

Reflexions on certain books

To man with a hammer, everything looks like a nail.

Mark Twain

Possibly it was a Friday Evening Discourse at the Royal Institution in London given by Abdus Salam around 1980 that sparked my interest in “grand unifying theories” (GUTs) that encompass electric, magnetic, weak nuclear and strong nuclear forces (Salam’s own contribution was the unification of the electromagnetic force—electricity and magnetism had been unified by James Clerk Maxwell—with the weak nuclear force—the electroweak force). As Salam remarked in his witty and urbane discourse, when he was a schoolboy his teacher also ranked capillarity as one of the fundamental forces. Nevertheless, despite the impressive advances since then, gravity, the most immediately perceptible and ubiquitous of all the fundamental forces, remains outside the scheme of GUTs; its unification with the other forces would indeed be a “theory of everything”, as described in a book by Stephen Hawking [1]. The title had already been used in a book by John Barrow on the same topic [2] with, however, a significant difference. The euphoria that accompanied the unification of electromagnetic and weak forces, also accomplished independently by Glashow and Weinberg,¹ was tempered by Philip Anderson pointing out that even the most perfect knowledge of all elementary particles and their interactions would not allow phenomena at higher levels of organization to be predicted [4]. As he put it, chemistry is not applied physics,² biology is not applied chemistry etc.—the emergent phenomena are in different categories. Barrow’s book, in fact, devotes quite a bit of space to this.

The desire to find a single unifying principle with which everything in the world can be understood seems to be a very ancient human desire. The book of Genesis might be considered to be in line with that, and Pierre Duhem’s monumental *Système du monde* documents the many efforts from 5th century BCE Athens to the time of Copernicus [6].³ Newton’s *Principia* [8], in which gravity looms large, might be considered to be the first monograph in the “theory of everything” tradition. In

parallel with this burgeoning knowledge was anxiety concerning human limitations in the amount of information that could be held and processed in the mind, leading to Leibniz and others developing combinatorial logic and the like in order to facilitate assimilation of what was known and discovery of yet more knowledge—the search for a universal key [9].

It is entirely understandable that discovery of a single idea subsuming a multitude of known facts can loom so large in the minds of the discoverer that he or she ends up thinking that it is the ultimate, universal, governing principle. Such a sentiment may be discerned in ref. 10, describing what is certainly a far-reaching representational tool for the structure of at least part of the natural world. Around the time of Barrow’s book, we had *The Origins of Order* [11]⁴ and *How Nature Works* [13]. In the following decade, networks vied with self-organization as the ultimate key to understanding the higher—and most immediately apparent—levels of organization in our world [14,15]. In the same decade, cellular automata were also proposed as a central, universal concept (the universe as a computer) [16]. All these ideas are undoubtedly fascinating and useful and provide powerful tools for better understanding a wide range of phenomena.

The next decade—the one just preceding our own—saw a dramatic shift in the genre. No longer were books, admittedly hubristic,⁵ being written in the spirit of the disinterested pursuit of ultimate, universal knowledge—a true *clavis universalis*. The professors, it seemed, were now falling prostrate in adoration before the FAANGs,⁶ much as they had done a century earlier before the prosperity of the cotton spinners [18]. By 2020, Amazon’s annual revenue exceeded Finland’s GDP (Fig. 1), the 47th-largest economy in the world.⁷ This extraordinary phenomenon is, essentially, the result of applying a kind of inverse “Irish applewoman’s principle”:⁸ namely, “you can afford to make an almost infinitesimal profit on each transaction provided you have

¹ See ref. 3 for a useful account of the history.

² Cf. Dirac’s remark “the underlying physical laws necessary for the mathematical theory of a large part of physics and the whole of chemistry are thus completely known” [5].

³ Published under the motto “Never was any science invented at any particular time, but from the beginning of the world knowledge has grown slowly and is still not complete at this very age” (Roger Bacon) [7].

⁴ Followed by a book written for the wider public [12], covering much of the same ground.

⁵ Ref 17, while also aiming to be “a complete guide to the laws of the universe”, is of a different stamp, being altogether more sober than some of the other works cited, as well as much longer, and requiring much harder (but also more rewarding) work to go through.

