

53rd IAA SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) –
The Next Steps (A4)
SETI 2: SETI and Society (2)

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TECHNOSIGNATURES. THE 400-YEAR SEARCH FOR EXTRATERRESTRIAL ARTEFACTS

Abstract

Technosignature Science (TS), also known as astroarchaeology or SETA (Search for Extraterrestrial Artefacts), is a contemporary research programme that attempts to detect evidence of extraterrestrial intelligent life by identifying astronomical phenomena that may be explained only as the result of technological modification of a given environment (i.e., technosignatures). Examples of potential technosignatures include artificial satellites orbiting exoplanets, atmospheric pollution, asteroid mining, and so forth. TS may therefore be viewed as a generalisation of "traditional" radioastronomy-based SETI (Search for Extraterrestrial Intelligence), which attempted to detect extraterrestrial intelligent life by intercepting a specific type of artefact: interstellar radio communications. Technosignature science is an exciting, budding field of astronomy that promises numerous potential developments in the near future; it also poses several interesting epistemological questions concerning the identification and assessment of observational evidence, which are starting to be explored by relevant scholarly literature in recent years. However, it may perhaps be surprising that the debate concerning technosignatures has roots that run quite deep; indeed, many of the questions facing astronomers and researchers today have direct precursors dating as far back as the XVII century. This contribution attempts to explore the history of the debate concerning what constitutes evidence when it comes to signs of extraterrestrial intelligent life. I will offer examples of historical controversies and discussions among European scientists concerning phenomena that were identified, described or explained as technosignatures (from Kepler's "oppida lunaria" to Schiaparelli's "canals" on Mars, and others). Next, we will discuss the origins of contemporary technosignature research, overviewing the contributions of astronomers such as Shklovsky and writers such as Lem to the nascent field of SETI in the latter half of the 20th century. I will briefly review some contemporary cases where hypotheses related to technosignatures were brought forth in an attempt to explain astronomical phenomena, such as Przybylski's Star and the interstellar object 'Oumuamua. Finally, I will highlight some of the key epistemological and methodological points in these debates that are most relevant to contemporary discussions, hopefully helping to bring these questions into clearer focus for future research.