

FORECASTING & FORESIGHT:

THE INTERDISCIPLINARY FOUNDATIONS OF CREATIVE INTELLIGENCE

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A highly respected scientific approach is interdisciplinary research, which is briefly defined as the combination and integration of theories, methodologies, and perspectives from two or more scientific disciplines. The interdisciplinary approach is usually called upon for what is termed “complex problem solving”, which is, in turn, associated nowadays with the use of Artificial Intelligence (AI), to support, enhance or even replace Human Intelligence (HI). In forecasting, the interdisciplinary approach is implemented in various fields, be it business and economics (e.g. Orrell & McSharry, [2009](#)), security studies (e.g. Palczewska & Pilarski, [2022](#)) or environmental issues’ research (e.g. Ouzounov et al., [2018](#)), among others. Yet, what if the interdisciplinary approach to forecasting is not conceptually that recent and innovative, but rooted instead - in its seminal and foundational form - in times long past, when HI was the epicenter of every scientific and productive activity?

Plutarch’s (circa 50-120 AD) *The Obsolescence of Oracles* (*Περὶ τῶν ἐκλελοιπότηων χρηστηρίων*) is an essay - in the form of dialogue - concerning the causes of the oracles’ decline in Greece in his time. As with several of his other works, this one contains significant elaboration on various subjects, as an addition and unrelated to the main topic. During the discussion on the Stoics’ beliefs about daemons, one of the participants, Cleombrotus, speaks of his strenuous effort to meet a stranger, a man of extraordinary capabilities and elevated state of mind:

«οὐκ ὀκνῶ χαρίζεσθαι βαρβάρου διήγησιν ἀνδρός, ὃν πλάναις πολλαῖς καὶ μήνυτρα τελέσας μεγάλα περὶ τὴν Ἐρυθρὰν θάλασσαν ἀνθρώποις ἀνὰ πᾶν ἔτος ἄπαξ ἐντυγχάνοντα τᾶλλα δὲ συνόντα νύμφαις νομάσι καὶ δαίμοσιν, ὡς ἔφασκε, μόλις ἐξανευρὼν ἔτυχον λόγου καὶ φιλοφροσύνης... γλώσσαις δὲ πολλαῖς ἠσκήτο χρῆσθαι, πρὸς δ’ ἐμὲ τὸ πλεῖστον ἐδώριζεν οὐ πόρρω μελῶν. φθεγγομένου δὲ τὸν τόπον εὐωδία κατεῖχε τοῦ στόματος ἠδιστον ἀποπνέοντος. ἢ μὲν οὖν ἄλλη μάθησις καὶ ἱστορία συνῆν αὐτῷ τὸν πάντα χρόνον· εἰς δὲ μαντικὴν ἐνεπνεῖτο μίαν ἡμέραν ἔτους ἐκάστου καὶ προσθέσπιζε καπιῶν ἐπὶ θάλατταν...ἐκεῖνος οὖν τὴν μαντικὴν ἀνήγεν εἰς δαίμονα» (421: A-B)

“So, I do not hesitate to favor you with a narrative about a man, not a Greek, for whom I had wondered for long and paid large sums of money for information, before I managed to find him near the Red Sea, where he offered me a friendly reception and we talked, even though he would hold meetings with other people once every year. The other days of his life, according to his statement, *he spends in association with roving nymphs and daemons* [emphasis added]. He was proficient in the use of many languages, but with me, for the most part, he spoke a Doric which was almost music. When he was speaking, a fragrance overspread the place, as his mouth breathed forth a most pleasant perfume. *While he retained always at his command every learning and knowledge of history* [emphasis added], he was inspired to divination only one day annually when he went down to the seaside and foretold things to come... *This man attributed divination to the daemons* [emphasis added]”

Seemingly, this excerpt features several fictional or supernatural - irrational elements, such as the stranger’s (un)usual companions, his fragrant breath, and his belief in divine entities (*daemons*) responsible for the art of prognosis (divination). Yet, in addition to bearing in mind the purpose of such references in texts of that time, as explained in an earlier post (pts [1](#) & [2](#)), what should not be overlooked are the rational and predictive analytic elements contained, either explicit or implicit in the form of allegories or, using a modern term (see Green & Armstrong, [2007](#)), *structured analogies*.

To begin with, Cleombrotus explicitly claims that this stranger possessed extensive knowledge on various subjects (*ἄλλη μάθησις*), whose indication was his proficiency in many languages. Given the stranger’s alleged supernatural affiliations (*roving nymphs and daemons*), one could lightheartedly conclude that his knowledge was of divine origin and should therefore be dismissed as purely irrational. Yet, Cleombrotus stresses the fact that the stranger’s knowledge was attributed to *learning* (*μάθησις*), thus highlighting its cognitive rationalist nature. Moreover, the stranger is said to have reached such a high level of mastery of all his learnings (*always at his command*), that it is justified to assume that his knowledge exhibited great

depth and should have been the product of an intensive educational procedure, resulting in the accumulation of theories and data.