⁶ Facebook, Amazon, Apple, Netflix and Google.

⁷ <https://www.worldometers.info/gdp/gdp-by-country/>. Amazon achieves this with less than a third of Finland’s population.

⁸ “You can afford to sell each apple at a loss if you only sell enough” [19].

enough transactions”. Such is the secret of the colossal revenues generated by Facebook, Google, Snapchat and many other companies,⁹ enabled by the majority of the world’s population (in 2023 more than 5000 million) now being connected to the Internet (Fig. 2). The method of extracting these colossal revenues is described with

admirable conciseness and clarity by David Sumpter [20]. No longer is a grand unified theory the goal. Instead, we learn about “the single most important equation of the 21st century”, supremely important because “this equation is the basis for a trillion-dollar industry”.

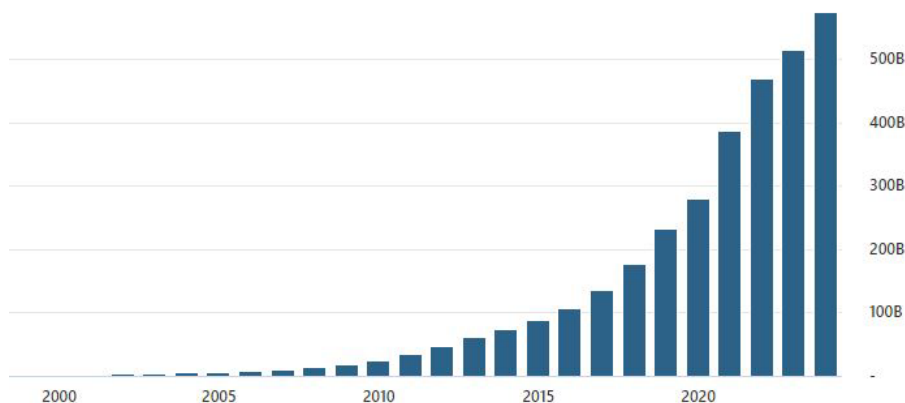


Figure 1. Revenues (in milliards of USD) of Amazon.com, Inc. (founded by Jeff Bezos in 1994) since 2000. Source: <https://stockanalysis.com/stocks/amzn/revenue/>

