



The Imagined Sounds of Outer Space

James Wierzbicki

Readers who know that I often write about film music – and that my publications include an article on the use of the electronic instrument called the theremin in depicting alien “Others” in Hollywood films from the 1950s (Wierzbicki 2002), a monograph on the score for the 1956 film *Forbidden Planet* (Wierzbicki 2005), and a book chapter on music in *The Twilight Zone* (Wierzbicki 2012) – might well suspect that this essay will focus on the imagined sounds of outer space as realized in the soundtracks of science-fiction films and television. Those imagined sounds are indeed my primary concerns here, but I will frame my thoughts with considerations of the imagined sounds of space as realized in music alone.

The core of the essay deals in turn with depictions both literary and cinematic of signals from space, with cinematic sounds that in one way or another are linked to the technology of space exploration, with imagined sounds associated with “heavenly bodies” that might be visited by Earth-based astronauts, and with sounds that represent travel in and through outer space.

This last category of sounds is, I think, especially interesting, because at least some of its cinematic exemplars seem to share basic elements with the “space music” of various composers for whom writing for the cinema was perhaps one of the furthest things from their minds. I make no claim that composers of film music illustrative of space travel were in any way influenced by composers who attempted to express through abstract music the idea of space’s weightlessness and even timelessness. I simply suggest that “space music” in film and “space music” in the concert hall have perhaps a few things in common. And to work

toward making that point, I will begin by referring to a passage from the *String Quartet No. 2*, op. 10, of Arnold Schoenberg.

Introduction

Schoenberg finished his second string quartet in September of 1908. That year marks a dramatic turning point in his musical style; it was also, for Schoenberg, not a very happy year, for his wife Mathilde had just abandoned him and their two children and run off to live with the painter Richard Gerstl. Although this sorry detail of Schoenberg's personal life was not made public until 1967, sixteen years after his death (Meyerowitz 1967: 161), that the second quartet was somehow "special" has been obvious to listeners ever since its first performances. Nowadays it is common to hear the music as "the composer's anguished response to feelings of rejection and failure, both as a man and artist," and to conclude that "the composer's personal anguish drove him toward a potentially nihilistic musical language that could otherwise exist only in a distant future time" (Simms 2003: 260). For most of the twentieth century, however, Schoenberg's *String Quartet No. 2* was regarded "simply" as the very start of musical modernism.

Critics have different opinions as to when Schoenberg's bold new style first fully blossomed. Some say that the composer's "first atonal masterwork" was the opening movement of his 1909 *Drei Klavierstücke*, op. 11 (Forte 1981: 127). Others say that Schoenberg's "first atonal masterpiece, his first monumental work to renounce tonal center and to handle dissonant harmonies as structurally equivalent to consonant ones," was his 1908–09 *Das Buch der hängenden Gärten* (The Book of the Hanging Gardens), op. 15, a setting for soprano and piano of fifteen poems by the Berlin-based writer Stefan George (Simms 2000: 46). There seems to be consensus, though, that the second string quartet had Schoenberg standing "on the brink of atonality" (Keller 1974: 10) and that it was with the last of the quartet's four movements that he took his decisive step over the edge.

Although the quartet as a whole is rooted in the key of F-sharp minor, the final movement—until the concluding measures—is in no key at all. Like the third movement, the fourth movement features not only the string instruments but also a soprano, singing a poem from Stefan George's 1907 collection *Der siebente Ring* (The Seventh Ring). The poem for the fourth movement is "Entrückung" (Rapture), which begins with the evocative words "Ich fühle Luft von anderem Planeten" (I feel wind from other planets).

**Arnold Schoenberg, *String Quartet No. 2*, fourth movement
("Entrückung")**

Vis-à-vis Schoenberg and his music in general, the standard reading of this line interprets it as metaphor, as a symbolic signal that with his first venture into music whose harmonies were “bound by no convention whatsoever” (Adorno 1973: 41). The composer knew that he was, indeed, moving into new territory. But Schoenberg himself has given evidence that he took the line at least somewhat literally. Focusing in particular on the alternation of churning low-register figurations with disconnected wisps of high-pitched melody that for more than two minutes precedes the soprano’s entrance, he wrote:

The fourth movement, “Entrückung,” begins with an introduction that depicts a departure from the earth to another planet. The visionary poet has anticipated sensations here that will perhaps soon be confirmed. Emancipation from gravity—drifting up through clouds into ever thinner air, forgetting all the travail of earthly life—all this will be portrayed in the introduction. [1]

In this 1949 commentary on music composed more than forty years earlier, Schoenberg’s mention of “emancipation from gravity” (Loslösung von der Erdanziehung) seems, in light of the topic of this essay, especially relevant. The final movement of the quartet, clearly, does not follow the “rules” of tonal harmony that in Western culture had been solidly in place since the beginning of the eighteenth century. One of the formulators of these “rules” was Jean-Philippe Rameau, famous in his day as a composer of operas but famous today mostly as the author of the 1722 *Traité de l’harmonie réduite à ses principes naturels* (Treatise on Harmony, Reduced to Its Natural Principals). Working with ideas that date back to the pagan Greek mathematician Pythagoras in the fifth century B.C. and to the Christian philosopher Boethius in the sixth century A.D., Rameau in this treatise described the conventional musical scale as having a tonal center around which the scale’s other tones exist in a hierarchical arrangement. Rameau wrote about the tonal center’s “gravitational pull,” and this idea so dominated his writings that, in his native France, he was known as “the Isaac Newton of music” (Christensen 1993: 7–15).

If traditional compositions can be said to be bound by something comparable to the “laws of gravity,” then the final movement of Schoenberg’s *String Quartet No. 2* surely breaks free of those “laws.” And with its poetic text that speaks of “wind from other planets,” the composition in more ways than one represents an idea that doubtless has long occupied human imagination.

The Sounds of Signals

The first cinematic representation of travel through space—indeed, the first science-fiction film—seems to have been *Le Voyage dans la Lune* (A Trip to the Moon) (Méliès 1902), an eleven-minute silent film made in 1902 by the French stage illusionist Georges Méliès. There are no signals from outer space suggested in this highly comic story about scientists who travel to the moon in a ballistic projectile, have various adventures with the moon creatures they call Selenites,

and then – by means of a splash-down landing that anticipates NASA’s procedures in the 1960s – arrive safely back on earth. Signals from space, however, do figure into two of the novels on which *Le Voyage dans la Lune* is loosely based.

Jules Verne’s 1865 *De la Terre à la Lune* (From the Earth to the Moon) deals only with the preparations for the projectile’s launch. Verne’s 1870 sequel to that book, *Autour de la Lune* (All Around the Moon), deals with the three astronauts’ lunar explorations and eventual safe return. At one point near the end of *All Around the Moon*, when the astronauts’ earth-bound colleagues are expressing concern, one of them suggests that it would not be unreasonable for the moon party to attempt to communicate by means of “a gigantic alphabet” whose words could be read via a telescope. Another of them expands on this idea. As Verne tells the story:

The Lieutenant assured his listeners that, by means of large parabolic reflectors, luminous groups of rays could be dispatched from the Earth, of sufficient brightness to establish direct communication even with Venus or Mars, where these rays would be quite as visible as the planet Neptune is from the Earth. He even added that those brilliant points of light, which have been quite frequently observed in Mars and Venus, are perhaps signals made to the Earth by the inhabitants of these planets. (Verne 1899: 126)

Whereas the proposed signals from space in Jules Verne’s 1870 *All Around the Moon* are optical, the *actual* signals received in H.G. Wells’s 1901 novel *The First Men in the Moon* are electro-magnetic. It is from the novel by this British writer, not from either of the novels by Verne, that Méliès got his ideas for face-to-face encounters with Selenites. Quite unlike the encounters in the Méliès film, however, those depicted in Wells’s *The First Men in the Moon* are hardly comic, and, indeed, the novel as a whole has the tone of bittersweet tragedy. In Wells’s story, two scientists travel to the moon, but only one of them returns. After the returning scientist has written up his memoirs, and while he is wondering sadly about the fate of his marooned colleague, he learns that “a Dutch electrician, [...] experimenting with a certain apparatus used by [Nikola] Tesla in America,” has been receiving “day by day a curiously fragmentary message in English which was indisputably emanating from [...] the moon” (Wells 1901: 128).

