

Revisiting Hippocrates' "On Ancient Medicine" to Inform Natural and Artificial Anticipation

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... I wish I had known of these views of Hippocrates before I had published, for they seem almost identical with mine - merely a change of terms - and an application of them to classes of facts necessarily unknown to the old philosopher. The whole case is a good illustration of how rarely anything is new.

Charles Darwin (1809-1882).

Darwin F, editor. The Life and Letters of Charles Darwin, Vol II, London: John Murray, 1887.

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I. Medicine is the anticipatory art (*tékhne*) par excellence.¹⁻³ The paramount importance of prediction and prognosis for the skillful exercise of this art was early acknowledged by Hippocratic medicine in Ancient Greece.⁴⁻⁷ This awareness, tacitly shared among clinicians since then, has regrettably been overlooked by some contemporary researchers in Anticipation Studies.⁸ As a result of this oversight, one scholar has even asserted that medical practitioners approach health from the perspective of reaction and reductionism,

and that the anticipation framework could prove to be consequential for medicine if it became its backbone.⁹ While this criticism may be valid in respect of some practitioners of present times, it is far from universally the case and it would be wrong to assume that it needed the emergence of Anticipation Studies to point to a better approach. Scholars familiar with the *Corpus Hippocraticum* may recognise such opinions as examples of those “newfangled hypotheses” that were strongly criticised by the author of the treatise *De Vetere Medicina (VM)* “On Ancient Medicine”,¹⁰ who vigorously rejected the intrusion of these kinds of postulates into medicine.¹¹ Following the ethos of this treatise and other writings from the same source, I would like to make the case for re-enacting the method of Hippocratic medicine to inform and supplement the practise and theory of Anticipation Studies. It is my intention to show, with some practical examples, how the Hippocratic approach could inspire research in Anticipation Studies. Conversely, I will illustrate how human cognitive anticipation research could facilitate the development of a “human phenomic”¹² and foster personalised medicine in psychiatry.³³ In following this path it is important to recognise that:

“[...] medicine has long since had everything it needs, both a principle and a discovered method, by which many admirable discoveries have been made over a long period of time and those that remain will be discovered, if one who is adequate to the task and knows what has been discovered sets out from these things in his investigation.”¹⁰

II. Briefly, what is this principle and method for making discoveries that even Plato praises as a model for scientific enquiry?¹³ Regarding the principle we are told in the *Phaedrus* that:

“Hippocrates the Asclepiad says that the nature even of the body can only be understood as a whole.”¹⁴

After *VM*, this notable text is one of the earliest records of the use of the concept of “wholeness” emerging from a manifold of interrelated elements or a system^{15, 16, 30} as a principle to guide knowledge acquisition. Apropos the

method, later in the same writing, Plato describes the relational procedure by which this principle is methodologically enacted:

“Then consider what truth as well as Hippocrates says about this or about any other nature. Ought we not to consider first whether that which we wish to learn and to teach is a simple or multiform thing, and if simple, then to enquire what power it has of acting or being acted upon in relation to other things, and if multiform, then to number the forms; and see first in the case of one of them, and then in the case of all of them, what is that power of acting or being acted upon which makes each and all of them to be what they are?”¹⁴

This text makes apparent the mutual interdependence of the principle of wholeness, and the relational thinking¹⁷ that underpins the methodological position of Hippocratic medicine. Hippocratic physicians knew that human beings have different organic make-ups, live in different environments under different atmospheric conditions and seasons; that they have diverse habits, drink different waters, eat different foods prepared in different ways and that they live under distinct political regimes. All in all, the Hippocratic practitioners acknowledged the fundamental intricacies of the multifarious elements, circumstances and conditions that affect the health status of their patients. Having this awareness, it was evident to the author of *VM* that sickness or health were not governed by simple linear causal chains of events affecting the body at the structural and functional levels. Thus, according to this author, reductionist accounts are of no use in medical diagnosis or treatment.¹⁰ He recognised that the complexity of human health and illness is the result of ever changing patterns of manifold elements and relations in which causality is expressed in a network of interactions. Therefore, this complex causality can only be understood in a twofold complementary way, i.e., analytically, by determining the elements and relations between those elements and synthetically, by detecting meaningful patterns (by analogical reasoning) in the wholeness of those elements and relations (*katástasis*), to further list and classify them to make diagnoses, predictions and prognoses.^{2, 18, 19}

The use of analogical reasoning is widespread in the *Corpus Hippocraticum*.²⁰ This kind of reasoning was of cardinal importance for the performance of three interdependent activities: i) to describe the wholeness of symptoms, ii) to build theoretical explanations and iii) to produce new knowledge (epistemic things²¹) from a research technological matrix (experimental systems²¹):

i). Firstly, analogies, correspondences or similarities (*homoiotès*) were used by physicians to synthesise and descriptively unify the whole set of symptoms of the patients and the characteristic features of their environment (*katástasis*) in meaningful patterns, i.e., the specific patterns (*tropos*) and the typical patterns (*eidos*) of different illnesses. The Hippocratic physician was trained to detect, classify, correlate and interpret these patterns by using a kind of “synthetic memory” (*mnèmè xynthetikè*).¹⁸ To quote the author of the *Epidemics* treatises:

“ The summary conclusion comes from the origin and the going forth, and from very many accounts and things learned little by little, when one gathers them together and studies them thoroughly, whether the things are like one another; again whether the dissimilarities in them are like each other, so that from dissimilarities there arises one similarity. This would be the road (i.e., method). In this way develop verification of correct accounts and refutation of erroneous ones.”²²

ii). Secondly, Hippocratic practitioners used analogies (based on techniques, tools and instrumental activities of daily living) both as heuristic tools and as arguments of proof in the construction of their explanations of the mechanisms underpinning diseases. These analogies were the means for knowing the invisible through to the visible²³ and served as basis to establish the diagnosis (*diagignóskein*).² Hippocratic physicians acknowledged the value of theoretical explanations at the same time as they recognised that their clinical, practical success and predictive power, ascertained by observational evidence (obtained by *aísthēsis tou sōmatos*) should inform those theoretical explanations.²⁴ As a consequence, in this framework acceptable explanations

were subordinated to their clinical predictive success. This epistemological position went beyond simple empiricism and is far subtler. It recognises the reciprocal structuring influence between theory and practise that reshape, extend and redefine the limits of the phenomena, while investigating and medically dealing with them.²⁵

iii). Thirdly, in a refined self-conscious methodological advancement, the Hippocratic physicians used the same medical research tools as sources of analogies.¹⁹ The construction of written lists with symptoms and diseases (e.g., *Epidemics* treatises) gave to this information a coordinated visual presence (like a mind map), “juxtaposing items of information gleaned from an extended series of empirical observations”.¹⁹ These lists worked as mnemonic devices³¹ and thinking tools³² to support the operations of “synthetic memory” to arrive “at a total unified picture of a diseased state”,²⁶ and as experimental matrices to perform new discoveries.¹⁹ The network of internal relationships depicted in a well-ordered list was used as a model or analogy of the order in the body to illuminate the unknown territory of internal diseases.¹⁹

III. In a recent publication, the historian of science H-J Rheinberger²⁷ noted that, notwithstanding that science has profoundly changed over time, there is a “gesture” that is common to all different forms of scientific practise (viz., observation, experiment, classification, quantification, isolation, purification, analysing, synthesising, etc.) across history, namely transposition.

“Transposition basically means that things are taken out of a particular context of use—or out of their absence in that particular context for that matter—and brought into a constellation where we can marvel at and do things with them.”²⁷

For the attentive reader of the *Corpus Hippocraticum* this account is insightful. Transposition operators are fundamentally implicated in analogical thinking²⁸ and “reflecting abstraction”²⁹ processes. Drawing in Rheinberger’s notions of “transposition”, “experimental systems” and “epistemic things”, and guided by a Hippocratic analogical approach, I will outline our research in cognitive anticipation that will be further developed in my presentation.

i). The first and most important transposition in an experimental discipline is the “creation of an experimental context in which epistemic things can be explored for the sake of gaining knowledge about them”.²⁷ In our particular case this first transposition engendered an experimental system to study cognitive anticipation. This experimental system contains epistemic things and their traces.

ii). The second step in the transposition chain of experimental studies, operates at the level of those epistemic objects and their traces. These are then transposed to the next level that can be addressed as the “data space level”. This procedure consist in transposing the data to a set of geometrical descriptors of cognitive anticipation.

iii). The third transposition consists of generating from geometrical descriptors, predictive models of cognitive anticipation.

iv). The fourth transposition is - departing from those predictive models- the determination of classes and taxonomies of human cognitive anticipation. This is a phenotyping procedure aimed at creating a human cognitive anticipation ontology for the diagnosis and prognosis in psychiatry.

Keywords: Anticipation, Hippocratic Medicine, *Corpus Hippocraticum*, *Tékhnē*, Cognitive Anticipation, Anticipation Studies Methods, Epistemology.

References

- ¹ Hippocrates. *Hippocrates, Volume II: Prognostic* (Harvard University Press, 1959).
- ² Entralgo, P. L. *La Medicina Hipocrática/ The Hippocratic Medicine* (Alianza Editorial Sa, Madrid, 2007).
- ³ Mann, J. *Hippocrates, on the Art of Medicine* (Brill, Leiden, 2012).
- ⁴ Jouanna, J. *Hippocrates* (Johns Hopkins University Press, Baltimore, Md.; London, 2001).