Apart from its depth, another aspect of the stranger's knowledge was its range and diversity [*every learning (ἄλλη μάθησις)*]. Considering these three properties of his knowledge (learning, depth, and diversity), it is safe to assume that this man received general education and acquired scientific knowledge of different disciplines. Such a claim is rendered even more valid if seen within the social context of those times, when being all-knowing (*πανεπιστήμων*) was feasible for the very few, Aristotle being a prime example of this. Cleombrotus additionally claims that the stranger combined his multidisciplinary knowledge with history. History can be viewed as a formation, consisting of a massive amount of individual historical events and consequently, is a product of these events' accumulation. In this regard, history is an information set, characterized by great variety and huge volume and thus analogous to today's big data. Apart from that, all pieces of data, whose aggregate shapes history, follow one another in chronological order, thus leading to the formation of what is nowadays defined as a time series.

All things considered, it certainly comes as no surprise that Cleombrotus' next assertion is about the stranger predicting the future once a year. For it is exactly the combination between the stranger's multidisciplinary knowledge and the historical dataset at his disposal, that results in his ability to forecast future happenings, in the form of divination, which in this context should be interpreted as the method of delivering predictions, not merely as the divine transmission of forthcoming events. This precisely constitutes the basis of an interdisciplinary approach to forecasting, as multidisciplinary knowledge provides the forecaster with several methodological tools for sorting out and processing an information set.

Initially, it is about choosing the most adequate and suitable method for establishing causality between past and present events. Afterwards, the attempt at causal inference of future developments requires the most appropriate method to provide with a convincing, rational explanation of the forecast. Plutarch was familiar with the concept of causality, since he had already described it in an earlier essay of his, entitled *The E at Delphi* (*Περὶ τοῦ Εἰ τοῦ ἐν Δελφοῖς*):

«καὶ μάντις μὲν ὁ θεὸς μαντικὴ δὲ τέχνη περὶ τὸ μέλλον ἐκ τῶν παρόντων ἢ παροχρημένων. οὐδενὸς γὰρ. οὔτ' ἀναίτιος ἢ γένεσις οὔτ' ἄλογος ἢ πρόγνωσις: ἀλλ' ἐπεὶ πάντα τοῖς γεγονόσι τὰ γιγνόμενα τὰ τε γενησόμενα τοῖς γιγνομένοις ἔπεται καὶ συνήρηται κατὰ διέξοδον ἀπ' ἀρχῆς εἰς τέλος περαίνουσιν, ὁ τὰς αἰτίας εἰς ταῦτ' ἐκτελεῖν τε πρὸς ἄλληλα καὶ συμπλέκειν φυσικῶς ἐπιτάμενος οἶδε καὶ προλέγειν τὰ τ' ἔόντα τὰ τ' ἐσόμενα πρὸ τ' ἔόντα» (387: B)

“The god, moreover, is a prophet (forecaster), and the art of prognosis (forecasting) concerns the future that is to result from things present and past. For there is nothing of which either the origin is without cause or the foreknowledge thereof without reason; but since all present events follow in close conjunction with past events, and all future events follow in close conjunction with present events, in accordance with a regular procedure which brings them to fulfillment from beginning to end, he who understands, in consonance with Nature, how to fathom the connections and interrelations of the causes one with another knows and can declare: what now is, and in future shall be, and has been of aforetime”.

With respect to divination as the method of delivering forecasts, Cleombrotus' next reference points to a decisive factor which, although under an obscure metaphysical veil, bridges the gap between the ancient and the modern: it is the *daemons* who are responsible for delivering predictions. This specific segment stresses the urgency to comprehend whether the use of the daemon is literal or a metaphor, conveying an entirely different - and deeply scientific - meaning. In ancient philosophy, the notion of the daemon was fluid and could carry multiple connotations. According to a typology, the daemons that were considered internal, taking the self as a focal point (as opposed to the

external ones, who denoted guardian spirits, messengers of the gods, and the like), represented “*the divine part of a human being, usually reason, conceived of as a part of God or as an internal divinity*”, as well as they were “*usually identified with either the self as a whole, a part of the self, or a higher or true self*” (Dyson, [2009](#)).

