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Is contact a process?

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ABSTRACT

Both “optimists” and “sceptics” in regard to extraterrestrial intelligence tend to hold the view that we are entitled to an epistemically clear position: either there will be a signal, in the sufficiently general sense, proving the existence of extraterrestrial intelligence (ETI), or no such signal is forthcoming. The distinction, I wish to argue here, is not at all so clear-cut. On the contrary, there are arguments, intrinsic to the subject matter, to the effect that the detection of ETI will be a protracted affair characterized by uncertainty at every step. Such view of SETI discovery mandates different policies from those conventionally discussed in the literature. We should not gear our expectations and publicly promote the view that the Contact will be a clear-cut, Archimedean “Eureka!”-style discovery. In contrast, the tempo and mode of the process of discovery might significantly influence societal and political reactions to the discovery. We should be prepared for such a protracted unfolding of events.

I shall not today attempt further to define the kinds of material I understand to be embraced within that shorthand description [hard-core pornography]; and perhaps I could never succeed in intelligibly doing so. But *I know it when I see it*.

US Supreme Justice Potter Stewart in *Jacobellis v. Ohio* (1964)

We will know alien manifestations when we see them.

An anonymous SETI enthusiast on the Web (2013)

1. Introduction

Detection of extraterrestrial intelligence (henceforth ETI) or the “first contact” or the Contact,² has been an accepted and acknowledged goal of SETI projects since their inauguration in 1960 (for historical overviews, see Refs. [18,59]). Even opponents of SETI have acknowledged that much and actually indicated that the fact that SETI activities have not so far reached that goal confirms their sceptical position (e.g., [40,60,61,63]). In doing so, they have *tacitly assumed a particular model of Contact*. Usually, it is the same model used by the SETI proponents and investigators, which considers the Contact as an *event*, rather than a *process*. This somewhat subtle point has already generated a number of confusions and it continues to undermine the SETI discourse in various ways. Contact is usually used synonymously with “the discovery of extraterrestrial intelligence”, without much considerations what such a discovery might look like, or even what exactly qualifies as a discovery

in this context. In part, this is a relic of positivist strictures against delving into the “context of discovery”, which are fortunately much less relevant these days than it was hitherto the case (especially in the times of the founding fathers of SETI). Nowadays, we are very much entitled to ask difficult questions about the nature of scientific discovery and its tempos and modes. These questions bear much relevance to SETI studies and it is quite irresponsible – both cognitively and policy-wise – to ignore them.

There has been much discussion in SETI circles concerning “protocol”, “conduct”, “post-detection activities”, “contact procedures”, etc., as well as possible risks for humanity following contact (e.g., [1,6,24,26,41,43–45,57,59,64]). Most of these works presuppose a particular model or a scenario of discovery and consequently lack sufficient generality (partial exceptions to this trend are Refs. [6,26]). In contrast to dogmatic views often present in the media and popular science discourses, any critical departures in this respect should be welcomed, as decreasing the risk of groupthink and systematic policy errors.

There are several reasons why reconsidering these issues is highly desirable. We are witnessing renaissance of the *extragalactic* SETI searches, most notably the \hat{G} infrared search for Type 2.x/Type 3 civilizations [65,66,70] and the search for stellar-powered Type 3 civilizations by using the Tully-Fisher relation (pioneered by Annis [2]; for new attempts see Zackrisson et al. [68]). Both these original and dynamical approaches share the grounding directly inspired by Karda-

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² I shall use capitalized version (“Contact”) for the avowed goal of all SETI projects and activities, the discovery of an extraterrestrial intelligence (i.e., as synonymous with “the first contact”).

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shev's [28] classification and the Dysonian SETI [9,22, 23,14]. There is reason to expect, therefore, that the extent of SETI activities will increase and diversify in the near future, so the present topic will become more and more relevant in the years ahead.

We can even go some steps further and consider epistemological and even ethical consequences following from the discovery of possible extraterrestrial *artefacts*, with all implications of a long-term planning, stable society. Recent controversy over the lack of flux during transits of KIC 8462852 [8,39,67] is just one instance of the possible formulation of explanatory hypotheses directly motivated by Kardashev's scale and its ramifications. It is the prediction following from the overall framework of detectability, Dysonian SETI and the logic of Kardashev's scale that the number of such hard cases in which purely "natural" (i.e., non-intentional) explanations are progressively harder and harder to find will increase with the number and sensitivity of our detectors, in both intragalactic and extragalactic domain. This might have an interesting consequence for the concept of "success" or "discovery" in the domain of SETI studies. In contrast to the conventional image of the "first contact" powerfully suggested by the pop-cultural discourse (e.g., [54]; and the subsequent movie of Robert Zemeckis) and supported by the orthodox SETI circles, especially radioastronomers [59], and encoded in the famous "Wow!" signal (e.g. [25]), we might not have any particular decisive moment of discovery. Rather, we might face slow accrue-ment of "inexplicable" cases without natural or non-artificial explanation, leading gradually to mainstream acceptance of astroengi-neering as not only legitimate, but even the best explanation.

