power. On the other hand, the desert (*dšrt*) was always thought of as an ambivalent place:<sup>2</sup> a landscape of death (Sethian realm and the scorching Sun) and of hidden valuable stones (*šwt špswt*), which leads to a virtual synthesis via an antithesis. The ancient Egyptian Mining Project was of paramount importance for the wealth of the country and of the royal family, all these expeditions being under the charge of the pharaoh and under his auspices. The king as *lord of rituals* and *master of actions* (*nb irt-ht*) was thus projecting his image and *persona* into a political and financial undertaking that had also both intense metaphysical undertones and pre-scientific nuances<sup>3</sup> (Fig. 1).

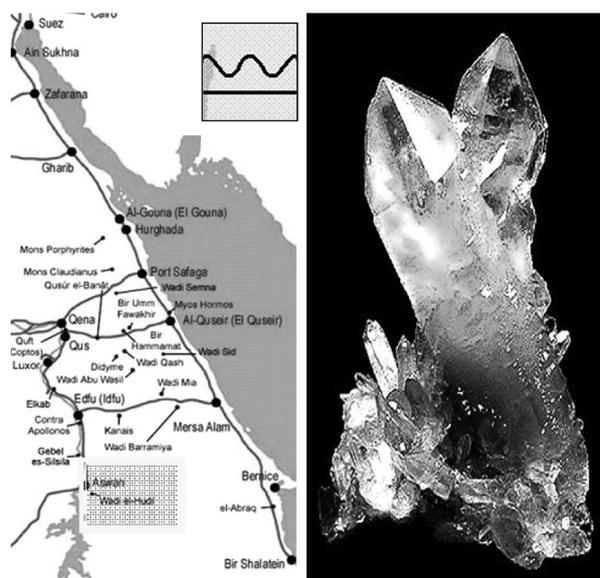
The Eastern Desert of Egypt was always remarkable for the rich variety of minerals and for the scenery of desolate *grandeur*, and many people since the remote Antiquity have searched through these barren wastes, in order to extract the hidden treasures, as Ashraf Sadek has correctly pointed out<sup>4</sup>. Wadi



(Fig. 1) Metal, stone and jewellery work as depicted in a Theban tomb, showing also the weighing of gold, the grinding of stone and the displaying of completed valuable jewels, ornaments and amulets (with inlays made of various mineral crystals). From the Tomb of Nebamun and Ipuky (TT 181), c. 1370 BCE.

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'el-Houdi<sup>5</sup> lies very close to Aswān, approximately 35 km SE of the latter, and was always a place of amethyst mines. Amethyst (*hzmnn*) was considered by the Egyptians of Antiquity as a particularly important mineral,<sup>6</sup> whose allegoric and meta-physical symbolism was related to its alleged protection against intoxication, due to its wine-like colored crystals, (Fig. 2) and enchantment, and whose use was also extended to the construction of jewels<sup>7</sup> and certain amulets<sup>8</sup> (such as scarabs, the Horus-amulet). The rarity and preciousness of amethyst (as is the case for other minerals and valuable or semi-valuable stones too) has made the Egyptians of Antiquity look at it with admiration and bestow upon it various apotropaic, protective, therapeutic, as well as other magical qualities.<sup>9</sup> The mining of amethyst during the Middle Kingdom at Wadi 'el-Houdi could be easily and fruitfully compared to the extraction of turquoise in the Sinai Peninsula (at Serabit 'el-Khadim), as well as to the quarrying of choice stone in Wadi Hammamāt, and to other similar enterprises elsewhere.<sup>10</sup> Such expeditions came at intervals by royal command, while the gems were securely going to the king, actually to the royal State

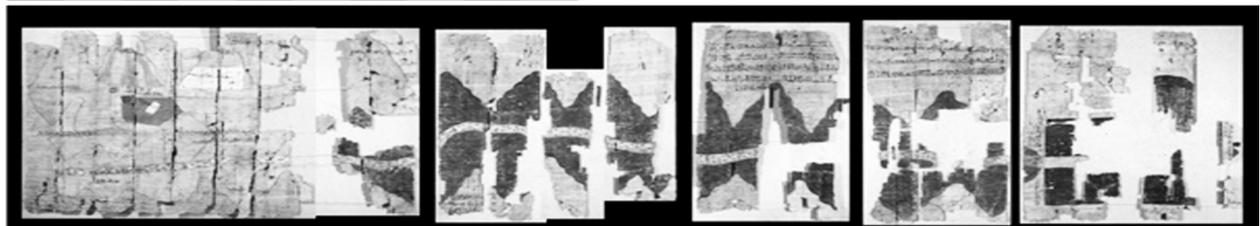


(Fig. 2) *On the left*: A modern map of South Eastern Egypt, with the area of Aswān and Wadi 'el-Houdi highlighted. *On the right*: Two superb crystals of amethyst grown on a base of quartz.

treasury. Hence the study of the mining inscriptions from that particular site is significant and contributes to the overall knowledge of the ancient Egyptian quarrying practices and the gemstones' mining activity.