The novel’s narrator reminds readers of “the little excitement that began the century, arising out of the announcement by Mr. Nikola Tesla, the American electrical celebrity, that he had received a message from Mars. His announcement recalled attention to a fact that had long been familiar to scientific people, namely: that from some unknown source in space, waves of electro-magnetic disturbance, entirely similar to those used by Signor Marconi for his wireless telegraphy, are constantly reaching the earth” (Wells 1901: 129).

The narrator goes on to say that “besides Mr. Tesla several other observers have been engaged in perfecting apparatus for receiving and recording these

vibrations, though few would go so far as to consider them actual messages from some extraterrestrial sender” (Wells 1901: 129).

The Serbian-born Tesla did not, in fact, claim to have received actual “messages from Mars” at his laboratory in the mountains of Colorado, although the sensationalist popular press of the day certainly suggested that that indeed had happened. [2] Perhaps referring to the Jules Verne novel, Tesla observed in a 1901 magazine article that “most of those who are enthusiastic upon the subject of interplanetary communication have reposed their faith in the light-ray as the best possible medium of such communication” (Tesla 1901: 4), and then he suggested that a more efficient medium would be electrical signals. He went on to explain that with a specially-built apparatus he had detected puzzling disturbances in the earth’s electrical field. And these, he wrote, caused him to wonder:

The changes I noted were taking place periodically, and with such a clear suggestion of number and order that they were not traceable to any cause then known to me. [...] It was some time afterward when the thought flashed upon my mind that the disturbances I had observed might be due to an intelligent control. Although I could not decipher their meaning, it was impossible for me to think of them as having been entirely accidental. The feeling is constantly growing on me that I had been the first to hear the greeting of one planet to another. (Tesla 1901: 5)

Tesla concluded his article only by speculating that, in the future, communication with other planets by means of electrical signals *might* be possible.

Regardless of their source, and despite Tesla’s use of the phrase “hear the greeting,” the real life electrical disturbances that Tesla observed were not associated with sound of any sort. The fictional messages from the moon received by the Dutch electrician in the H.G. Wells novel, on the other hand, clearly sounded like either the clicks or the beeps of radio-transmitted Morse Code. [3] And doubtless it was the sound of the International Morse Code that “radio operators all around the world,” at a certain moment on a certain day, heard in the opening scene of Yakov Protazanof’s 1924 film *Аэлита* (Aelita, or Aelita: Queen of Mars) (Protazanof 1924). [4] After a few sequences that from various angles show telegraph wires, a title card informs audiences that “on 4 December 1921, at 18.27 hrs, all radio stations on Earth received a strange message.” The next scene depicts a Japanese telegrapher, wearing headphones, sharing with his superiors the message he had just received. The next action scene depicts a telegrapher, also wearing headphones, receiving the message in some Middle Eastern country, and the action scene after that depicts a headphone-wearing telegrapher in a Soviet laboratory. In some easily accessible versions of the film, interspersed with these scenes are apparently hand-written transcriptions of the message in Japanese ideograms, Cyrillic script, and the Latin alphabet. [5] The version in the Latin alphabet reads: “Anta ... Odeli ... Uta”

This first-ever Soviet science-fiction film was, of course, a “silent” movie. So the realization of the “code sound,” if the sound was realized at all, was left to the

creativity of music directors at individual cinemas. We have no evidence for it, but perhaps some of the realizations were at least in certain ways similar to the soundtrack of the Russian Cinema Council's 2004 DVD release, which in the opening scenes features washes of electronic noise overlaid with code-like rhythms tapped out on a piano's high G. [6]

The "strange message" received by telegraphers worldwide plays an important role both in Protazanof's 1924 film and in the 1923 novel by Alexei Tolstoy on which the film is based. To make a long story short, an emotion-wrought Soviet scientist believes that the "message" is coming from Mars, so he initiates a project that involves first building a spacecraft and then traveling to the distant planet. Naturally, there ensues much drama, including a workers' revolution on Mars and a passionate romance between the scientist and the Martian queen. In Tolstoy's novel, the widowed scientist heartbrokenly returns to earth after his Martian paramour dies in what was to have been a double love-suicide; in the Protazanof film, the scientist awakens from a dream to discover not only that the wife he thought he had murdered is very much alive but also that the "strange message" amounted to nothing more than three words he had fleetingly seen on a poster advertising tires for automobiles. [7] In any case, both the novel and the film begin with the *hearing* of something that is assumed to be a signal from outer space.

Protazonof's *Aelita* is an early science-fiction film, and, along with Fritz Lang's 1929 *Frau im Mond* (Germany; *Woman in the Moon* in the UK, *By Rocket to the Moon* in the United States) (Lang 1929), it counts as one of the relatively few early science-fiction films that deal with space travel. To be sure, cinema in the 1920s and 1930s offered audiences plenty of science fiction. [8] But most of these, including the archly futuristic *Metropolis* (Lang 1927), *Things to Come* (Menzies 1936), and *Just Imagine* (Butler 1930), deal fictionally with science that is decidedly earth-bound.

It was not until the 1950s that science-fiction cinema worldwide began to concentrate on themes extra-terrestrial. The reasons for this are largely socio-political. One of these is the rapid development of rocket science, and the first steps towards the actual exploration of space, that in the years immediately following World War II triggered the so-called Space Race between the United States and the Soviet Union. Another reason is the so-called Arms Race between these same two nations; knowing that increasingly large arsenals of atomic bombs and then hydrogen bombs could easily bring an end to earthly civilization, persons all over the world started to wonder about what sort of power might be owned by technologically advanced *non-earthly* civilizations. Still another reason is the much-publicized sighting of "flying saucers" by an air force pilot over the American state of Washington in June 1947 and then, a month later, the similarly much-publicized report of an alien spacecraft that supposedly crashed near Roswell, New Mexico. [9] Likely fueled by Cold War paranoia, persons of all ages – and in many different countries – took a keen interest in "outsiders" and the possibility of being visited, or invaded, by them. They took an interest, as well, in

imagining visits to worlds inhabited by alien “others.”

The film industry of course catered to these widespread interests, and thus the 1950s became the Golden Age of space-oriented science fiction. Many of the sci-fi films from that era indeed featured “signals” from outer space. Since most of these films were of quite low budget, the realizations of those signals tended to be neither spectacular nor especially inventive. Indeed, most often the realized signals simply imitated the various means of earthly communication that in those days were commonplace: the signals were electrical, manifest in audible or graphic form as something that at least resembled Morse Code, or they were electronic, manifest in the form of television or – more often – radio broadcasts.