Therefore, the attempts made recently of classifying and codifying the response to ETI detection or contact (e.g. [1,43]) might be incomplete in that they address only a particular mode of discovery, which is not very likely anyway. This, unfortunately, applies to the *Declaration of Principles Concerning Activities Following the Detection of Extraterrestrial Intelligence*, the most frequently cited international document on the topic.³ In order to achieve better coverage of the complexity of the real issue, and avoid misunderstandings, mispresen-tations, and confusions which have anyway cost SETI the great deal in terms of respectability, authority, and funding, we need to put the discussion about responses to a broader level. In the rest of this paper, I shall argue that there are reasons to expect that detection and acknowl-edgement of ETI will be a protracted affair, without any "crucial", "defining", "epochal", "seminal", etc. moments. At least such moments will be visible only much later, on careful and complex historical analysis, not obvious to all contemporaries. Such scenarios are in sharp contrast to those implied, as a characteristic example, by Michaud [42]:

Release of the news that ETI has been detected would provoke a burst of intense public and media interest. Reporters and others would ask officials and politicians not only what they know, but what they plan to do.

But what if there are no "news" in this sensationalist sense, and yet the discovery of extraterrestrial intelligence is no less real and relevant? Obviously, the debate is *not* about semantics of "discovery" or "detection". There are deeper and more serious philosophical issues involved to which we now turn.

2. Two simplified models

Here I contrast two very rough models of discovery, distinct along the temporal dimension of emergence and acceptance. For more detailed philosophical accounts of this topic see Popper [48]; Kordig [30]; Simon, Langley, and Bradshaw [56]; Lugg [37]; Schaffer [55]; or Magnani [38].

2.1. Eureka! model

Archimedes' legendary *Eureka!* moment is a prototype of the first category. The discovery happens suddenly, "in a flash" or in a very brief interval of time and is obvious, first to the discoverers, and subse-quently to anyone else. Acceptance is usually also quick, since empirical evidence is close at hand, and interpersonal consensus is easy to establish. The discovery is quick, clear-cut, immediately recognizable, manifestly repeatable, illuminating of other problems in its home field and related fields of study. It is a form of *euclatrophe* ("good catastrophe" in a memorable neologism of J. R. R. Tolkien⁴) or a *positive black swan* [58].

In contrast to a popular view of science, moments like these are exceptions, rather than a rule. It is only a selection effect – it is memorable to evoke naked Archimedes running through Syracuse, or an apple falling on Newton's head – which puts too big an emphasis on the "origin myths" and the role of great personalities, key moments, events, and circumstances in any historical process. These are oppor-tunities for biographers, novelists, movie directors, and other artists, as well as media sound-bites, but their role should not be overrated. One of the reasons while the distinction between the contexts of discovery and the context of justification remains salient to this day, in spite of almost everything else from the epoch of logical positivism being overturned or changed, is the realization that such tremendous moments of discovery are very few and give an incomplete and highly distorted image of the context of discovery.

2.2. Atomic-theory model

While ideas about atomism originate with Leucippus and Democritus in 5th century BC, the acceptance of the atomic structure of matter was controversial until early 20th century. Prominent atomists of previous centuries, including luminaries such as Descartes, Boyle, Boscovich, Lavoisier, Dalton, and others were not able to decisively persuade natural-philosophical/scientific circles – not to mention wider public – of their times of the veracity of their main thesis (for a historical review see, for instance, [49]). The turn of the century saw the famous debate between Ludwig Boltzmann and Ernst Mach on the reality of atoms. Einstein's celebrated 1905 work on the Brownian motion was only the penultimate stepstone toward realization that only atomic hypothesis can successfully explain the results of our macroscopic experiments.

The scientific community gradually adopted the discovery and engaged in investigating its ramifications. The opponents were not vanquished in a flash – some of them, like Mach or the great physical chemist Wilhelm Ostwald, continued to oppose it well into the 20th century. The most decisive evidence came with the experiments of Jean Perrin, performed about 1908, which left no reasonable doubt in the reality of atoms [47]. So, even if we discount ancient and early-modern atomistic speculations, and take as a landmark moment Dalton's lecture of 1803, it took about 105 years for the scientific community to accept the reality of atoms as basic structural blocks of all matter. For those who find this example too extreme, there are many other instances of protracted discoveries. In the long term, perhaps the most significant contemporary discovery in physics, the one of Higgs boson [17,19] was such an example, where although a landmark moment occurred in 2012, it was discussed for at least 48 years prior to the announcement, and the period of cautious rechecking the data and confirmation of the discovery is still continuing. A similar case was the discovery of oxygen, which was accompanied by the rejection of the old paradigm of phlogiston and adopting Lavoisier's new chemistry (e.g., [55]). Even a seemingly clear-cut case like the discovery of new planet, Uranus, took more than a year (March 13, 1781-late April 1782) to be understood and publicized as such. In all these cases and many others, there is a

³ E.g., <http://www.seti.org/post-detection.html> (last accessed July 7, 2016).

⁴ Tolkien [62].

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