 doi:10.20944/preprints202101.0377.v2

Scientist as parrhesiastes

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Abstract

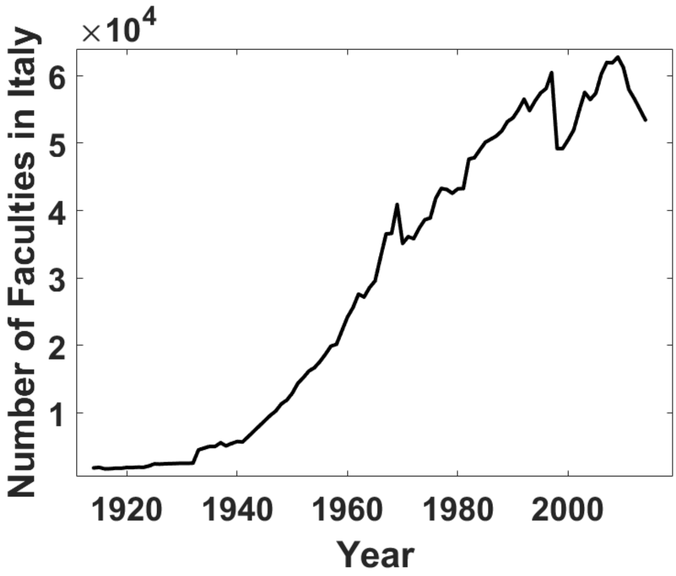
The scientific community of the XX and XXI centuries is a very large companionship, very fragmented and spread all over the world. Moreover, the status of the scientist, which in most cases is a member of the States' *apparati*, is significantly different with respect to the one of the scientists up to the First World War.

The concepts of scientific revolution of Thomas Kuhn and scientific anarchy of Paul Feyerabend should be reconsidered in this contest. In particular, the anarchist modus operandi should be shifted from the scientific method, that has become significantly standardized with protocols, to the sociology of the scientific community. A pluralism of the scientific method is possible, but an anarchy in the relationships among scientists emerges as more important. The scientist is in many cases a parrhesiastes, a person that says the truth even when he is going to pay because of that, that defends the developed theory or model, by respecting the protocols established in the scientific community. On the other side, each scientist should be a patient beholder that accepts the more solid, and intersubjectively recognized, theories of other scientists.

Keywords: Scientific community; parrhesia; anarchy; Paul K. Feyerabend.

Introduction

The scientific community increased a lot in terms of number of members in the last decades. For example, in Italy the number of faculties in 100 years is 30 times larger (Figure 1) [1]. In United States, the number of faculties in 1970 is 474000 (of which 369000 full-time), while in 2017 the number of faculties is 1543569 (of which 821168 full-time) [2]. According to the UNESCO Science Report, in 2013 there were 7.8 million full-time equivalent researchers with a growth of 21% since 2007 [3].



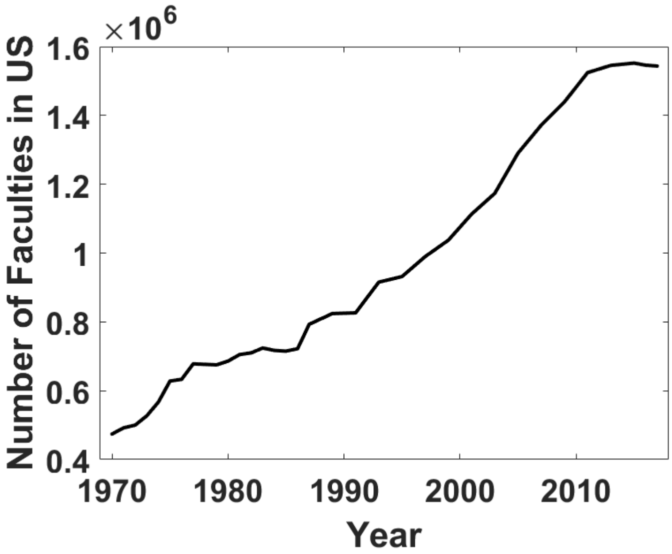


Figure 1. Number of faculties in Italy [1] (top) and United States [2] (bottom).

It is well established that the number of publications has enormously increased in the last years. We report three simple examples to highlight this aspect. By looking for publications with the query “graphene” we can find 345 publications in 2006 and 24055 publications in 2020 (source Scopus.com [4]). With the query “genom*” (the asterisk wildcard replaces multiple characters in a word) we can find 258 publications in 1970 and 70626 publications in 2020 (source Scopus.com [4]). With the query “COVID-19 OR SARS-CoV-2” we can find 88030 publications in 2020 (source Scopus.com [4]).

In this context it is difficult to think about a “thought collective” as mentioned by Fleck in *Genesis and development of a scientific fact* [5]. A thought collective can be described as a collective of scientists that share common concepts and common practices. Nowadays, the factions in a scientific community are transversal among countries and it is debatable that, for a specific discipline or topic, such a collective of scientists could exist.

Moreover, the vast communities start to have strict protocols, especially in experiments. Since there are so many scientists that work at the same time on a certain topic, it is very difficult to observe a “paradigm shift” (Kuhn), even when such shift is occurring, considering the huge amount of incremental steps achieved by scientists all over the world.