There are a great many Golden Age science-fiction films that feature visual signals of the sort received on an astronomer’s television screen in *Red Planet Mars* (Horner 1952), or audio signals of the sort heard through loudspeakers worldwide in *Earth vs. the Flying Saucers* (Sears 1956), or signals of the sort whose recordings “from long ago” are discovered and then deciphered in *Der schweigende Stern* (The Silent Star, a.k.a. First Spaceship on Venus) (Maetzig 1960), or audio-visual signals of the sort sent to Earth by stranded aliens in *Мечте навстречу* (Toward Meeting a Dream, a.k.a. Encounter in Space) (Karzhukov 1963). Some of the messages contained in those signals are friendly, but many of them take the form of a threat or a warning. Almost all of them – once they have been de-coded or translated – are perfectly unambiguous.

Ambiguous signals from outer space, of course, make for much more interesting drama, which is probably why they are reserved for science-fiction films that require at least a bit of thought from their audiences. One of cinema’s most famous ambiguous auditory signals from outer space involves neither Morse Code nor broadcast radio, and the content of its cryptic message is neither mathematical nor verbal but, rather, musical. This is the five-note “motif” that dominates Steven Spielberg’s 1977 *Close Encounters of the Third Kind* (Spielberg 1977). By the point late in the film during which the motif is used by the American military to “beckon” the alien spacecraft, the motif has been heard – perhaps telepathically – by persons all over the world, and the film’s audience has in fact heard it dozens of times. Everyone, in other words, knows the motif, which director Spielberg insisted be, indeed, a signal, “more like a ding-dong, ... not a melody, not even a phrase” (Bouzereau 1998). But no one, ever, knows what the signal means. [10]

Another example of an ambiguous audible signal from outer space is to be found in the 1997 film *Contact* (Zemeckis 1997). Directed by Robert Zemeckis, the film is closely based on the same-titled 1985 novel by the American astronomer and astrophysicist Carl Sagan, a novel that in turn originated with a screenplay whose first drafts date back to 1979. The central character in *Contact* is Ellie Arroway, an astronomer who has devoted her entire life to the SETI (Search for Extra-Terrestrial Intelligence) project. After countless long hours of hearing nothing whatsoever from the oscillators connected to various arrays of ultra-sensitive

radio telescopes, at last she hears a regular pulsation of “white noise.” She enlists her colleagues to determine the source of this signal that apparently emanates from outer space; just as the team is getting a triangulated “fix” on the signal’s source, they are shocked when the signal stops; a stressfully long moment later they are delighted as the signal begins afresh, in a sequence of pulsations separated by spaces that together represent, the astronomers realize, prime numbers.

The “message scene” from the film *Contact*.

The electro-magnetic signal from outer space turns out to be much richer than at first it seems. In the 1985 novel on which the 1997 film is based, author Carl Sagan describes the initial stages of the de-coding process:

The picture, still unintelligible, was joined by a deep rumbling glissando of sounds, sliding first up and then down the audio spectrum until it gravitated to rest somewhere around the octave below middle C. Slowly the group became aware of faint but swelling music. The picture rotated, rectified, and focused.

Ellie found herself staring at a black--and--white grainy image of [...] a massive reviewing stand adorned with an immense art deco eagle. Clutched in the eagle's concrete talons (Sagan 1985: 86)

What she stared at, and heard, was a copy of the television broadcast of Adolf Hitler’s welcoming speech at the 1936 Olympic games. And then the astronomers discovered that, embedded *within* the sounds and images of mundane television broadcasts from the 1930s and '40s, were the detailed plans for the building of a machine whose technology is, literally, “out of this world.”

The Sounds of Outer-Space Technology

Science fiction that deals with space travel has always involved technology. After all, it is technology – in real life nowadays as well as in the literary or cinematic fiction of the past – that makes travel into space possible. In science fiction, technology is typically far more advanced than the technology that exists at the time of the fiction’s creation. But usually the futuristic technology is modeled on whatever technology is solidly in place at the time of the fiction’s creation.

In Fritz Lang’s 1929 “silent” film *Frau im Mond*, for example, the flight-managing equipment looks very much like the voyage-managing equipment one might have seen, in those days, on the bridge of an ocean liner. Likewise, the flight-managing equipment of “outer space” films from the Golden Age of science fiction typically looks like what might have been seen in the cockpits of airplanes from that period. And the same might be said for films from the early 1960s,

when space flight for humans was fast becoming a reality. Although images published in magazines and on television showed persons around the world what the cramped capsules occupied by the helmeted and tightly space-suited Yuri Gagarin and John Glenn looked like in reality, in fiction, filmmakers most often opted for a more comfortable imagery based on the spacious flight decks of intercontinental airliners. [11]

Just as flight-management equipment in these films resembles what might have been seen in airplanes of the 1950s and '60s, so the sounds emanating from that equipment resembles what might have been heard in airplanes. The vocabulary of flight-management “sound effects” in Golden Age science-fiction films, in other words, consists for the most part of buzzes and bleeps that indicate when equipment is being turned on and off, of monotone intermittent audio signals in what might well be Morse Code, and of broadcast vocalizations whose timbre is distorted by low-fidelity loudspeakers.

Radio communication in Golden Age sci-fi films, whether it be communication between space craft or communication between persons on the ground of some distant planet, typically involves not just distorted voice transmissions but also the swooping “interference” patterns – resulting from the so-called heterodyne effect – of the sort that would be familiar to any person who has ever been physically close to the operations of short-wave radio. This is a point worth emphasizing, for it seems that in postwar science-fiction films – no matter where they were made – the actual sounds generated by short-wave radio figured hugely into the imagined sounds not just of “outer space” communication devices but of “outer space” technology in general.

One of the first electronic musical instruments was produced in 1920 by the Soviet physicist Léon Theremin. Named after its inventor, the theremin used a simple vacuum-tube oscillator to produce sounds whose frequencies and amplitudes were modulated by the player’s hands held in proximity to a pair of antennas and thus “interfering” with low-level radio signals. Similar sounds – in essence variants of simple sine waves – came from the so-called *ondes Martenot*. First exhibited in Paris in 1928 and directly influenced by the theremin, this instrument, too, is named after its inventor, Maurice Martenot, who was a telegrapher and electrical engineer and, like Léon Theremin, an amateur cellist.

In 1929 in Berlin, at the Musikhochschule’s laboratory for music and radio – the *Rundfunkversuchsstelle* – the German physicist Friedrich Trautwein exhibited the first version of his eponymous *trautonium*, an electronic instrument that generated a wide range of sounds by means of neon-tube oscillators whose vibrations were processed through a variety of resistor circuits. In 1937, in Moscow, the Soviet radio engineer Evgeny Murzin began work on what eventually was called the ANS Synthesizer; named not after himself but after the initials of the Russian composer Alexander Nikolayevich Scriabin, Murzin’s ANS Synthesizer similarly used oscillators to generate sounds, but in this case the basic “material” of the sounds was first recorded as optical information and then

transformed – often radically – by means of various photoelectric techniques.

Friedrich Trautwein's Berlin-based trautionium and Evgeny Murzin's Moscow-based ANS Synthesizer were sophisticated and extraordinarily versatile electronic musical instruments, but they did not travel well. Other electronic musical instruments that did not travel well were the synthesizers set up in 1951 by Herbert Eimert and Werner Meyer-Eppeler at the Cologne studios of the Nordwestdeutscher Rundfunk and in 1957 by Herbert Belar and Harry Olson at Columbia University in New York. [12] In marked contrast to these one-of-a-kind and physically large instruments, the theremin and the ondes Martenot were, eventually, mass produced. [13] They were both lightweight and relatively affordable; more significant, they were based on radio technology that since World War I had become almost universal. To make yet another long story short, although sounds generated by bulky studio-based synthesizers indeed figured into certain German and Soviet science-fiction films over the years, [14] during the Golden Age of science fiction most films from elsewhere in the world tended to rely, for their suggestions of outer-space technology or "things" from outer space, on much simpler technology.