Before referring briefly to the work of Dr. Ashraf Sadek and give a general description of these very mining inscriptions, it would be good to discuss also very shortly our method of textual archæoastronomical analysis and its implications, as well as to present some summary hints on ancient Egyptian Astronomy. Ancient Egyptian Astronomy was clearly a synthesis between metaphysical allegories and pre- (or later during the Ptolemaic Era) proto-scientific approaches, the latter being the vehicle of the metaphorical although quite accurate description of heavenly phenomena, the former being the manner of ascribing to them certain divine celestial epiphanies. Although the mining inscriptions are not astronomical neither cosmovisional texts *per se*, they do present a few astronomical and cosmographic terms, which as we have already pointed out in previous papers<sup>11</sup> and books<sup>12</sup> are used in a daily and not in an explicitly astronomical context. They are not diagonal star clocks and they are not inscriptions from astronomical ceilings of the New Kingdom and they are not religious funerary texts as the *PT*, the *CT* or the *BD*, where many astronomical and cosmovisional elements do abide, however they contain some similar explicitly astronomical terms in a different context and hence in a varied meaning.

0 50 100 cm



(Fig. 3) An ancient map of the mining regions at the Eastern Desert from Papyrus Turin. The whole map on the papyrus is shown here, as was designed by the ancient scribe Amün-Nakht (son of Ipouy), c. 1160 BCE, in order to be used by the expedition of King Rameses IV at Wadi Hammamât in the Eastern Desert [see J.A. Harrell, V.M. Brown, 'The World's Oldest surviving Geological Map: The 1150 BCE Turin Papyrus from Egypt', *Journal of Geology* 100 (1992a), 3-18; J.A. Harrell, V.M. Brown, 'The Oldest Surviving Topographical Map from Ancient Egypt (Turin Papyri 1879, 1899 and 1969)', *JARCE* 29 (1992b), 81-105].  
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This having being noticed, we can continue our study taking into account that our statistical study will shed some more light on this very use of such (otherwise explicitly astronomical) terms in an everyday-life context, viz in the domain of mining.

## 2. The Mining Inscriptions of Wadi 'el-Houdi

Mining in Upper Egypt can be traced back to the Predynastic Era (Au), and the earliest map known from the Ramesside Period dating to about 1160 BCE, shows the route to the gold mines in the Wadi Hammamât in the Eastern Desert (Fig. 3), which were like that of Wadi 'el-Houdi famous for amethyst (*hzm*). The work of Dr. Ashraf Sadek<sup>13</sup> is an improved and enriched study of the related inscriptions initially carried out by Prof. Dr. Ahmed Fakhry<sup>14</sup> and represents the fully revised version of a Doctoral Thesis by the former author presented at the University of Sorbonne in 1977. Sadek, in his two volumes, extended and completed the work of Fakhry, presenting also very useful indexes of ancient Egyptian terms, on which we also based our current study. It is a well-documented and clearly presented study with commentaries, normalized inscriptions, translation, maps, indexes, on which our work is firmly based.

The site of Wadi 'el-Houdi consists of a typical example and a characteristic case study of a mining area, well defined both in space (SE Desert) and in time (Dynasties XI, XII and XIII of the Middle Kingdom), thus it is very important from a point of view of an analytical approach to the very kernel of amethyst mining and its implications on the ancient Egyptian economy and society. Amethyst has been used in jewellery since at least the time of the Old Kingdom. Some amethyst mining may have occurred as early as 3000 BCE. The stone was widely used during Dynasty XI and the Middle Kingdom Period, from around 2000 BCE to 1700 BCE. Wadi 'el-Houdi was an important mining locality during that time, but appears to have been depleted during this period, and the popularity and availability of amethyst waned. Perhaps it was probably during this period that the purple color first became associated with royalty. There was an active trade of amethyst in the Aegean, and the Romans too operated some mines during the Roman Period of Egyptian history.

### 3. Astronomical and Cosmographic Elements in the Corpus of the Mining Inscriptions of Wadi 'el-Houdi

Interestingly the Wadi 'el-Houdi inscriptions form a compact textual corpus in subject, time and space, as we have already noted. They consist of the permanent memorials of the Middle Kingdom mining expeditions sent out to mine and collect amethyst from the hillocks of

Wadi 'el-Houdi, 35 km SE of Aswān (c. 2000–1730 BCE, Dynasties XI, XII and XIII).<sup>15</sup> The Wadi 'el-Houdi mining region (covering an area of approx. 300 km<sup>2</sup>, and having been also exploited further for various other minerals, such as gold, barytes and possibly mica, since the early 2<sup>nd</sup> Millennium BCE) was the primary source for amethyst in ancient Egypt from Dynasty XI until the end of the Middle Kingdom, an era during which the use of amethyst in jewellery reached a peak of popularity.<sup>16</sup> Our purpose in this paper is the brief study of the astronomical and of the cosmographic elements in the Corpus of the Wadi 'el-Houdi inscriptions. In previous articles we have already given a short description of our method of textual archæoastronomical analysis,<sup>17</sup> which is going to be followed here too. We have already pointed out that even if certain terms, the use of which is explicitly astronomical in the context of funerary texts, are also met in the Wadi 'el-Houdi inscriptions, still their use in the latter is only meant at a purely everyday level, without any particular astronomical or even cosmographic hint. The nature and context of these astronomical terms is going to be examined now, as well as those of the cosmovisional, cosmographic and of certain geographical terms.

