A MINOAN APPLICATION FOR THE PHAISTOS DISK USING MODERN TECHNOLOGY TO SOLVE ANCIENT PROBLEMS

Gareth Alun Owens

CRETE = **C**ulture & **R**espect in **E**uropean **T**echnology & **E**ducation

1. INTRODUCTION

The Phaistos Disk was discovered by Italian Archaeologists in the First Minoan Palace of Phaistos in the Mesara of South Crete and dates to c.1700 B.C. It had baffled scholars for a century. In 2008, it was claimed that it might be a fake and at the TEI of CRETE we decided to start a proper scientific study of the Phaistos Disk, the Enigma of Minoan Crete. The TEI of Crete has given continuous support, encouragement and stimuli for the last 6 years. We have also called upon ICT for assistance. Our study of epigraphic continuity, i.e., based on the same signs, and using partial parallel texts, i.e., a Minoan 'Rosetta Stone' has produced what we believe is the best possible reading, c.90%+, of the Phaistos Disk. Both Erasmus, i.e., European Cooperation in Science and Information Technology have contributed considerably to both continually refining and focusing this research, through a dedicated revised website, documentaries and videos, TEDX and this year resulting in a Minoan Application for the Phaistos Disk. For the next 6 years we are now in a position to hopefully progress further in order not just to 'Read' but also to 'Understand' this Genuine Minoan Religious Inscription from Crete c.1700 B.C., which is perhaps a Hymn to the Pregnant Mother Goddess – IQEKURJA in the Minoan Indo-European Language of Bronze Age Crete. Step One has been completed and we are now starting Step Two with European Cooperation in Science. As a result of the current research an academic dialogue on the Phaistos disk has commenced.

A pleasure shared is a pleasure doubled;
A trouble shared is a Trouble Halved

Dr Gareth Owens, Erasmus+ Institutional Co-ordinator, TEI of CRETE

EU Erasmus+ Ambassador HE

2. SCRIPT

Minoan Crete constitutes the first literate civilization of Europe and the beginning of European recorded history. In 1878, Minos Kalokairinos carried out pioneering excavations in the West Wing of the Palace of Knossos and discovered the first Linear B tablet. In the first month of excavations at Knossos in 1900, Arthur Evans discovered 3 Bronze Age Scripts, Minoan "Cretan Hieroglyphic" and Linear A, and Mycenaean Linear B, thus bringing Minoan and Mycenaean Crete into the historical period. These three scripts were syllabic in nature and were used for both administrative and religious purposes. The rulers, priests, scribes and bureaucrats of Knossos used these writing systems for approximately 800 years to keep tax archives, to list personnel and agricultural products and to record religious offerings. The decipherment of Mycenaean Linear B in 1952 by Michael Ventris added 7 centuries to the history of the Hellenic language. Using Linear B it is possible to begin to approach an understanding of the Minoan script and language.

Figure 1.

Figure 2.

Figure 3.
Mycenaean Linear B

3. MYCENAEAN LINEAR B SCRIPT

Among other things, the coming of Mycenaean Greeks from Mainland Greece to Crete was accompanied by the adaptation of Minoan script to the Hellenic language. Mycenaean Linear B, which was also a syllabic script, was recorded on clay tablets at Knossos (ko-no-so), c.1400 B.C.. It was deciphered by the English architect Michael Ventris in 1952. The language of the tablets is Mycenaean Greek; they refer to the rulers of Knossos (Anax), to warriors and chariots, to olive oil and aromatic oils, honey, wine and large numbers of sheep. Extensive references are made to the tax records of Knossos, thus indicating a highly organized bureaucracy. There is also information concerning offerings to the Pantheon, to Zeus and to other divinities. The Linear B Script fell into disuse following the destruction of Knossos, though its survival has been attested at Chania (ku-do-ni-ja) and in Mycenaean Greece.

4. MINOAN LINEAR A SCRIPT

During the period from 1700 to 1450 B.C. the syllabic script of Linear A was widely used. Because Minoan Linear A developed into Mycenaean Linear B, it is possible to “read” though not to fully “understand” the contents of the Minoan inscriptions, which record various products (wine, cereals, figs), animals, personnel, as well as offerings at religious sites (peak sanctuaries). Minoan inscriptions have also been found beyond Crete, in the Peloponnese, on Thera, Milos, Kea, Kythera and Samothraki, at Troy, at Miletus in Asia Minor and in Palestine-Israel, thus demonstrating the extent of Minoan trade and international relations. The Minoan inscriptions are now approximately 2000 in number. “Cretan Hieroglyphic” inscriptions of the First Palace Period and Linear A inscriptions of the Second Palace Period are now beginning to inform us about Minoan administration, society, commerce and religion.