Oscillator-based theremins manufactured and marketed by RCA, for example, in effect gave a wordless voice to the powerful inter-stellar robot in *The Day the Earth Stood Still* (Wise 1951), to the fierce vegetable-like creature rescued from a long-ago crashed flying saucer in *The Thing from Another World* (Nyby 1951), and to the frightful-looking but nonetheless friendly aliens who bother earthlings only because their spacecraft is in need of repair in *It Came from Outer Space* (Arnold 1953). To illustrate outer-space technology in such low-budget films as *It Conquered the World* (Corman 1956), *Invasion of the Saucer Men* (Cahn 1957), and *Attack of the 50 Foot Woman* (Juran 1958), composer Ronald Stein craftily imitated the sound of the theremin by means of tuned oscillators, sometimes in combination with a solo violin or a vibraphone set to a slow pulsation rate. In the high-budget MGM film *Forbidden Planet* (Wilcox 1956), avant-garde composers Louis and Bebe Barron sonically portrayed the technology of both a distant planet and a futuristic earthly spacecraft with "electronic tonalities" whose raw material was the sound of oscillators activated by one-of-a-kind, and for the most part short-lived, circuits. Similarly, "unearthly" sounds produced by a great many custom-built electronic instruments, along with the conventional sound of the theremin, figured richly into various British television and radio dramas whose soundtracks, after 1958, were provided by the BBC Radiophonic Workshop. [15]

So that cinematic depictions of other-worldly or futuristic technology would indeed be "read" as being other-worldly or futuristic, the depictions of course needed to be colored by something – audio and/or visual – quite out of the ordinary. At the same time, so that audiences of science-fiction cinema could immediately understand whatever other-worldly or futuristic technology was being depicted, the sights and sounds of the imagined technology had to be based on things that were, in fact, quite mundane. This applies not just to depictions of communication devices and flight-managing equipment but also to flight-

powering equipment and – importantly – to weaponry.

In the Golden Age of science-fiction films – that is, in the 1950s – probably almost everyone in the cinema audience would have been familiar with the sounds of airplanes and automobiles, and of firearms and explosions in general. If members of the cinema audience were not in fact familiar with these actual sounds, they were at least likely to have been familiar with how such sounds had, since the mid-1930s, been represented in the soundtracks of a wide variety of narrative films. Seldom, of course, were these “realistic sounds” actually real. As the French sound theorist Michel Chion reminds us, “sound that rings true for the spectator and sound that *is* true are two different things,” and we tend to measure the truth of cinematic sound not against “our hypothetical lived experience” but against the “codes established by cinema itself” (Chion 1994: 107). [16]

Thus, in science-fiction of the 1950s the “imagined” sound of outer-space ballistic confrontation is most often a sonic variation not of the actual sound of earthly cannonades but, rather, of the quite invented sound of artillery barrages as represented in films. Similarly, the sound of futuristic side-arms in sci-fi films is most often a variant not of what one might actually hear on a target-practice range but of what one might hear in a “shoot-’em-up” scene from a gangster or cowboy movie. So that they can easily be “read” as teleportation devices, futuristic transporters not only visually but also sonically resemble earthly elevators, and the technology of various modes of futuristic ground transportation, sonically as well as visually, resembles that of earthly automobiles, railroad trains, and subways. The voices of “monsters” from outer space, whether on their native planets or visiting the Earth, tend to mimic the traditional cinematic voices of earthly beasts; interestingly, the voices of outer-space robots (Robbie in *Forbidden Planet*, for example, C-3PO in George Lucas’s 1977 *Star Wars* (Lucas 1977), the Daleks in the BBC’s long-running television series *Doctor Who*) resemble those not of earthly robots but, rather, of earthly humans. [17]

The Sounds of Heavenly Bodies

There is little in *The Phantom Planet* (Marshall 1961) that qualifies it for a place in the canon of science-fiction cinema. But this arguably “cheesy” film, which in fact is not about a planet but an asteroid, is noteworthy at least for an image that appears in its opening title credits. After the standard mentions of producer, director, writer, and starring actors, viewers see a single title card that lists credits for “director of photography,” for “music editor,” for “music supervisor,” and – quite out of the ordinary – for the creators of “Interplanetary Sound.”

This is an unusual listing, and “interplanetary sound” is an interesting term. What it describes is clearly not what the film industry in those days would have

called “music,” in other words, sounds generated by violinists or trumpet players or other persons who were members of Hollywood’s strictly controlled musicians’ union. And what the term describes is also clearly not what the industry would have called “sound effects,” that is, sounds that within the film narrative seem to result directly from physical objects or activities. Neither music nor sound effect, the “interplanetary sound” in *The Phantom Planet* is simply a sound that hovers in the background whenever the action takes place outside the caves in which the asteroid’s inhabitants live. A visit to the archives of Four Crown Productions – if such archives still exist – might reveal how in fact this “interplanetary sound” was made; the sound seems to have been, at least in part, electronically generated, probably by means of simple oscillators, but it also seems to include such natural noises as those produced by bubbling liquid and rushing wind. In any case, the “interplanetary sound” in the low-budget *The Phantom Planet* quite effectively conjures an atmosphere that audiences soon enough associate with the narrative’s setting.

The 1961 *The Phantom Planet* is certainly not the first instance of a special sound illustrating the atmosphere of a distant planet. Hayes Pagel, who along with Walter Dick is credited for *The Phantom Planet*’s “interplanetary sounds,” had worked as a music editor for the 1955-57 television series *Science Fiction Theatre*, and more often than not he concocted special sounds for those many of the series’ episodes that involved distant planets. [18] Evoking the titular heavenly body – not just its atmosphere and landscape but also its mysterious “living” nature – is one of the prime functions of the above-mentioned “electronic tonalities” that Louis and Bebe Barron generated for the 1956 film *Forbidden Planet*. Sonic evocations of planets or asteroids are similarly used, occasionally and sparingly, and mostly in the first season, in those episodes of the 1959-64 television series *The Twilight Zone* that describe existence somehow remote from Earth. [19] Before any of these, however, “planetary” sound figured importantly in the very first American science-fiction film to make use of the theremin.

Rocketship X-M (Neumann 1950) did not mark the theremin’s Hollywood debut. The instrument’s first usage occurred in *Lady in the Dark* (Leisen 1944), a maudlin and arguably inconsequential romantic film from 1944 about an editor of a fashion magazine who, because she has been having “disturbing” dreams, decides to undergo psychoanalysis. [20] But a year later, and quite famously, came Alfred Hitchcock’s *Spellbound* (Hitchcock 1945), a grim dramatic film about a murder suspect who discovers his innocence only when he, too – like the titular character in *Lady in the Dark* – undergoes psychoanalysis. Just a few months after that, and also quite famously, came *The Lost Weekend* (Wilder 1945), for which Hitchcock’s *Spellbound* composer, Miklós Rózsa, used the theremin to depict the ravings of a seriously unbalanced alcoholic. And after this, in rapid succession, came a slew of films in which the theremin – as a musical instrument, not as a generator of sound effects – was used to represent a wide variety of “abnormal” states of mind. [21]

In the films from the late 1940s, the ethereal and arguably eerie sound of the

theremin in and of itself symbolized a mental state that is in one way or another bizarre but nonetheless quite human, and therefore quite earthly. In contrast, the sound of the theremin in *Rocketship X-M* symbolized the landscape – or perhaps the atmosphere – of a distant planet. And thus with the score for *Rocketship X-M* there came, in terms of the relationship between “strange” sounds and “strange” filmic situations, a long-lasting paradigm shift.