In Table 1 we have gathered all the astronomical, cosmographic, cosmovisional and similarly related terms that are met in the Corpus of the Wadi 'el-Houdi Mining Inscriptions, based on the work of Dr. Ashraf Sadek.<sup>18</sup> For each such term its source (specific inscription), as well as its frequency are presented.

No.	Term	Source [ <i>Sadek, The Amethyst Mining Inscriptions of Wadi 'el-Houdi</i> ]	Frequency
1	<i>3bd</i>	WH 20: l. 1; WH 149: l. 1	2
2	<i>3ht</i>	WH 20: l. 1	1
3	<i>Itn</i>	WH 143: l. 9	1
4	<i>w<sup>c</sup>rt</i>	WH 6: l. 14; WH 23: l. B.3; WH 23: l. B.6	3
5	<i>bi3t (?)</i>	WH 148: l. 7	1

6	<i>Prt</i>	WH 149: l. 1	1
7	<i>nḥḥ</i>	WH 6: l. 3; 10: 6; 16: 2; 17: 2; 20: 2; 21: 2; 22: 3; 23: A1; 24: 3; 25: 2; 95: 2; 146: 8-9	12*
8	<i>r<sup>c</sup></i>	WH 4: l. 10; 8: 4; 9: 6; 14: 6; 18: 2; 18: 3; 21: 4; 58: 3; 144: 4; 145: 3; 146: 8; 147: 4; 149: 7	13*
9	<i>rnpt (?)</i>	WH 4: l. 13	1
10	<i>hrw</i>	WH 8: l. 4; 9: 6; 14: 6; 16: 6; 21: 4; 58: 2; 144: 4; 145: 3; 147: 3-4	9
11	<i>ḥ3t-zp</i>	WH 1: l. 1; 2: 1; 3: 1; 4: 1-2; 6: 1; 7:1; 8: 1; 14: 1; 20: 1; 26: 1; & c.	33*
12	<i>ḥ3st</i>	WH 21: l. 8; 23: B.4; 143: B.4; 143: B.7; 149: 11; & c.	11*
13	<i>sw</i>	WH 20: l. 1	1
14	<i>zp</i>	WH 14: l. 18; WH 23: l. A.4	2
15	<i>šni</i>	WH 143: l. 9	1
16	<i>t3</i>	WH 8: l. 6; 14: 12; 84: 2; 143: B.6; 143: B.8; & c.	10*
17	<i>dt</i>	WH 14: l. 4; 14: 14; 19: 2; 21: 2; 143: A.3; 143: B.15; 146: 9; & c.	30*

(Table 1) The most common astronomical and/or cosmographic terms met in the Corpus of the Mining Inscriptions of Wadi 'el-Houdi (presented in alphabetical order) and their frequencies of occurrence. The most frequent terms of these are marked with an asterisk.

The most frequently met terms, as one can clearly see, are the following:

1. The term *regnal year* (*ḥ3t-zp*),<sup>19</sup> met at least 33 times in total: this term is meant in the historical and socio-political context of ancient Egyptian pharaonic records, thus even if it is actually a purely calendrical term, here it is used in an everyday context.
2. The term *static eternity* (*dt*),<sup>20</sup> met at least 30 times in total: A rather cosmovisional or cosmographic term *par excellence*, it can also be bestowed with an astronomical or calendrical nuance, however it is here used in a purely socio-political context, where a typical wish for the longevity and health of the pharaoh is directly expressed.
3. The term *Sun/day* (*r<sup>c</sup>*),<sup>21</sup> met at least 13 times in total. In this case, we have a typical example of two distinct terms astronomical *per se*, that are used however in a purely societal and everyday context. The same would definitely hold for the term *day/daytime* (*hrw*),<sup>22</sup> in the context of the characteristic phrase *m ḥrt-hrw nt r<sup>c</sup>-nb*.<sup>23</sup>
4. The term *dynamic eternity* (*nḥḥ*),<sup>24</sup> met at least 12 times in total. It is a rather cosmovisional or cosmographic term *par excellence* (exactly as the term *dt*, see *supra*), it can also be bestowed with an astronomical or calendrical nuance, however it is here used in a purely socio-political context, where a typical wish for the virtually eternal longevity of the pharaoh is directly expressed.
5. The term *desert* (*ḥ3st*),<sup>25</sup> met at least 11 times in total. In this case, we have a purely geographic term, used in the context of the ancient Egyptian mining protocol.

6. The term *land/country* (*t3*),<sup>26</sup> met at least 10 times in total. Here we deal again with a purely geographic term, used in the context of the ancient Egyptian mining protocol, in order to praise the effective power of the Pharaoh over all lands and his capacity in the Mining Project of the Royal Residence (*Hnw*).