Figure 4.
Minoan Linear A

5. “CRETAN HIEROGLYPHIC” SCRIPT

The oldest example of writing from Europe is on a seal-stone found at Archanes, 10 km. from Knossos. The symbols in this first script are encountered as early as the Pre-Palatial period, mainly on seal-stones. The idea for the “Cretan Hieroglyphic” Script probably came from the

neighbouring literate people of Egypt, although the script, like Mycenaean Linear B and Minoan Linear A, was also syllabic in nature. Such inscriptions are found on clay tablets, seal-stones and various other objects. The "Cretan Hieroglyphic" Script (c.2000-1700 B.C.) was an invention of the First Palaces and is found in inscriptions of both administrative and religious content. The best known example of this is the Phaistos Disk (which bears 45 different printed signs, 242 in total, in 61 words, on its two sides).

Figure 5.
Minoan "Cretan Hieroglyphic"

6. THE PHAISTOS DISK AND RELATED INSCRIPTIONS

The best-known Minoan inscription is the Phaistos Disk. It is commonly accepted that this can be read spirally, i.e., from the rim inwards. 16 cm in diameter, the disk's two sides bear a total of 242 signs which can be divided into 61 groups. There are 45 different signs on the Disk, too many for them to constitute an alphabet and too few for them to constitute a truly ideographic script, as is the case with Chinese. This observation enables us to deduce that it is also a syllabic script, as are both Linear B and Linear A. It goes without saying that that the language of the Disk is unknown, and thus the text remains beyond our reach. Nevertheless, this has not deterred many potential decipherers from offering their own interpretations. Indeed, more has been written about this Cretan inscription than about any other, but most work is the product of fantasy.

7. FIND PLACE AND PUBLICATION

The Phaistos Disk was found by the Italian Archaeologists excavating in the Palace of Rhadamanthys in the Mesara in South Crete, on the 3rd July 1908. It was discovered in Room 8 of the North Wing of the Palace where it was found along with pieces of Kamares Ware pottery and a Minoan Linear A clay tablet (PH 1). In the same year, 1908, it was published by the excavator Pernier 'Il disco di Phaestos con caratteri pittografici' Ausonia 3. In the following year, 1909, it was published by Della Seta 'Il disco de Phaistos' and Sir Arthur Evans in Scripta Minoa I, Oxford, 1909, described it as a "Religious *Chaunt* in Honour of the *Anatolian* Great Mother". The Phaistos Disk was systematically studied and published in the excellent book of Louis Godart, The Phaistos Disk, the Enigma of an Aegean Script (Detorakis 1995), thus making the Phaistos Disk seriously 'Studiable'. In 2008, a century after its discovery, the Phaistos Disk began to be studied systematically and epigraphically/phonetically as a Cretan Syllabic Inscription of the Second Millennium B.C. just like Mycenaean Linear B, Minoan Linear A and "Cretan Hieroglyphics", by John Coleman, Professor of Phonetics at the University of Oxford, UK and Dr Gareth Owens at the TEI of Crete, Hellas and published on the DAIDALIKA website of the TEI of Crete, "From Linear B to the Phaistos Disk". It is now possible using both Epigraphic Continuity and partial Parallel Texts to 'Read' the Phaistos Disk c.90% after 6 years of team work and hard work. This 'Reading' has been re-recorded in the Music Technology Studio of the TEI of Crete, as a sort of Jurassic Park for Minoan Linguistics, thus, in collaboration with IT and Multi-Media, developing a 'Minoan Application' for the Phaistos Disk, http://disk.aboutcrete.eu/.

Figure 6.
The Phaistos Disk, Side A and Side B

8. TEXT/SIDE A – 123 SIGNS IN 31 WORDS

Starting from the 5 dots on the rim of Side A and working in spirally, the text unfolds like a labyrinth, consisting of 123 signs in 31 words on Side A of the Phaistos Disk. Side A begins with the initial word starting with 'Punk Head' + 'Circle with 7 Dots' IQE-PAJE and concludes with ZU-U-KE and the 'Rosette' exactly in the middle of the text. Sentences and verses probably end with a line below the last sign. The missing sign in word 8 is probably PD20 with a line below indicating the end of a sentence. There are 18 verses, i.e. rhyming lines, on the Disk. There are 10 verses on Side A, line 11 starts on Side A and continues onto Side B, and there are 7 verses on Side B. The word IQEKURJA is found repeated 3 times on Side A and is undoubtedly the Key Word on the Phaistos Disk.