The letters “X-M” in the film’s title refer to an expedition to the moon, but the spaceship gets sidetracked and ends up on Mars. The film’s four sections depict the planning of the expedition, the space flight that goes awry, the astronauts’ walk-about on Mars, and then – tragically – the astronauts’ unsuccessful attempt to return to Earth. The film’s score is by Ferde Grofé, a composer involved only minimally with Hollywood and known – at least in the United States – primarily as the orchestrator of George Gershwin’s 1924 *Rhapsody in Blue* and as the creator of a 1931 pops concert favorite titled *Grand Canyon Suite*.

Grofé’s score for *Rocketship X-M* is for the most part unremarkable. Indeed, almost everything about the hastily made *Rocketship X-M* is unremarkable, [22] except for the film’s third section, during which the five astronauts exit their spaceship and venture onto the surface of Mars. At this point, the otherwise black-and-white film suddenly shifts to red-tinted imagery. At this point, too, the otherwise quite tonal score suddenly shifts to something very similar to the “weird chords,” “strange harmonies,” and generally “mysterious music” that Grofé had used, almost twenty years earlier, in the second movement of his *Grand Canyon Suite* to depict the vastness of Arizona’s Painted Desert. [23] And also at this point, to help the accompanying music describe the landscape/atmosphere of an alien planet, Grofé introduces the sound of the theremin. [24]

After the 1950 *Rocketship X-M*, the theremin and its various inexpensive imitations – the simple tuned oscillator, the newly invented electronic keyboard instrument called the Novachord, the recorded and perhaps somehow processed sound of rushing wind and water, the wordless human voice – over the next decade were used almost exclusively not in psychological dramas but in science-fiction films. For better or worse, after *Rocketship X-M*, the idea of “strange” sound was for quite a long while disconnected entirely from depictions of human abnormality and associated, instead, with “alien” phenomena. Many of these “alien” phenomena were of course creatures from outer space, or earthly creatures somehow mutated due to radiation from earth or elsewhere. At the same time, many of the “alien” phenomena were physical places in outer space.

One could make a long list of Soviet, European, and American science-fiction films from the 1950s and ’60s that have the word “planet” in their titles, or whose titles mention Mars, Venus, or the Moon, or some other specific outer-space destination. [25] In almost all of these, the narrative involves not just the journey of Earth-based astronauts to a far-off place but also the adventures of those astronauts on the surface of that place. In most of these, the place itself – not just

distant from the Earth but in many ways different from the Earth – functions almost like a character in the drama. And just as in most filmic dramas the central human characters tend to be identified by means of accompanying music, so in these films the planets themselves tend to be identified not just by “weird chords” and “strange harmonies” but also, and often, by “other-worldly” sonorities added to the soundtrack.

The Sounds of Space Travel

As presented in science-fiction films, the sounds of distant planets are entirely fictitious, as are the sounds of the travel through space that allows astronauts to arrive at, or depart from, those planets. These sounds are fictitious – invented, so to speak, out of thin air – because planets and travel do not make sounds. For most persons, the Earth as a planetary body, aside from the rumble of the occasional earthquake or volcano, is quite mute, and there is no reason to think that the situation would be different elsewhere in the universe. Similarly silent, for most persons, is movement from one place to another; travel in the earthly world is of course often linked with sound – the clicks of footsteps on the pavement, for example, or the whoosh of wind in the ears of a bicyclist, or the roar of an automobile engine – but movement in and of itself triggers no vibrations that might be perceived as sonic. As noted above, filmmakers have long appropriated the noises of familiar technology for their portrayals of fantastic technology, and thus the machines that in science-fiction films facilitate space travel tend to sound quite a bit like earthly airplanes or rockets. To represent the quite silent phenomenon of travel through space, however, filmmakers have long relied on music.

In tracing the history of audio-visual portrayals of space flight in science-fiction films, one notes four main tropes. The most dominant of these, and the one with the deepest roots, places sonic emphasis on both the speed of space travel and the sheer power of the means of propulsion. This trope typically begins with more or less realistic “blast off” sound effects and then settles, as the spacecraft escapes the bounds of planetary gravity, into fast-paced orchestral music. It can be found as early as the fanciful *Flash Gordon* (Stephani and Taylor 1936) and the earnestly speculative *Weltraumschiff* (Space Ship) (Kutter 1937). [26] Without substantial change, the trope is found, after the dust of World War II had started to settle, in the 1948 *Superman* (Bennet and Carr 1948) and the above-described 1950 *Rocketship X-M*. [27] Well into the era of the Cold War and its concomitant Space Race, after the Soviet Union’s launch of Sputnik had embedded the idea of genuine space flight into the consciousness of persons all around the world, the speed/power trope is found in dozens of science-fiction films. [28]

Another space flight trope, albeit not a common one, and for the most part limited to the late 1950s and early 1960s, places sonic emphasis not on speed and propulsive power but on the idea of “the future.” In examples of this trope, the

accompanying sounds are most often electronically generated, but they are not of the sustained yet wobbly sort that in so many sci-fi films denote the “alien” nature of distant planets or their creatures. Rather, the sounds that denote decidedly futuristic space travel, and which are instantly read as signifiers for high technology, tend to be made up of bleeps and blips that cover a wide pitch range and are devoid of recognizable rhythmic patterns. Unlike the isolated bleeps and blips that, as discussed above, served simply as sound effects for science-fiction films, the collected sounds associated with futuristic space travel take the form of what some would call “electronic music”; indeed, they bear a resemblance, at least in terms of their sonic content, to the earliest output of the post-war European and American electronic music studios. [29] And with these, the boundary lines between “sound effects” and accompanying “music” are often intriguingly blurred.

This situation arises in almost all of the scenes in the 1963 Czech film *Ikárie XB-1* (Polák 1963) that depict the titular spacecraft traveling toward a mysterious planet that is discovered to be orbiting the star Alpha Centauri. But perhaps the most famous examples of electronic “space flight” music that might be confused with high-tech sound effects are found in the above-mentioned 1956 *Forbidden Planet*. Especially in *Forbidden Planet*’s opening sequence, which shows an Earth-based craft moving through star-spangled space, but also in the scene that shows the craft’s landing on the planet and the final scene that shows the craft’s crew, from a safe distance, observing the planet’s demise, audience members are subtly given a pair of questions. Are the “electronic tonalities” concocted by Louis and Bebe Barron (like the electronic sounds that Zdeněk Liška, in collaboration with Bohumír Brunclík and Jaromír Svoboda, created for *Ikárie XB-1*) to be heard simply as a *mélange* of diegetic *noise* that somehow emanates from the depicted spaceship and all its futuristic equipment? Or are these “tonalities” to be heard as extra-diegetic *music* that illustrates – as extra-diegetic music, or underscore, since the mid-1930s had illustrated many a filmic concept – the ineffable high-tech “essence” of space flight?

Opening sequence of the film *Forbidden Planet*.

A third musical trope related to filmic depictions of space travel – not at all enigmatic, and to an extent related to the speed/power trope discussed earlier – began to manifest itself only in the mid-1960s, but its roots date back to the nineteenth century. Even in the pre-cinema science-fiction novels of Jules Verne and H.G. Wells, imagined space travel of course involved ideas of speed and force, and of course it also involved ideas of futuristic technology. Importantly, it also involved the idea of adventure.