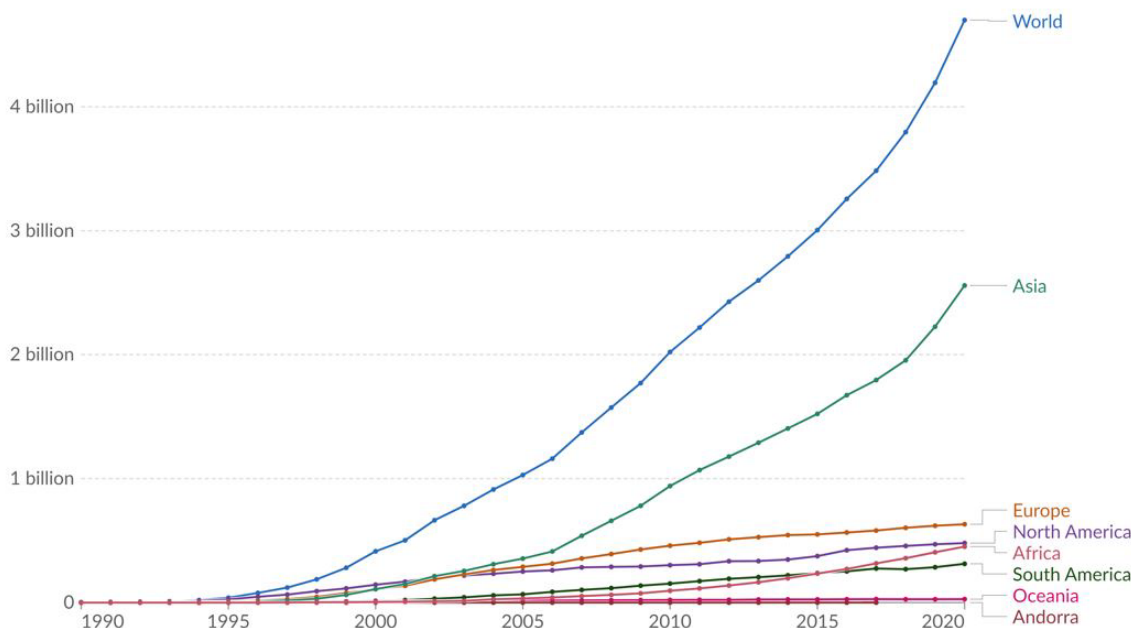


Figure 2. Numbers of Internet users (in US billions, i.e. milliards) since 1990. At any chosen epoch, a user is defined by the International Telecommunications Union as anyone who has accessed the Internet from any location within the last three months, from any type of device). Source: <https://ourworldindata.org/internet>

The culture that Sumpter so blatantly adores is profoundly antithetical towards civilization, despite the primacy he gives to reason, which is one of the twin pillars of true civilization [21] (“they turned every

problem into numbers and data. They made their assumptions clear. Their reasoned rationally and answered the questions posed to them”—ref. 20, p. 130).¹⁰ The root of the problem seems to be the sterility of the

⁹ Large as they are, these revenues are not unprecedentedly so, being somewhat smaller than those of, for example, the Fuggers’ banking operations in the 16th century.

¹⁰ Oddly (or perhaps the reader should not be surprised), the author reveals himself to be a firm advocate of logical positivism. Evidently he never came across Popper’s remark that “there is no such thing as a logical method for having new ideas”. Or perhaps he did, because near the end of the book there is just a hint of a recantation of his earlier avowal.

thinking of “the rich and powerful élite who control how the information is presented to us” (p. 129). In ch. 7 we read that “the members of TEN had won again, adding advertising and marketing to the list of problems they had solved ... using big data correctly” (p. 167).¹¹ Instead of the hitherto admired civilizations of fifth century BCE Athens, Renaissance Italy or late seventeenth and much of eighteenth century France, Sumpter favours the society of pismires (p. 178). Is it all, perhaps, tongue-in-cheek? In the spirit of tolerance — another pillar of civilization — we should perhaps give him the benefit of the doubt. Nevertheless, the spirit of collectivism pervades TEN. The word “individually” only occurs once in the entire book of over 250 pages. In contrast, the Athenians insisted on the personal significance of an educated, intelligent citizen.

A book in similar vein, published in the same year, is ref. 22. Dismally, Barabási has subsequently tried to subsume the entire scientific enterprise within its mentality, as expounded in ref. 23,¹² thereby elevating into a ruling principle what was previously a scientometric pastime [25].¹³ One can only hope that the appalling superficiality of this mentality will lead to the neglect of these books. In them we learn that fitness is what’s fit, successful is what’s successful etc. Put in slightly different words, fitness is defined as an ability to outcompete—in yet other words, it’s all about popularity within a community, the cynosure of TEN. Never was Galileo’s “the authority of thousands of opinions is not worth as much as one tiny spark of reason in an individual man” so apt. If Sumpter’s “rich and powerful élite” were to step for a moment outside their little box, they would perceive that they are merely overpaid helots, to use a phrase of Bell’s. Such is the allure of their comfortable lifestyle, and perhaps even the enjoyment of their day-to-day efforts, however, that they are unlikely to do so. Their error, and that of their academic acolytes, is simply that they have confused the means with the end. Surely, as Bell points out, good states of mind are good as ends, but TEN singularly fails to deliver good states of mind. For achieving them, it would not matter an iota if a brief solar cataclysm destroyed the Internet [27]. Civilization is about valuing thought and knowledge for their own sakes rather than for their possible utility. The Athenians wished to live richly rather than be rich, an observation doubtless lost on TEN. The latter, beguiled by the gospel of work [28], have adopted the religion of money-making, and this, coupled with the power of the Internet, minimizes self-expression for all, in diametric opposition to the maximization that is a goal of true civilization.

Is all, then, lost? Are we indeed on a path of irreversible decline? That we are now in an era of continual revolutions [29] makes prediction difficult, and offers some hope for the future.

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¹¹ TEN refers to those who have mastered the ten equations on which ref. 20 is based.

¹² Not to be confused with the much better book having the same title [24].

¹³ See also ref. 26.

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