Other than the previous most frequent terms (with the exception of *hrw*, that is also quite frequent, see *supra*), the rest of them are not at all frequent. Some of these very terms, however, are astronomical and/or cosmographic indeed, hence they need some additional discussion.

1. The term *month* (*3bd*),<sup>27</sup> met at least twice in total. This term is of course astronomical *per se*, but is here used in the context of counting the regnal years.
2. The terms *Inundation Season* (*3ht*)<sup>28</sup> and *Winter Season* (*Prt*),<sup>29</sup> met at least once each in total. Both these terms are of course astronomical and calendrical *per se*, but are here used in the context of counting the regnal years.
3. The terms *Solar Disc* (*Itn*)<sup>30</sup> and *encircle* (*šni*),<sup>31</sup> met at least once each in total (both in the same passage). The former is both religious and astronomical, while the latter is used in both a cosmographic and the royal mining protocol context, in order to praise the pharaoh: consequently they are astronomical and calendrical *per se*, but are here used in the context of counting the regnal years.
4. The term *district/administrative department* (*wꜣrt*),<sup>32</sup> met at least 3 times in total. In the context of the Wadi `el-Houdi Corpus of Mining Inscriptions, it is used simply as a mere geographical district name (in a societal and royal protocol context), two times with the geographical taxogram N23, thus:
  - (i) «[...] *nt Wꜣrt nt Tp-Rst, z 6I*» [WH, 6: 14];
  - (ii) «[...] *hr htmty n Wꜣrt Tp-Rst*» [WH, 23:



(Fig. 4) Extract from the *Coffin Texts* referred to in the text [see Section III, *supra*]. It is taken from *CT*, I, 62, §§ 270e-271c [B10C] and its transliteration is as follows: «*ts.t<w> n.k m3kt r pt, di Nwt ꜣwy.s(y) r.k; skdy.k m Š-n-Ḥ3; ꜣ.k t3w m ḥmnyw, nty[w m] wi3; skd tw isty iptny nt ḥmw-skiw, nt ḥmw-wrḏw; wḏ.sn tw, itḥ.sn tw hr Wꜣrt m nwḥw.sn nw bi3*». The celestial polar region *Wꜣrt* is explicitly referred to in a purely astronomical manner.

- B.3]; (iii) «[...] *imy-r3 Wꜣrt nt Gbtyw*» [WH, 23: B.6]. However, the term *Wꜣrt*, in the context of the funerary texts, where explicit astronomical elements were abundant, had the meaning of the northern polar celestial region<sup>33</sup> (cf. e.g.: *CT*, I, 62, §§ 270e-271c: «*ts.t<w> n.k m3kt r pt, di Nwt ꜣwy.s(y) r.k; skdy.k m Š-n-Ḥ3; ꜣ.k t3w m ḥmnyw, nty[w m] wi3; skd tw isty iptny nt ḥmw-skiw, nt ḥmw-wrḏw; wḏ.sn tw, itḥ.sn tw hr Wꜣrt m nwḥw.sn nw bi3*» [B10C]), & c. [Fig. 4].
5. The term *wonder/marvel* (*bi3t*),<sup>34</sup> met at least once in total. This term is rather cosmographic *per se*, reminding us of the astronomical term *meteoritic iron* (*bi3*),<sup>35</sup> but is here used in the context of praising the successful outcome of that certain mining expedition, thus as a heavenly miracle is admirable, hence the mining deeds of the pharaoh are also formidable.
6. The term *year* (*rnpt*),<sup>36</sup> met at least once in total. This term is of course astronomical *per se*, but is here used only in the context of a brief description of the mining operations and of their eventually successful outcomes.

7. The term *regnal day* (*sw*),<sup>37</sup> met at least once in total. This term is calendrical *per se*, and is here used in order to denote and count the date of a certain event, in the usual ancient Egyptian manner.
8. The term *occasion/time* (*zp*),<sup>38</sup> met at least twice in total. This term is sometimes cosmographic in meaning (such as in *zp-tpy*, the *first time*), but here it is only used in the context of describing certain events and facts, related to the mining deeds of the pharaohs.

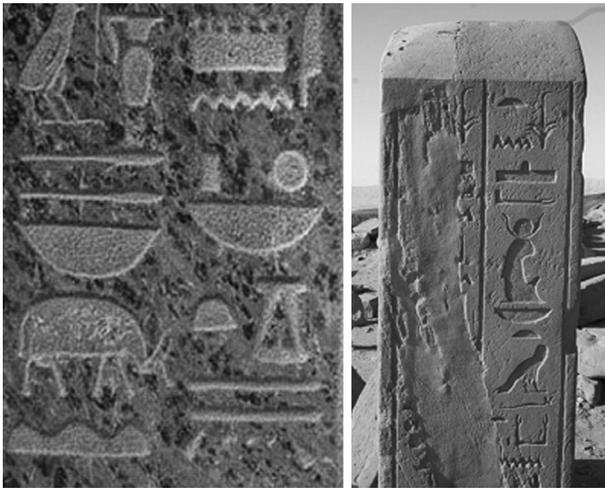
#### 4. Final Remarks and Conclusions

We have picked and chosen some 17 astronomical, cosmovisional, cosmographic and related terms, found in the Corpus of the Mining Inscriptions of Wadi 'el-Houdi, based on the work of Dr. Ashraf Sadek, in order to review them in their own contexts. Thus, we can conclude the following:

1. Although some of the most frequent of them are explicitly either astronomical or cosmographic or cosmovisional in character, they are used in the Wadi 'el-Houdi Inscriptions in a non-astronomical context.
2. The same holds also true for some of the less frequently met terms.
3. Terms that are neither astronomical nor cosmovisional, but rather present a geographic or partly cosmographic undertone (such as the term *t3*) are also used in a clearly non-astronomical context.
4. Terms that are astronomical in the context of funerary texts, but are used in the Wadi 'el-Houdi Inscriptions in a non-astronomical but rather socio-geographical context (such as the term *w<sup>c</sup>rt*) do subsist and have also been equally discussed.

Following and complementing our previous papers,<sup>39</sup> all the above show that even if we actually

deal with purely astronomical terms found in the Corpus of the Mining Inscriptions of Wadi 'el-Houdi, these very terms (be them in principle astronomical, cosmovisional or cosmographic), in all these texts they are not meant as astronomical *per se*, but used in the context of everyday life, calendrical purposes and to the effect of counting the regnal years of the pharaohs who undertook those mining operations, as well as for recording their successful deeds related thereto. We denote that some of these terms in the context of purely astronomical and/or funerary texts (such as *PT*, *CT*, *BD*, *BoHC*, & c.) have an explicit astronomical co-notation and meaning in a pre- or sometimes even proto-scientific background (such as the terms *3bd*, *W<sup>c</sup>rt*, *r<sup>c</sup>*, *hrw*, & c.). However, in the context of the Wadi 'el-Houdi mining inscriptions the meaning of some is completely different, while the meaning of others has only to do with royal dating, calendrical purposes and the daily life use of these particular astronomical elements. Furthermore, the terms *itn* and *šni* are met in a purely cosmographic or quasi-astronomical context, denoting the power of the Pharaoh by virtue of his possession of the land-wealth and its minerals. In addition, terms as *3bd*, *3ht*, *Prt*, *Šmw*, *rnpt*, *hrw*, *r<sup>c</sup>*, *sw*, *zp*, & c., are used in a purely calendrical and royal-dating protocol (*h3t-zp*) context. The highest frequency of terms, such as *h3t-zp* and *dt/nhh* is to be understood in the very context of royal dating and calendrical purposes, as well as in the usual pharaonic titulary wishing protocol (l, p, h). Finally, the terms *bi3t* and *bi3* (use of the former is met in the Wadi 'el-Houdi in an allegorically cosmographic context) have been also discussed. Further specialized study must be carried out by linguists, in order to assess the possible alphabetic dating criteria, based on the taxograms of some astronomical (see the term *W<sup>c</sup>rt*) or other terms of the Wadi 'el-Houdi Mining Inscriptions, following an idea of other authors (Shaw & Jameson, *JEA* 79);



(Fig. 5) *On the left*: A typical inscription from the Eastern Desert. It mentions the high-god of the NK, namely Amūn Rē, as *Lord of the Thrones of the Two Lands* (*nb nswt-t3wy*).

*On the right*: A round top *htp-di-nsw*-stele with reference to Hathor as *Lady of Turquoise* (*nbt-mfk3t*), from the Temple of Hathor at Serabit 'el-Khadim. Hathor (*Hwt-Hr*) was considered as *Lady of Minerals* in the Eastern Desert [IS 93 (S Edge), dating from the reign of Amūnemhat III; see Gardiner *et al.*, *Sinai* II, 100].

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however, they did not propose the comparison of hieroglyphic signs as a dating criterion, but only the systematic study of the associated ceramics that will be found during the excavations at Wadi 'el-Houdi.<sup>40</sup> Consequently, our archæoastronomical study sheds light towards that direction and could in principle provide further chronological criteria, proving how useful Archæoastronomy can be.

Ahmed Mansour, in a recent paper, discussed the possible interconnections between religion and proto-science in the process of extracting minerals (actually turquoise) from the mining areas of Serabit 'el-Khadim at the Sinai Peninsula, where Hathor was the matron goddess<sup>41</sup> (Figs. 5, 6). We should point out that Hathor (*Hwt-Hr*)<sup>42</sup> in her aspect as a funerary goddess (*nbt-Imntt*) had also important cosmic traits: she protected the deserts of the West (and conjecturally of the East), which are carriers of minerals and hidden treasures. She also encapsulated protectively the setting Sun (~ Nūt),