The concept of adventurous space travel was certainly hinted at in such “silent” science-fiction films as *Le Voyage dans la Lune*, *Aelita*, and *Frau im Mond*, but in the whole of these films’ narratives this concept was of relatively minor

importance in comparison to the more prominent themes of comedy and romance. The concept of adventure was certainly imbedded, too, in *Flash Gordon*, *Weltraumschiff*, and all the other films mentioned in the discussion of the speed/power trope. But it was not until the mid-1960s – well after Sputnik, and a few years after the first successful orbital flights – that the idea of adventure, first and foremost, came to dominate cinema’s sonic imaginings of space travel.

Setting the trend for deliberately “adventurous” space-travel music was the theme that Alexander Courage composed in 1966 for the American television series *Star Trek* (Roddenberry 1966–69). [30] In stark contrast to the lightweight, almost cartoonish theme that John Williams had created for the previous year’s *Lost in Space* series (Allen 1965–68), [31] Courage’s sweeping *Star Trek* music embodies the very spirit of the spoken words that, beginning with the third episode, were laid over the title sequence: “Space. The final frontier. These are the voyages of the starship *Enterprise*. Its five-year mission: to explore strange new worlds, to seek out new life and new civilizations, to boldly go where no man has gone before.”

The idea of “boldly” going hither and yon into outer space was embodied as well in the theme music, by various composers, for *Star Trek*’s numerous follow-up television series and cinematic spin-offs. [32] This same idea figured potently in the “adventurous” music that John Williams wrote for George Lucas’s 1977 film *Star Wars* (Lucas 1977), and a year later it figured just as potently in the theme music that Stu Phillips composed for the short-lived ABC television series *Battlestar Galactica* (Larson 1978–79). The audio-visual “adventure” trope remains alive and well, [33] and almost always it dispenses entirely with propulsive or technological devices and focuses instead on images of spacecraft not so much speeding through the heavens as simply floating.

That spacecraft, once freed from gravity, would indeed “float” through space – rapidly, to be sure, but quietly propelled by momentum, not by noisy rocket engines – was known to the nineteenth-century astronomers and physicists whose research informed the novels of Jules Verne. But this idea was foreign to the experience of most ordinary human beings, and so it did not enter the realm of “common knowledge” until early in the 1960s, when it figured into the intense media reportage of Yuri Gagarin’s and John Glenn’s orbits of the Earth.

Likewise for the idea that physical objects contained within a gravity-free spacecraft would “float.” The concept of weightlessness in outer space had long been obvious to scientists, and thus it is not surprising that it is demonstrated, with somewhat comic effect, in the otherwise wholly serious German 1929 silent film *Frau im Mond* (Lang 1929). But the transformation of outer-space “weightlessness” from theoretical concept into accepted fact did not take place until 1968, when television cameras in the capsule of NASA’s Apollo 7 flight actually *showed* earthlings what happens when a pencil, say, is released from its owner’s hand.

Probably the most famous filmic representations of the weightlessness of space travel are found in a 1968 film released six months before the Apollo 7 mission. [34] With a screenplay by the science-fiction writer Arthur C. Clarke and the film's director, Stanley Kubrick, *2001: A Space Odyssey* (Kubrick 1968) depicts, early in its story, a shuttle vehicle approaching a space station that orbits the moon. The accompanying music – the 1866 concert waltz *An der schönen blauen Donau* (On the Beautiful Blue Danube) by Johann Strauss, Jr. – is quite unlike what up to this point had been heard in scenes depicting space travel. Various writers on science-fiction films have recently noted that perhaps some of Kubrick's imagery for the first half of *2001: A Space Odyssey* was influenced by scenes that Soviet director Pavel Klushantzev had included throughout his 1958 *Дорога к звёздам* (The Road to the Stars) (Klushantzev 1958). [35] What has not been noted is the possibility that Kubrick's choice of music for *2001*'s iconic space station scene might have been influenced by Klushantzev's opening sequence, a montage in which both imagery and a voice-over summary of the entire history of mankind's fascination with flight is underscored with background music whose character, like that of the "Blue Danube" waltz, is decidedly lightweight.

The music for Klushantzev's "The Road to the Stars" was composed especially for the film by Sergey Shatiryan. All of the music in Kubrick's *2001: A Space Odyssey*, on the other hand, was borrowed from pre-existing repertoire. Along with the "Blue Danube" waltz, the score includes the opening section of Richard Strauss's 1896 tone-poem *Also sprach Zarathustra* (used in the film's title sequence), an Adagio movement from Aram Khachaturian's 1941–42 ballet *Gayane* (used in the film's second half, in an extended scene depicting the activities of astronauts within a craft moving through "deep" space), and no less than four pieces by the Hungarian composer Györgi Ligeti. These are the "Kyrie" movement from Ligeti's 1965 *Requiem* (used as a recurring motif that symbolizes the mysterious monoliths as they manifest themselves on Earth, on the moon, and in deep space); his 1966 *Lux Aeterna* for sixteen solo voices (used in the scene early in the film that depicts travel, via a flying "moon bus," from a military base to the just-discovered monolith); his 1965 *Aventures*, for three voices and small instrumental ensemble (used in the scene at the very end of the film that shows what by this time is the main character, an astronaut named Dave, undergoing a never-explained psycho-physical transformation); and his 1961 orchestral work *Atmosphères* (used in various scenes, including the blank-screen prelude that precedes the title sequence, the scene near the film's beginning that depicts the unease of humanoids as they "sense" the presence of a monolith newly arrived on Earth, and the extended scene near the film's end that in an almost surreal way depicts Dave's travel through what the screenwriters of *2001* perhaps presciently called a "Star Gate"). [36]

"Star Gate" sequence from the film *2001: A Space Odyssey*.

In contrast to Johann Strauss’s lilting and lyrical “Blue Danube,” all of the just-named pieces by Györgi Ligeti are strikingly “modernist” in style. Hardly lightweight, they suggest the idea of weightlessness, and one suspects that it was their obvious “freedom” from the “gravitational pull” of traditional harmony that prompted Kubrick to use them, rather than the originally commissioned music by Alex North, for scenes whose narrative content is far removed from earthly normality. [37] Of the film’s many such scenes, perhaps the most powerful is the “Star Gate” sequence, during which control of the astronaut’s space capsule is taken over by some unidentified force and the capsule is then transported into what seems to be some “other” dimension.

Kubrick’s *2001: A Space Odyssey* had its first showings in April of 1968; fifteen months later, at the very moment that television viewers around the world were watching the members of the Apollo 11 mission take their first steps on the surface of the moon, the film was featured in the sixth Moscow International Film Festival. [38] In March of 1972, less than three years after the United States had demonstrably won at least one round of the Space Race, audiences in Moscow and St. Petersburg witnessed the world premiere of the Soviet film *Солярис* (*Solaris*) (Tarkovsky 1972).

Directed by Andrey Tarkovsky and based on the same-titled 1961 novel by the Polish writer Stanisław Lem, *Solaris* features in its opening sequence visual images of a “planetary alignment” that are remarkably similar to those that introduce *2001: A Space Odyssey*. Also remarkably, the film’s “outer space” imagery is supported by music [39] that, like the *Atmosphères* of Györgi Ligeti that features approximately ten minutes from the end of the Kubrick film, conveys a feeling not just of weightlessness but also of timelessness.

To be sure, the linkage between cinematic depictions of flight through outer space and music that unambiguously suggests “propulsive power” or “adventure” is still very much a part of popular culture. But the fourth trope – involving “outer-space music” that suggests something more profound than mere power or adventure – also remains in circulation, although typically this trope is found only in science-fiction films whose subject matter is ultimately quite serious. Kubrick’s *2001: A Space Odyssey*, after all, is not so much a film about the future or about space travel as it is a film about the nature of human consciousness and its relationship with what might be called “a higher power”; Tarkovsky’s *Solaris* is not so much a film about individual human beings’ activities in *outer* space as it is a film about all human beings’ engagement with the deep, and ineffably cryptic, *inner* space of memory.