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- ⁵ Hipocrates. *Tratados Hipocráticos II. / Hippocratic Corpus* (Gredos Editorial S.A., Madrid, 1997).
- ⁶ Hipocrates. *Tratados Hipocráticos I. / Hippocratic Corpus*. (Gredos Editorial S.A., 1983).
- ⁷ Langholf, V. *Medical Theories in Hippocrates* (De Gruyter, Berlin, 1990).
- ⁸ Nadin, M. (ed.) *Anticipation and Medicine* (Springer, Cham, Switzerland, 2017).
- ⁹ Nadin, M. Medicine: The Decisive Test of Anticipation. In Nadin, M. (ed.) *Anticipation and Medicine* (Springer, Cham, Switzerland, 2017).
- ¹⁰ Schiefsky, P. M. *Hippocrates on Ancient Medicine* (Brill Academic Publishers, Leiden ; Boston, 2005).
- ¹¹ Longrigg, J. *Greek Rational Medicine: Philosophy and Medicine from Alcmaeon to the Alexandrians* (Routledge, London ; New York, 1993).
- ¹² FitzGerald, G. *et al.* The future of humans as model organisms. *Science* **361**, 552–553 (2018).
- ¹³ Steckerl, F. Plato, Hippocrates, and the Menon papyrus. *Classical Philology* **40**, 166–180 (1945).
- ¹⁴ Plato. *Phaedrus* (CreateSpace Independent Publishing Platform, 2017).
- ¹⁵ Bertalanffy, L. V. *General System Theory: Foundations, Development, Applications* (George Braziller, New York, 1968).
- ¹⁶ Lin, Y., Duan, X., Zhao, C. & Xu, L. D. *Systems Science: Methodological Approaches* (CRC Press, Boca Raton, 2012).
- ¹⁷ Alexander, P. A. Relational thinking and relational reasoning: harnessing the power of patterning. *NPJ Science of Learning* **1**, 16004 (2016).
- ¹⁸ Entralgo, P. L. *El Diagnóstico Médico - Historia y Teoría* (Salvat, 1988).

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- ¹⁹ Miller, G. L. Literacy and the Hippocratic art: reading, writing, and epistemology in ancient Greek medicine. *Journal of the history of medicine and allied sciences* **45**, 11–40 (1990).
- ²⁰ Craik, E. M. *The ‘Hippocratic’ Corpus: Content and Context* (Routledge, Abingdon, Oxon ; New York, NY, 2014).
- ²¹ Rheinberger, H.-J. *Toward a History of Epistemic Things: Synthesizing Proteins in the Test Tube* (Stanford University Press, Stanford, Calif, 1997).
- ²² Hippocrates. *Hippocrates: Epidemics 2, 4-7* (Harvard University Press, Cambridge, Mass, 1994).
- ²³ Fausti, D. Analogical method, experiment and didacticism in the Hippocratic treatises Generation/Nature of the Child/Diseases 4. *Stud Anc Med* **35**, 301–321 (2010).
- ²⁴ Barton, J. Hippocratic explanations. In van der Eijk, P. (ed.) *Hippocrates in Context*, 29–47 (Brill, 2005).
- ²⁵ Lo Presti, R. Visible’and ‘Invisible’as Categories of Thought in the Hippocratics (On Regimen, On Ancient Medicine, On the Art). *QRO* **3**, 164–92 (2010).
- ²⁶ Heidel, W. A. *Hippocratic medicine : its spirit and method* (New York : Columbia University Press, 1941).
- ²⁷ Rheinberger, H.-J. Transpositions:: From Traces through Data to Models and Simulations. In Schwab, M. (ed.) *Transpositions, Aesthetico-Epistemic Operators in Artistic Research*, 215–224 (Leuven University Press, 2018).
- ²⁸ Malaspina, C. Transposition. In Schwab, M. (ed.) *Transpositions, Aesthetico-Epistemic Operators in Artistic Research*, 225–244 (Leuven University Press, 2018).
- ²⁹ Piaget, J. & Campell, R. L. *Studies in reflecting abstraction* (Psychology Press, 2014).

- ³⁰ Davis, J. D., Kumbale, C. M., Zhang, Q. & Voit, E. O. Dynamical systems approaches to personalized medicine. *Current Opinion in Biotechnology* **58**, 168–174 (2019).
- ³¹ Thumiger, C. The professional audiences of the Hippocratic Epidemics: Patient cases in Hippocratic scientific communication. In *Greek Medical Literature and its Readers*, 48–64 (Routledge, 2018).
- ³² Forrester, J. If p, then what? Thinking in cases. *History of the human sciences* **9**, 1–25 (1996).
- ³³ Wium-Andersen, I. K., Vinberg, M., Kessing, L. V. & McIntyre, R. S. Personalized medicine in psychiatry. *Nord J Psychiatry* **71**, 12–19 (2017).