hence the pharaohs and the deceased in general *post mortem*, just like the Earth (~ Geb) encapsulated the minerals and the precious stones *sub terram*. In the *Tale of Sinūhe* we should also detect some interesting related hints: Sinūhe/*Z3-nht* is the virtual son of the sycamore, the son of the tree goddess<sup>43</sup> (refreshing the deceased in the Egyptian Paradise), that is of Hathor/Nūt, who is manifesting in herself another aspect of the heavenly attributes as a cosmic cow<sup>44</sup> (~ *t3 iht n nbw*, *nbt-pt*; cf. the circular text on the circular Zodiac of Denderah: *t3 pt n nbw* [...]), the hero is actually seeking during all his life after heavens and the sky [Fig. 7]! Allegorically the stars and the celestial luminaries are the virtual *ornaments/κοσμήματα* of the firmament,<sup>45</sup> hence metaphorically speaking the virtual and invaluable celestial minerals and brightest heavenly stones, a fact that was true not only in the ancient Egyptian, but also in the ancient Hellenic *forma mentis*.<sup>46</sup>

Ancient Egyptian culture was a continuous and propitious quest for eternity, eternal life, the firmament, the stars and heavens, a fact attested in texts and even (indirectly and definitely not explicitly) in some mining



(Fig. 6) The text of line 9 from *Wadi 'el-Houdi* 143. The transliteration is: *n.f imy snnt Itn, in n.f irt, m imy.s, nbt hprw, m km3.s nb*. The translation is as follows: «To him (to the pharaoh) belongs what the Solar Disc encircles, what the Eye brings for him from what is in her, the Lady of Forms, from every creation of her». To be compared with almost similar texts in the context of mining inscriptions from Serabit 'el-Khadim in Mansour, in Maravelia (ed.), *Ancient Egyptian Science and Meta-Physics*, 190.



(Fig. 7) Part of the text from *the Tale of Sinūhe* [*pBerlin* 3022: ll. 269-71], related to Hathor as a heavenly and stellar goddess. She was also the Lady of Minerals *par excellence* (*Hwt-Hr*: *nbt pt, nbt nht, nbt mfk3t, nbt hzmn*). The transliteration is: *ꜥwy.k(y) r nfrt nsw w3h, hkryt nt Nbt-Pt! Di Nbw ꜥnh r fnd.k! Hnm.tw nbt-sb3w!* The translation is as follows: «(May) thy two hands point towards the Beautiful One, (o) eternal king, towards the ornament of the Lady of the Sky! (May) the Golden One give life to thy nostril! (May) the Lady of the Stars join thee!» [for a discussion see: Maravelia, *Les astres dans les textes religieux en Égypte antique et dans les Hymnes Orphiques*, 269-75].

inscriptions. It is in this aspect that the studied terms must be understood and approached, even though their very use in the Corpus of the Mining Inscriptions of Wadi 'el-Houdi was not astronomical or cosmographic *per se*.