Regardless of the antique belief in its divine origin, reason has always symbolized the cognitive - rational side of every human being. Consequently, the interpretation of the daemon as a representation of human reason fits ideally with the implicit rationalist context of the excerpt under study. In sum, the *daemon* (reason; HI) is that decisive mediating factor between *ἅλλη μάθησις* (every learning as an indication of multidisciplinary knowledge), *ἱστορία* (history as an information set), and *μαντικὴ* (divination as a preceding method to, and an equivalent form of modern forecasting).

This interpretation of the daemon as the part of the self that is tasked with reasoning, could shed new light on the earliest mention of daemons in Cleombrotus' narration. If it is also applied to the sentence “*the other days of his life... he spends in association with roving nymphs and daemons*”, the interdisciplinary approach to forecasting is raised from the personal to the group level. The stranger's ability to make predictions and his attribution of the same ability to the daemons, in conjunction with his claim that he was in frequent contact with them, imply that he was affiliated with people of high intellect, like his, a feature which set them apart from their average contemporaries. Therefore, it can be legitimately assumed that divination, as meant in the excerpt under study and possibly in general too, was the product of cooperative effort, through collective data accumulation and processing, and causality analysis prior to the final delivery of predictions. If

this was the case, the stranger would not act as a single forecaster, but as a member of a “group of experts” with equal multidisciplinary knowledge, facing complex issues necessitating prediction and, also, as this group’s spokesman, with the group possibly performing implicitly what is now defined as superforecasting. This assumption bears strong resemblance to the contemporary formation of interaction groups as a forecasting method, which “... suggests active interaction among a group of experts until a consensus forecast is reached through deliberation and discussion” and promises enhanced accuracy of the forecasts (Litsiou et al., [2022](#)).

The present analysis could prove a bone of contention, concerning the underlying rationalist basis of this excerpt from Plutarch’s *The Obsolescence of Oracles* (421: A-B). Yet, it is precisely the ambiguity of the ancient Hellenic language that permits interpretations of this kind. Ambiguity, in essence measured uncertainty, contained in any kind of data (linguistic ones included) is a situation AI cannot handle sufficiently – at the moment – a fact that has implications on forecasting too. Where AI is likely to fail, HI needs to step up and steer its way through uncertainty, caused by such ambiguity. It is only when HI realizes its full potential, by deciphering the riddle of causal relations between innumerable pieces of information and various facts, that it becomes *Creative Intelligence* (CI); for only through creativity, combined with rational reasoning based on learning, is it possible to exclude all irrelevant data, process the relevant ones, conceive the logic of causality between them and distinct events, and apply this logic to predictions about the future.

The aftermath of this analysis suggests that the interdisciplinary foundations of forecasting are neither new nor were unknown in the classical world. The

fundamentals of general education, based on attraction to wisdom (*φιλοσοφία*), were strong enough to warrant that rational and fact-based predictions were part of what those with higher learning would deliver to their average contemporaries, irrespective of the attribution of knowledge transmission to the divine. CI, as the result of innovative thinking (*καινοτόμος σκέψις*), learning (*μάθησις*) and accumulation of past knowledge (*ιστορία*), is the cornerstone of scientific progress and of methodological and social innovations, and it encompasses both HI and its propagation (the *ἀπότοκον*), which is AI. The interplay between these three forms of intelligence in the areas of forecasting and decision making is one of the main foci of the author's ongoing research.

REFERENCES

Dyson, H. (2009). The God Within: The Normative Self in Epictetus. *History of Philosophy Quarterly*, 26(3), pp. 235-253.

Green, K. C. & Armstrong, J. S. (2007). Structured analogies for forecasting. *International Journal of Forecasting*, 23(3), pp. 365-376.

Litsiou, K. et al. (2022). Relative performance of judgmental methods for forecasting the success of megaprojects. *International Journal of Forecasting*, 38(3), pp. 1185-1196.

Orrell, D. & McSharry, P. (2009). System economics: Overcoming the pitfalls of forecasting models via a multidisciplinary approach. *International Journal of Forecasting*, 25, pp. 734-743.

Ouzounov, D. et al. (2018). *Pre-Earthquake Processes: A Multidisciplinary Approach to Earthquake Prediction Studies*. Hoboken, NJ: John Wiley & Sons, Ltd.

Palczewska, M. & Pilarski, G. (2022). Case Study Method as an Interdisciplinary Approach to the Issue of Estimating the Security Level. *European Research Studies Journal*, 25(1), pp. 296-307.

Plutarch (1936). *Moralia Vol. V*. Translated by Frank Cole Babbitt. Cambridge; Massachusetts; London: Harvard University Press (Loeb Classical Library).

Plutarch (1995). *Moralia Vol. 11*. Translated by Kaktos philological team. Athens: Kaktos Publications.