Conclusions

It goes without saying that explorations of human consciousness, or of human memory, or of many other aspects of what it means to be human, are not limited

to the literary or cinematic genre we call “science fiction.” The invitation to embark upon such explorations has been extended to artists of all kinds, and it has certainly not been limited to artists born of the “Space Age.”

This essay began with comments on Arnold Schoenberg’s 1908 *String Quartet No. 2*, the final movement of which is generally thought to be the first instance of what is known as atonal music, that is, music whose pitches do not “circle” around a clear tonal center, music that is not governed by the “laws of musical gravity” that pertain to most conventional music. And in this movement, readers will recall, the instruments accompany a soprano who sings a poem by Stefan George that begins with the words “Ich fühle Luft von anderem Planeten” (I feel wind from other planets).

Schoenberg’s skittish string figurations and free-floating vocal lines, of course, sound not at all like the densely packed and long-sustained tone clusters that characterize the evocatively titled *Atmosphères* by Ligeti that Kubrick used in *2001: A Space Odyssey*. Nor does Schoenberg’s music – or Ligeti’s – sound much like the alternately aggressive and plaintive “Appel interstellaire” (Interstellar Call), for solo French horn with electronic reverberation, that the French composer Olivier Messiaen included in his 1974 suite *Des canyons aux étoiles ...* (The Canyons of the Stars ...). [40] And Schoenberg’s music – and Ligeti’s and Messiaen’s – does not sound anything like the harmonically static yet rhythmically propulsive “kosmische Musik” of the sort popularized by rock groups Popol Vuh, Tangerine Dream and other representatives of the so-called Berlin School of electronic music. [41]

These various examples of “space music,” designed not for the cinema but for the concert venue, indeed seem to have little in common. But perhaps these disparate examples of “space music” share more than what first meets the ear. They obviously do not share musical content or specific musical techniques, but perhaps they share – at least in the minds of their hearers – a collection of implied images.

It is not true, despite the story’s wide circulation in the popular press, that the German composer Karlheinz Stockhausen in the last decades of his life claimed to have been born either on a planet called Sirius or on a planet that orbits the same-named star that belongs to the constellation Canis Major. [42] It is true, however, that over a long period Stockhausen created music – ranging from *Telemusik* (1966) and *Sternklang* (1971) to *Cosmic Pulses* (2007) – whose titles, at least, somehow refer to outer space. It is also true that in 1958 Stockhausen presented a lecture titled “Musik im Raum” (Music in Space). [43]

By the title of this lecture, it should be noted, Stockhausen meant not music in or from outer space, or in any way suggestive of outer space, but music that exists in earthly physical space. And in this essay Stockhausen was simply furthering the idea of “Raummusik” (space music) that had been put forth thirty years earlier by the German engineer Robert Beyer. [44] Beyer’s concept of “space music,” or

“spatial music,” had to do with the three-dimensional nature of musical performance, and this was an idea that Stockhausen brought very much to the fore in much of his instrumental and electronic music from the 1960s and 1970s.

Stockhausen certainly exploited the idea of “spatiality” in the set-up of loudspeakers he prescribed for his 1966-67 four-channel tape composition *Hymnen*. Commenting on a particular audience’s response to that piece, Stockhausen allegedly wrote:

Many listeners have projected that strange new music which they experienced – especially in the realm of electronic music – into extraterrestrial space. Even though they are not familiar with it through human experience, they identify it with the fantastic dream world. Several have commented that my electronic music sounds “like on a different star,” or “like in outer space.” Many have said that when hearing this music, they have sensations as if flying at an infinitely high speed, and then again, as if immobile in an immense space. Thus, extreme words are employed to describe such experiences, which are not “objectively” communicable in the sense of an object description, but rather which exist in the subjective fantasy and which are projected into the extraterrestrial space. (Stockhausen, quoted in Holmes 2002: 136) [45]

Excerpt from Karlheinz Stockhausen’s *Hymnen*.

It is not difficult to imagine that what Stockhausen claims to have been the reaction to *Hymnen* could also be triggered by most of the “space music” produced by Tangerine Dream et al. since the early 1970s and by most of the so-called “ambient” or New Age music that has aired, also since the early 1970s, on *Hearts of Space* and similar radio programs. [46] Likewise, it is not difficult to imagine such a reaction to Ligeti’s 1961 *Atmosphères*, and this, one suspects, is precisely why Kubrick chose the music for the climactic scene of his 1968 film. It is perhaps more difficult to imagine that reaction to Messiaen’s “Appel interstellaire” or the final movement of Schoenberg’s *String Quartet No. 2*, but this music, too, avoids “gravitational” harmony and repeated, measured rhythm. For the creative listener, even Schoenberg and Messiaen might trigger the “subjective fantasy” of being “immobile in an immense space,” or of “flying at an infinitely high speed,” or of “feeling the wind of different planets.”

From the narrow perspective of musical techniques, Edgard Varèse’s mostly instrumental composition *Déserts*, from 1950–54, has little in common with any of the compositions mentioned above. [47] From a broadly philosophical perspective, however, what Varèse had to say about *Déserts* effectively summarizes all the various themes explored in this essay on “the imagined sounds of outer space.” Varèse said of this work that it was an attempt to depict, or to reflect upon, not only physical deserts of sand, sea, mountains, and snow, [and of] *outer* space [and] deserted city streets [...] but also [deserts of] distant

inner space [...] where man is alone in a world of mystery and essential solitude (Varèse, quoted in Sitsky 2002: 533. Emphases added). [48]

Today’s scientists know quite a lot about space; they know almost nothing about the actual sounds of space, except for the apparent fact that sounds in space seem not to exist. Thus, most of us are familiar only with outer space’s imagined sounds. And for reasons that have to do simply with human nature – because space’s vast and silent “world of mystery” is such a frightening thing to contemplate – this, I think, is what most of us prefer.

[1] The translation is Judith Ryan’s (Ryan 2000: 84); a reproduction of the original 1949 text can be found in *Stil und Gedanke: Aufsätze zur Musik (1909–1950)* (Schoenberg 1992: 421).

[2] Even today, the popular press makes much of Tesla and the messages he supposedly received from other planets. For scholarly assessment of Tesla’s work, see Burgan (Burgan 2009) and Carlson (Carlson 2013).

[3] The so-called Morse Code was developed by the American painter-turned-inventor Samuel F.B. Morse in the late 1830s for the sake of making it possible to transmit messages over distances bridged by electrical wires. The code’s vocabulary consists exclusively of relatively short impulses, relatively long impulses, and the complete absence of impulses. After early experiments that attempted to “translate” the coded electrical impulses into marks cut into paper by a stylus, by the 1850s it had become common practice to convert the impulses simply into audible clicks activated by an electro-magnet on the receiving end of the transmission. In the 1890s, after the Italian inventor Guglielmo Marconi realized his idea for transmitting electrical signals via radio waves instead of via wires, common practice had the long and short impulses converted into monotone pitches sounded by an oscillator.

[4] The International Morse Code is based not on Samuel F.B. Morse’s original code but on a code developed in 1848 in Germany by Friedrich Clemens Gerke. Based on the Latin alphabet and Arabic numerals, this version of the code was standardized by the International Telegraphy Congress in 1865.