9. TEXT/SIDE B – 119 SIGNS IN 30 WORDS

Starting from the 5 dots on the rim of Side B and working in spirally, the text unfolds again with the initial word starting again with 'Punk Head' + 'Circle with 7 Dots' IQE-ZOTUTI and concludes with the final word DI-TI in the centre of Side B. There are 18 verses, i.e. rhyming lines, on the Disk. There are 10 verses on Side A, line 11 starts on Side A and continues onto Side B, and there are 7 verses on Side B. The compound IQE- is found 13 times in total on the Phaistos Disk, 12 times on Side A and one on Side B in initial position. Side B has noticeably different sign frequencies from Side A. This may indicate that the two texts on Side A and B are different yet somehow related in meaning joined both by the sentence which runs from Side A to Side B and the initial word IQEZOTUTI on Side B.

10. KEY WORD IQEKURJA

The word IQEKURJA is found repeated 3 times on Side A and is undoubtedly the Key Word on the Phaistos Disk.

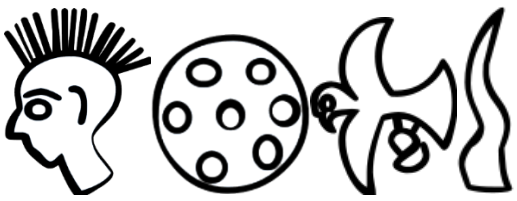

Figure 7.

11. COMPOUND IQE-

The compound IQE- is found 13 times in total on the Phaistos Disk, 12 times on Side A and once on Side B in initial position.

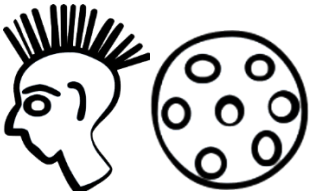

Figure 8.

12. PARALLEL TEXTS AND EPIGRAPHIC CONTINUITY

12.1 Arkalochori

It is now also possible using partial Parallel Texts to compare signs on the Phaistos Disk with inscribed Double Axes (Labrys) from the Cave of Arkalochori in Central Crete which may well be the original Labyrinth. There are 2 Minoan Linear A Double Axes, which can be read as IDAMATE, using Linear B sound values. This makes it possible in turn to read IDAMANA- and –MATE on the "Cretan Hieroglyphic" Double Axe from the Cave of Arkalochori. This in turn makes it possible to read the 'Punk Head' as sound value 'I' on the Phaistos Disk. The second sign in this key word/compound is the 'Circle with 7 Dots', 'QE', which is the same in all the syllabic scripts of Bronze Age Crete (Mycenaean Linear B, Minoan Linear A, "Cretan Hieroglyphics") of the Second Millennium B.C.

Figure 9.

12.2 Iouktas

It is now also possible using Epigraphic Continuity to compare both signs and words on Side B of the Phaistos Disk with the best preserved Minoan Religious inscription from the peak sanctuary on Mount Iouktas (IO Za 2) above Archanes and Knossos. Using Computational Linguistics it has been calculated that the possibility of 9 signs from 4 words on the Phaistos Disk matching exactly with those from Mount Iouktas by chance is 1 in 14 million. This Minoan inscription from Iouktas (IO Za 2) is perhaps the closest that exists at present to a Minoan 'Rosetta Stone'. This inscription from Iouktas consist of 8 words and was found along with Minoan tamata, votive dedications, to the Goddess and may suggest that the text of the Phaistos Disk is indeed a Minoan Religious Hymn, perhaps even a prayer for health to the Mother Goddess, perhaps when the women is giving birth.

Figure 10.

13. SUMMARY

It is now possible, after 6 years of hard work and team work, both to 'read' and to begin to 'understand', this Genuine Minoan Religious Inscription. It is a rhyming religious text, perhaps a wish for heath and/or a hymn to the mother goddess. Some human values which we all share are our common heritage and are consisten throughout the millennia. As a result of European cooperation in science, the foundations have been laid, for the continuation of the Odyssey of Understanding, on the way to Ithaka, which will guide us in the Labyrinth of Life.