## Notes

- \* Hellenic Institute of Egyptology, Athens, Hellas: 'hieg-aker.org@otenet.gr'.
- 1 On minerals, their divine character, & c., see J.R. Harris, *Lexicographical Studies in Ancient Egyptian Minerals* (Berlin, 1961); S. Aufrère, 'Caractères principaux et origine divine des minéraux', *RdE* 34 (1982–83), 3–21; Aufrère, *L'univers minéral dans la pensée égyptienne I; L'influence du désert et des minéraux sur la mentalité des anciens Égyptiens II; L'intégration des minéraux, des métaux et des 'Trésors' dans la marche de l'univers et dans la vie divine* (Le Caire, 1991).
  - 2 On the desert's metaphysics and semantics, see: P. du Bourguet, 'Pierres d'attente dans l'Égypte antique pour le monachisme chrétien', *CdO* 20 (1988), 41–46.
  - 3 See: A. Mansour, 'Opening Turquoise Galleries: Divine Gift or Scientific Experience?', in A.-A. Maravelia (ed.), *Ancient Egyptian Science and Metaphysics: Quintessence of Religious Allegories, Roots of Scientific Thought; Proceedings of the 1<sup>st</sup> Egyptological Conference of the Patriarchate of Alexandria: 6<sup>th</sup> May 2011*, Athens (Journal of the Hellenic Institute of Egyptology, 2) 189–97. On stones in ancient Egypt, see: T. Nicholson, I. Shaw, (eds.), *Ancient Egyptian Materials and Technology* (Cambridge, 2000), 6–77.
  - 4 See: A.I. Sadek, *The Amethyst Mining Inscriptions of Wadi 'el-Houdi*, I-II (Warminster 1980–85), 1.
  - 5 On this, see: Sadek, *The Amethyst Mining Inscriptions of Wadi 'el-Houdi*, 1–2, 100ff.; cf. also J. Baines, & J. Málek, *Atlas of Ancient Egypt* (Oxford, 1988), 41, 235. The geographic coordinates of this site are  $\varphi = 17^{\circ}42' N$ ,  $\lambda = 34^{\circ}17' E$ . For an introduction to Geophysics and Archaeology, cf. A.J. Witten, *Handbook of Geophysics and Archaeology* (UK, 2006).
  - 6 See: *LÄ*, I, 1975, col. 223–24: art. 'Amethyst'; R. Hannig, *Großes Handwörterbuch Ägyptisch–Deutsch (2800–950 v. Chr.)* (Mainz, 2009), 605. From the geological viewpoint, see: C.W. Chesterman, K. Lowe, *National Audubon Society, Field Guide to North American Rocks and Minerals* (NY, 1998), 502–04: art. 'Quartz' and Fig. 155–56. On its symbolism, through the ages, cf. J. Chevalier, A. Gheerbrant, *Dictionary of Symbols*, transl. by J. Buchanan–Brown (London, 1996), 20: art. 'Amethyst'. Amethyst is a translucent violet-colored macrocrystalline form of quartz ( $SiO_2$ ) whose characteristic color is due to trace amounts of ferric oxide (FeO). For a review of amethyst and its uses in ancient Egypt (with some typical examples too), see: B.G. Aston, J.A. Harrell, I. Shaw, 'Stone', in T. Nicholson, I. Shaw (eds.), *Ancient Egyptian Materials and Technology* (Cambridge, 2000), 50–52.
  - 7 See, for instance: C. Andrews, *Ancient Egyptian Jewellery* (London, 1990).
  - 8 On this topic, cf.: 'A.-A. Μαραβέλια, *Η μαγεία στην αρχαία Αίγυπτο: Μεταφυσική πεμπουσία της χώρας των θεών* (Αθήνα, 2003), 216–21 & Tab. VIII.1; C. Andrews, *Amulets of Ancient Egypt* (London, 1994), 64–65, Fig. 64, 67.
  - 9 See: Μαραβέλια, *Η μαγεία στην αρχαία Αίγυπτο: Μεταφυσική πεμπουσία της χώρας των θεών*, 223–25.
  - 10 See: Sadek, *The Amethyst Mining Inscriptions of Wadi 'el-Houdi*, 100.
  - 11 See, for instance: A.-A. Maravelia, 'ptri.st mi Spdt h'ry m-h3t rnpt nfrt: Astronomical and Cosmovisional Elements in the Corpus of Ancient Egyptian Love Poems', *Lingua Aegyptia* 11 (2004), 82–84, 106ff.
  - 12 Mainly in our PhD thesis, see: Maravelia, *Les astres dans les textes religieux en Égypte antique et dans les hymnes orphiques* (Oxford, 2006a), 260–62.
  - 13 Already given, *supra*: Sadek, *The Amethyst Mining Inscriptions of Wadi 'el-Houdi*.
  - 14 See: A. Fakhry, *The Inscriptions of the Amethyst Quarries at Wadi 'el-Houdi* (Cairo, 1952).
  - 15 For a review of the amethyst mines at Wadi 'el-Houdi see: Aston, *et al.*, in Nicholson, Shaw (eds.), *Ancient Egyptian Materials and Technology*, 51. For a discussion on the amethyst mining expeditions in the light of these very inscriptions and for each of these Dynasties, see Sadek, *The Amethyst Mining Inscriptions of Wadi 'el-Houdi*, 100–105.
  - 16 See: I. Shaw, R. Jameson, 'Amethyst Mining in the Eastern Desert: A Preliminary Survey at Wadi 'el-Houdi', *JEA* 79 (1993), 81–97.
  - 17 See, for instance: Maravelia, *Lingua Aegyptia* 11, 82–84, 106ff.; Maravelia, 'Hélios et Réc : Deux textes anciens vus par une astronome-égyptologue', *Tōzai* 6 (2004), 49–72; Maravelia, *Les astres dans les textes religieux en Égypte antique et dans les hymnes orphiques*, 260–62; Maravelia, 'Le ciel selon l'hymne orphique à Ouranos et selon des textes funéraires égyptiens (PT, CT, BD) : Une brève comparaison préliminaire', *AntOr*

