

An Example of a True Empirical Approach to a Classic Metaphor on Water

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Abstract: Throughout the known human history, we find numerous relations to water and its both physical importance as well as more metaphoric statements. Giving only a few historic examples may illustrate this statement. In ancient China Confucius stated: "The intelligent finds joy in water", see for instance Ball. P (2016) "The Water Kingdom". During the 19th century we may remember the writing from red Indian chief Seattle to the US president: "The shining water that moves in the streams and rivers is not just water, but the blood of our ancestors." In this paper the old telling from Exodus regarding the Israeli escape from Egypt (see Exodus 14:21) initiated Bo Hellström to study the metaphor from scientific viewpoints. His method is followed in the following.

THE PRESENTED STUDY

One sacred metaphor in both Jewish and Cristian faith is the Exodus, or the Israeli escape from Egypt. The Old Testimony telling contains the passage through the Red Sea, as the water had left a dry passage through the Red Sea for a short time. In Exodus, chapter 14:21, quote: "And Moses stretched forth his hand over the sea; and the LORD caused the sea to go back by strong east wind all that night, and made the sea dry land, and the waters were divided." (King James Authorized Bible version A. D. 1611). Now does the telling represents a true story or a mere metaphysical story? The question has been around for a long time. In the third decade of the 20th century a Swedish civil engineer, Bo Hellström, performed a study in 1924, based on his scientific skills to investigate whether the story has some real background. His study (only available in Swedish) may be a "blue-print" for a scientific-empiric approach. His comprehensive study [9] could be described as a theoretical/practical way to present the work. Bo Hellström was a hydraulic engineer when he wrote the study and become later one of the classic professors in Applied Hydraulic Engineering at the Royal Institute of Technology. His study-approach may be caught in three words "WHERE", "WHEN" and "HOW". A literary survey to find scientific papers on relevant perspectives was his starting point. His knowledge on the Bible texts was deep enough to contact theologian scholars representing the up to date exegetical knowledge. He went into the different natural science fields. Thus, he went through both geological issues relevant for the Saini peninsula, the meteorological conditions in the area, natural geographical and topographical

conditions. The water bodies surrounding the Saini, both the Mediterranean Sea in the north and the Red Sea in the south were of course of crucial interest for his study. The study presented a detailed profile of the Suez channel and based on historical data also the ancient water bodies in the area. Of special interest was the Serapeum area, where a shallow passage could be identified. The profile of the Suez passage from El-Guisr to Suez is presented in **Figure 1**.

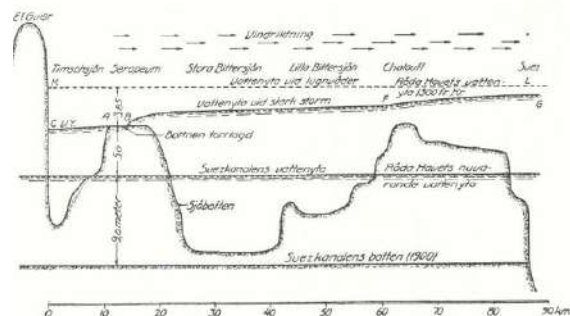


Fig. 13. Längdprofil genom Suezkanalen från El-Guisr till Suez. K-L vattenytta vid lugnväder, C-A Timoahjuns vattenytta vid storm, B-F-G Røda havets vattenytta vid storm. (Ritning av förf.)

Figure 1 Profile of the Suez presented in the study by Hellström

These observations helped Hellström to identify "WHERE" the most likely passage through the Red Sea was to be found. As the **Figure 1** shows the Serapeum location was by far the shallowest part of the water course. The figure also illustrates the variation in water level at certain wind conditions. What showed to be a crucial circumstance was the insight of the prevailing wind direction and the wind velocities. The dominant wind direction and linked to the strongest winds in the area were the north-west winds. By comparisons with other lakes and estuaries with respect to water level variations during storm winds he could find a possible way to understand what may have taken place at the Exodus. However, the study also includes an answer to the question "WHEN". Not only in the large scale, by studying Egyptian Farao rulers reign time, but also when the north western strong winds were dominant during the year. He found that the spring time was the most possible time of the year for these winds to prevail. As a matter of fact, the date is still celebrated as the Jewish Easter time. Furthermore, the Bible text gave the last time element in his analysis: The strong wind was blowing during the whole night. Based on all these indications he built a

hydraulic model back in Sweden to study how a strong wind would change the water level, thus providing an indicative answer on the question "HOW". The **Figure 2** illustrates the results from the hydraulic modelling with respect to the water levels.

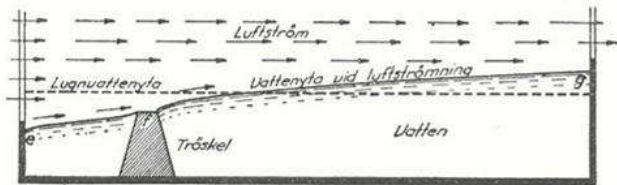
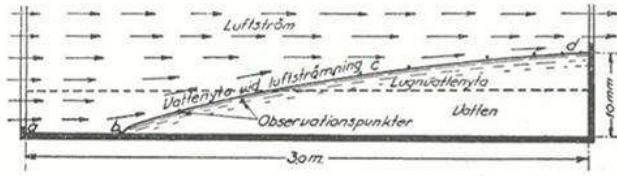


Fig. 11 och 12. Experimentresultat.
(Ritning av förf.)

Figure 2. Simplified presentations of the experimental results (drawings by Bo Hellström)

CONCLUSIONS

Based on his findings Hellström concluded that the natural conditions were not only possible but also favorable for the Israeli passage through the Red Sea as described in Exodus. On the other hand, as a natural scientist he concludes that the question with "metaphysical" aspects - "WHY" - could not be answered within the true natural science frame.

REFERENCES

- [1] Ball, P (2016) "The Water Kingdom" the University of Chicago Press ISBN 13:978-0-22636920-4
- [2] Hellström, Bo (1924) "Israelståggenom RödaHavet", (On the Israeli passage through the Red Sea) a study published in Swedish by A.-B. Gunnar Tisells Tekniska förlag.