14. SOME WORDS ABOUT SCIENCE WEEK AT DENNIS GABOR COLLEGE, BUDAPEST, HUNGARY

The 2014 Science Week conferences, took place in November 2014 at Dennis Gabor College, Budapest Hungary. In the Neumann Room on Thursday 13th November about 50 people in the audience were greeted by the scientific director Professor Emeritus Geza Bognar. In the first part of the program colleagues gave presentations in English on physics, economics and information technology topics. The audience was comprised of Undergraduates (Hungarian, French and Finnish [Erasmus] and Brazilian), Postgraduates and Teaching Staff of the Faculty.

After the break, the second half of the program was international as the audience listened to lectures from three guest speakers, from the TEI of CRETE. Dennis Gabor College, Budapest, Hungary has maintained a strong relationship for many years, with the Technological Educational Institute of Crete-University of Applied Sciences. Within the framework of the Erasmus mobility program several students and teachers have spent a semester or week respectively in Greece at the TEI of Crete. There are currently 2 TEI of Crete IT undergraduates at DGC within the Erasmus+ programme and the Rectors of both Universities recently signed a new bilateral agreement (2014-2020) to build even further upon fruitful past collaboration. The TEI of Crete is a young and dynamic Institution, located near the Minoan Palace of Knossos on the Island of Crete. DGC and TEI are committed to collaborating using modern technologies in order to further understand our common European heritage and both Institutions are committed to offering their students, both home and host, a National, European and International Education.

The first TEI speaker was Deputy Rector, Professor Ioannis Kopanakis who presented the TEI of Crete – University of Applied Sciences, History of the Institution, the 5 faculties with 15 departments and 15,000 students, and strategic plans for the next six years of Erasmus+ (2014-2020) and discussed the ongoing R&D activities. Prof. Kopanakis then discussed his own research field, data mining and data analytics with graphic examples of applications for economic matters.

The second TEI speaker was Dr. Gareth Owens, ERASMUS+ coordinator for the TEI of Crete, British linguist but who has lived in Greece for many years, and has devoted his research to the study of Minoan culture, especially focusing over the past six years, on the so-called. Phaistos Disc, trying to 'understand' the ancient Cretan inscription. The text of more than 90% of the Minoan Religious text can now be 'read' by combining disciplines, for example, epigraphy, linguistics and computer science. While listening

to Dr. Owens presentation the audience could see and hear the Disk and actually handle a museum copy of the Phaistos Disk.

The third TEI speaker was Professor Marcos Petousis who had already attended the conference last year as well. Prof. Petousis had offered hospitality, both social and scientific, to teaching staff from Dennis Gabor College and was the Co-ordinator of the TEI of Crete's participation in DGC Science Week Prof. Petousis presentation was "Sacred Relics From Byzantine to Hagiography", which showed how 3D Technology (Photography and Printing) could reconstruct the skull remains as a complete head of a 15th Century AD Byzantine Saint Eutuxios from Crete.

All three speakers stressed the importance of International and Interdisciplinary collaboration, such as that between DGC and TEI of Crete. The participants of the Science Day then experienced a demonstration of the research currently going on at DGC regarding the research and development of 3D Web pages.

After a successful conference and dinner at the Hungarian Academy of Sciences, DGC Rector Sarolta Zárda and the TEI of Crete Vice-Rector Ioannis Kopanakis signed a cooperation agreement to build upon the already existing student and staff exchange within the EU Erasmus + Programme, which made this trip possible.

The first tangible collaboration between the two institutions (DGC & TEI) will be to combine the technology of 3D Photography and Printing (TEI) with the technology of 3D Web pages (DGC) concerning the head of the 15th Century AD Byzantine Saint Eutuxios from Crete. This will be international and interdisciplinary collaboration in action, with students from both institutions working together and supervised by teaching and research staff from both institutions.

The second project will be a 3D Website for the Minoan Phaistos Disk. Research on the Phaistos Disk is progressing as a result of European Cooperation in Science and International and Interdisciplinary Collaboration.

On a personal note, for me, the Phaistos Disk symbolizes team work and friendship, health and love…IQEKURJA…G☺

15. REFERENCES

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[3] **Voices of Phaistos Disk**: http://disk.aboutcrete.eu/
[4] **Gareth Owens speaks live:** https://www.youtube.com/watch?v=h6D_3aIGMyw
[5] **Gareth Owens TEDx lecture**: https://www.youtube.com/watch?v=6Chcplx3tZ8