- 4 (2006b), 41–65; & c.
- 18 See: Sadek, *The Amethyst Mining Inscriptions of Wadi 'el-Houdi*; for various terms (deities, royal and personal names, titles, places and general), see: Section IV (= Indexes, pp. 107–13), particularly pp. 110–13 (= General Vocabulary).
- 19 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 540.
- 20 See: Hannig, *Großes Handwörterbuch Ägyptisch–Deutsch*, 447–48. On the terms *ḏt* and *nḥḥ*, see mainly J.P. Allen, 'Genesis in Egypt: The Philosophy of Ancient Egyptian Creation Accounts', *YES* 2 (1988), 26–27.
- 21 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 490.
- 22 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 528–29. The term *hrw* is met 9 times in the Wadi 'el-Houdi Mining Inscriptions.
- 23 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 528.
- 24 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 447–48. On the terms *ḏt* and *nḥḥ*, see mainly: Allen, *YES* 2, 26–27.
- 25 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 628.
- 26 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 982–84.
- 27 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 7.
- 28 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 12.
- 29 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 304.
- 30 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 125.
- 31 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 891.
- 32 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 199.
- 33 On this (with some discussion), see: Maravelia, *Les astres dans les textes religieux en Égypte antique et dans les hymnes orphiques*, 125 (Tab. III.2), 215 (Tab. III.4), 224, 230, 266, 287, 291 (n. 336), 294 (n. 346), 421, *passim*.
- 34 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 262.
- 35 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 262; E. Graefe, *Untersuchungen zur Wortfamilie bi3* (Köln, 1971). In the context of the *opening of the mouth ceremony* (*wḫ-r3*) it must be pointed out that the ceremonial adze was made of this very material, coming directly from heavens, the alleged realm of gods according to the ancient Egyptian funerary beliefs (see, for instance: A.M. Roth, 'The *psš-ḳf* and the Opening of the Mouth Ceremony: A Ritual of Birth and Rebirth', *JEA* 78 (1992), 113–47; A.M. Roth, 'Fingers, Stars, and the Opening of the Mouth: The Nature and Function of the *Nṯrwi*-Blades', *JEA* 79 (1993), 57–79).
- 36 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 501.
- 37 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 728.
- 38 See: Hannig, *Großes Handwörterbuch Ägyptisch Deutsch*, 746–48.
- 39 Cf. Maravelia, *Lingua Aegyptia* 11, 82–84, 106ff; Maravelia, *Les astres dans les textes religieux en Égypte antique et dans les hymnes orphiques*, 260–62.
- 40 See: Shaw, Jameson, *JEA* 79, 97.
- 41 See: Mansour, in Maravelia (ed.), *Ancient Egyptian Science and Meta-Physics*, 191–94, 196, *passim*. Cf. also M. Chartier-Raymond, B. Gratien, C. Traunecker, J.-M. Vinçon, 'Les sites miniers pharaoniques du Sud-Sinaï : Quelques notes et observations de terrain', *CRIPPEL* 16 (1994), 31–77; G. Mumford, 'Tell Ras Budran (Site 345): Defining Egypt's Eastern Frontier and Mining Operations in Southern Sinai during the Late Old Kingdom (Early EB IV/MB I)', *BASOR* 342 (May 2006), 13–67. Comparatively, on the Land of Punt and minerals, see: K.A. Kitchen, 'The Land of Punt', in I. Shaw, *et al.* (eds.), *The Archaeology of Africa: Foods, Metals and Towns* (London, 1993), 587–608.
- 42 On Hathor, in her different (religious, cosmic and "mineral") aspects, see: R.A. Parker, 'Hathor, Lady of the Acacia', *JARCE* IV (1965), 151; C.J. Bleeker, *Hathor and Thoth: Two Key Figures of the Ancient Egyptian Religion* (Leiden, 1973); D. Valbelle, C. Bonnet, *Le sanctuaire d'Hathor, maîtresse de la turquoise : Sérabit el-Khadim au Moyen Empire* (Paris–Aoste, 1996); Maravelia, *Les astres dans les textes religieux en Égypte antique et dans les hymnes orphiques*, 269–75; E.G. Bloxam, 'Miners and Mistresses: Middle Kingdom Mining on the Margins', *Journal of Social Archaeology* 6<sup>2</sup> (2006), 277–303.
- 43 On the tree goddess, see: M.L. Buhl, 'The Goddesses of the Egyptian Tree Cult', *JNES* 6 (1947), 80–97; N. Billing, *Nut: The Goddess of Life, Uppsala Series in Egyptology* 5 (Uppsala, 2002); J. Bergman, 'Nut–Himmelsgöttin–Baumgöttin Lebensgeberin', *Humanitas Religiosa: Festschrift für H. Biezais* (Stokholm, 1979), 53–69; *LÄ*, I (1975), col. 655–60: art. 'Baum, heiliger'; M. Lurker, *The Gods and Symbols*

- of Ancient Egypt: An Illustrated Dictionary* (London, 1986), 123–24: art. ‘tree’.
- 44 On the myth of the heavenly cow, see N. Guilhou, ‘Un nouveau fragment du *Livre de la Vache céleste*’, *BIFAO* 98 (1998), 197–213. On Dendarah and the Zodiacs, see: Chassinat, *Le temple de Dendarah*, I–V (Le Caire, 1934–47); B. Lenthéric, ‘À propos du zodiaque circulaire de Dendera : Éléments de réflexion’, *ASTRES I* (1996), 183–205; S. Cauville, *Le Zodiaque d’Osiris* (Leeuwen, 1997).
- 45 On this topic (*Κόσμος/κόσμημα - Cosmos/jewel*), see: Maravelia, *Les astres dans les textes religieux en Égypte antique et dans les hymnes orphiques*, 425 & n. 11.
- 46 See: Proklos, *Εἰς Πλάτωνα Τίμαιον*, 3, 40<sup>A</sup>, 118: 30: ‘τὸν Ἥφαιστον ὑμνοῦντες τοῦ οὐρανοῦ ποιητὴν συνάπτουσιν αὐτῷ τὴν Ἀγλαίαν ὡς ἀγλαΐζοντι πάντα τὸν οὐρανὸν διὰ τῆς τῶν ἄστρον ποικιλίας [...]’; cf.