In this work we give some examples of scientists that, without an established authority, could contribute significantly in their field behaving as parrhesiastes. According to Michel Foucault, “the parrhesiastes is someone who takes a risk” [6]. We describe briefly, and not exhaustively, some examples of topics of a dispute or of a discovery highlighting the fact the scientist exposed the own model or theory without the fear to be delegitimized by a more authoritative scientist.

Examples of parrhesiastes

We report three examples of disputes between two scientists (we focussed on physics and chemistry), in which, in a simplified picture, the first scientist is among the most authoritative scientists in a field and the second scientist is the parrhesiastes.

Einstein and Lemaître: In 1927 Lemaître publishes a paper that is the first report of the expansion of the universe [7]. Initially, Einstein, together with contemporary scientists, refuses the theory of Lemaître. In particular, in 1927 Einstein “rejected the notion of an expanding Universe as an abomination” [8,9]. In 1931, eventually Einstein agrees with the theory proposed by Lemaître [8]. In October 2018, via an electronic vote a “resolution to recommend renaming the Hubble law as the Hubble–Lemaître law has been accepted” [10].

Heeger and Bässler: Alan J. Heeger is Nobel Prize laureate in Chemistry (2000) develops, together with Su and Schrieffer, a model in which conjugated polymers, macromolecoles with backbones made of alternating single and double carbon-carbon bonds, behave as metals, with a conductivity that is inversely proportional to the temperature [11,12]. Years later, Heinz Bässler publishes a paper in which he describes the conduction in conjugated polymers is characterized by electron-hole pairs (excitons) [13]. The model of Bässler is successful in describing experimental evidences and such model significantly invalidates the model of Heeger, which is among the most authoritative scientists in the field of physics of organic materials.

Pauling and Shechtman: Dan Shechtman has studies alloys and has discovered the icosahedral phase. The new crystallographic phase opens the field of quasicrystals [14]. Shechtman publishes his paper encountering the hostility of many scientists, as for example Linus Pauling, Nobel Prize laureate in chemistry and peace. Pauling does not believe in quasicrystals and ridicule the work of Shechtman [15]. Years after his discovery, Dan Shechtman is awarded the Nobel Prize in chemistry (2011).

The anarchy in the scientific community

These three examples underline that the scientist is going to present the developed model or theory as a parrhesiastes and the scientific community (or at least majority of such community) is composed by patient beholders that are willing to understand the validity of the model or theory. Thus, the scientific society can be described as an anarchic society, in which the concentration of power of any authority, with an established knowledge in any topic, is only apparent and temporary, since any member can say something more solid concerning such topic. We would like to compare this picture with the one of Feyerabend (especially Feyerabend's thought in Against Method).

Objections to Feyerabend

The pluralistic methodology of Feyerabend authorizes any methods, even unconventional methods. Feyerabend is against the methodological monism, and he suggests a methodological pluralism. In this study we do not want to argue with this internationally recognized and fascinating methodology, as recently reported by Brown and Kidd [16] and in the special issue of *Studies in History and Philosophy of Science Part A* entitled *Reappraising Feyerabend*. In such special issue Brown stresses the metaphysics of science of the late Feyerabend that emphasizes the absolute abundancy of the world and the ineffability of Being [17]. Furthermore, it has been masterfully reported by Shaw in Ref. [18] that methodological pluralism can be described "methodological opportunism". With the clear risk of an oversimplification, we underline a cumbersome employment of such methodological opportunism in the contemporary scientific community. To be clearer, we just want to cite the words of Luca Guzzardi:

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> And it is certainly not the case that "anything goes." Something "goes" only if it can be integrated within the various elements that form a given dictionary [19]

Where the "dictionary" relates to the "scientist's dictionary" of Enrico Bellone [20]. Here, we aim at recall the scientist's dictionary that include some rigorous instruments such as theoretical frameworks, experimental procedures and protocols. Such instruments should be followed in order to make the discovery reliable for the community.

On the other hand, Feyerabend uses the term *Dadaism* to rule the political implication of the use of term *anarchy*. Anyway, for Feyerabend Dadaism or anarchy relates to a scientific pluralistic environment in which "anything goes". What we would like to stress is that pluralism is not strictly an anarchism. In principle, there could be a societal organization, with an actual exercise of power, that is pluralist (e.g. a complex democracy with an extended system of checks and balances).

Taking into account these considerations, we would like to state that the scientific society is inherently an anarchic society: Anyone can develop a theory or model that works, or an *experimentum crucis* that can be built or performed by anyone that has the proper instruments.

Why are we talking about anarchy and not about democracy? One can argue that, like in a democracy, the scientist/parrhesiastes is looking for a consensus and, if successful, the scientist will gain a larger consensus with respect to the one of the authorities. The scientist does not look for a consensus among the majority of the community. For example, Perelman publishes the solution of the Poincarè conjecture on a proper medium (the repository arXiv) [21–23] without the consensus of other mathematicians in the field. Years later, the solution of Perelman has been widely (intersubjectively) recognized.

Conclusion

In this work three examples have been reported in which a scientist behaves as a parrhesiastes, which expose a solid theoretical framework or interpretation of data that go against the knowledge of the scientific community including the most authoritative standards. Such community, that also includes careful and patient listeners, eventually accepts the more solid and reliable model of the parrhesiastes. Inductively, an anarchic society, without need of consensus and authoritative positions, can be considered as an interesting description of the scientific community.

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