EXTRATERRESTRIAL RESOURCE EXTRACTION TECHNOSIGNATURES. L. Walton[1]
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The earliest "mining" was carried out over two million years ago by early humans selecting the best stones to be fashioned into primitive scrappers and handaxes. With the coming of the Bronze and Iron ages, humans discovered smelting and were able to produce pure metals and alloys. The Romans and other civilizations were well-versed in surface and underground mining engineering techniques enabling metal extraction. The need for minerals and metals for tools, utensils, ornaments, currency, structures, machinery, electronics, art, and weapons has, for centuries, provided the impetus for expeditions to remote areas to find new ore deposits. Minerals and metals are necessary for the manufacturing of satellites, rockets, space stations, large radio and optical telescopes, and the accompanying instrumentation that makes everything work. A small subset of SETI searches focuses on finding evidence of extraterrestrial intelligence through detection of extraterrestrial technology including Dyson spheres, engineered stars, extraterrestrial fusion technology, starship propulsion, and monuments. Although we are limited in our ability to imagine futuristic biological or nanotechnology-based construction materials, it is feasible that at least some extraterrestrial civilizations may have embarked on large scale mining projects on their planet or within their own solar system to extract required metals and minerals for construction projects. A review of our own mining methods and their footprint on earth is presented, with the aim of generating awareness of what to look for when searching for extraterrestrial technosignatures related to small scale and large scale resource extraction activities.