[5] The 1991 release by Kino International features three transcriptions. The 2004 release by Ruscico (i.e., the Russian Cinema Council) features no transcriptions but only the Latin alphabet text, three times, in intertitles. An unidentified version that uses the soundtrack, but not the footage, of the Ruscico release features four transcriptions, including a second transcription, but in different handwriting, in Cyrillic.

[6] Interpreted as Morse Code, the monotone rhythms heard in the Ruscico release amount to gibberish. The proper “translation” of the message into Morse Code, with short pulses represented as “dit” and long pulses represented as “dah,” would be “dit-dah, dah-dit, dah, dit-dah; dah-dah-dah, dah-dit-dit, dit, dit-dah-dit-dit, dit-dit; dit-dit-dah, dah, dit-dah,” and the rhythms in the Ruscico release do not resemble this at all. The largely compiled score for the Ruscico release features piano and orchestral music by the Russian composers Alexander Scriabin, Igor Stravinsky, and Alexander Glazunov; the composer of the film’s original music is not identified.

[7] For detailed comparisons between plot elements in the Tolstoy novel and the Protazanof film, see Telotte (Telotte 1999: 39–46); Christensen (Christensen 2000: 107–122); and Vaingurt (Vaingurt 2013: 186–195).

[8] The genre’s well-known “classics” include *Das Cabinet des Dr. Caligari* (Wiene 1920), *Dr. Jekyll and Mr. Hyde* (Robertson 1920; Marmouliau 1931), *Metropolis* (Lang 1926), *Frankenstein* (Whale 1931), *The Invisible Man* (Whale 1933), *The Bride of Frankenstein* (Whale 1935), and *Things to Come* (Menzies 1936), and there are also such films as *Just Imagine* (Butler 1930), *Doctor X* (Curtiz 1932), *Island of Lost Souls* (Kenton 1932), *Der Tunnel* (Bernhardt 1933), *F.P. 1 Doesn’t Answer* (Hartl 1933), *Mad Love* (Freund 1935), *The Devil-Doll* (Browning 1936), and *The Invisible Ray* (Hillyer 1936). For a comprehensive survey of early science-fiction films, see Telotte (Telotte 2001: 77–90).

[9] Popular literature, as one might imagine, fairly teems with books that purportedly tell the “truth” about flying saucers. In comparison, the scholarly literature on this subject is slight, and most of it sensibly deals not with Unidentified Flying Objects (UFOs) per se but rather with society’s belief in UFO phenomena. For seriously critical examinations of the interest in UFOs, see, for example, (Flammonde 1971; Stuppel and Dashti 1977; Peebles 1994; Thomas 1995; Chequers, Joseph, and Diduca 1997; and Thieme 2000).

[10] Neil Lerner (Lerner 2004: 101) notes that the five-note motif fits conveniently with the phrase “we are not alone” that figured prominently in the film’s advertisements. But this, he adds in an endnote, is “likely a coincidence” (Lerner 2004: 108).

[11] The Soviet cosmonaut Yuri Gagarin made the first-ever orbit of the earth on 12 April 1961. On 20 February 1962, the astronaut John Glenn became the first American to orbit the earth.

[12] The RCA Mark II Sound Synthesizer installed by Belar and Olson at Columbia University was funded largely by the Bell Telephone Company, and its original intended purpose was not to make music but to inexpensively create credible equivalents of “voiced” sounds that could replace the relatively expensive speech of human telephone operators.

[13] In the 1930s the German government made an effort to mass-produce an inexpensive Volkstrautionium. After this instrument’s short-lived success, work on the trautionium remained almost exclusively in the hands of the Berlin-based composer Oskar Sala, who used the instrument to provide music for many German film productions and, perhaps most famously, the various avian sounds in Alfred Hitchcock’s 1963 film *The Birds* (Hitchcock 1963). For more on the historical development of the trautionium and its use in film, see Wierzbicki (Wierzbicki 2008).

[14] The ANS Synthesizer was used, for example, by Eduard Artemiev in Mikhail Karzhukov’s 1963 *Мечте навстречу* (Toward Meeting a Dream) (Karzhukov 1963) and in Andrey Tarkovsky’s 1972 *Солярис* (Solaris) (Tarkovsky 1972); it was used by Alfred Schnittke in Konstantin Lopushansky’s futuristic and highly technological, but not other-worldly, 1989 *Посетитель музея* (A Visitor to a Museum) (Lopushansky 1989). Andrzej Markowski produced the “alien” sounds for Kurt Maetzig’s 1960 *Der schweigende Stern* (Maetzig 1960) at the electronic music studio of Spółka Akcyjna (Polish Radio) in Warsaw. A Dresden-based instrument called the Subharchord, similar in technology to the Berlin-based Trautionium, was used by Karl-Ernst Sasse to create outer-space sounds for Gottfried Kolditz’s 1970 *Signale: Ein Weltraumabenteuer* (Signal: An Outer Space Adventure) (Kolditz 1970).

[15] For the full story on the workshop, see Neibur (Neibur 2010); for a chapter on “outer-space” sounds in the studio’s early years, see Brend (Brend 2012: 73–101).

[16] Emphasis original. Chion’s book was originally published as *L’Audio-Vision* (Paris: Éditions Nathan, 1990).

[17] The resonant voice of *Forbidden Planet*’s Robbie the Robot was provided by Marvin Miller, an American radio announcer-turned-actor who, by the mid-1950s, earned his living primarily by doing “voice over” narrations. The voice of C-3PO in *Star Wars* and its first two sequels, the sound effects for which were largely the work of Ben Burtt, was provided by British actor Anthony Daniels. Numerous actors have lent their voices to the Daleks, which made their debut in a *Doctor Who* story that ran from 21 December 1963 to 1 February 1964 and which to this day remain the series’ most popular villains, but the very first Dalek voice belonged to David Graham.

[18] The brainchild of Ivan Tors and Maurice Ziv, *Science Fiction Theatre*, initially ran from April 1955 until April 1957; it was not network-produced but, rather, independently produced and syndicated to various television outlets. Syndicated again in the early 1960s, it was re-titled *Beyond the Limits*. The re-titled series should not be confused with *One Step Beyond*, an ABC-produced science-fiction series that ran from January 1959 until July 1961, or with *The Outer Limits*, another ABC series that ran from September 1963 until January 1965.

About Walter Dick, Hayes Pagel’s partner on the creation of “interplanetary sound” for *The Phantom Planet*, little is known; about Pagel, on the other hand, it is easily known that after *Science Fiction Theater* he spent most of his career working as a music editor – not a designer of sound effects – for such popular television series as *Highway Patrol*, *Lock Up*, *Bat Masterson*, *Sea Hunt*, and *Everglades*.

[19] Aired on the CBS network, the first season of *The Twilight Zone* included no less than five episodes (“The Lonely,” “And When the Sky Was Opened,” “I Shot an Arrow into the Air,” “Elegy,” and “People Are Alike All Over”) that portrayed life on asteroids or distant planets. The second

and third seasons each featured only one such episode (“The Invaders” in the second season, “The Little People” in the third season). The fourth season, during which the show was expanded from its original thirty-minute format into a sixty-minute format, featured three “interplanetary” episodes (“Death Ship,” “The Parallel,” and “On Thursday We Leave for Home”); the fifth and final season, again in the thirty-minute format, included only one episode (“Probe 7, Over and Out”) that dealt with life on other planets. For details, see Wierzbicki (Wierzbicki 2012).

[20] Leisen’s *Lady in the Dark* is based on the same-titled musical, with music by Kurt Weill and lyrics by Ira Gershwin, and a “book” by Moss Hart that opened on Broadway in 1941. The film, with an original score by Robert Dolan, retains in full only two of the Weill-Gershwin songs (“The Saga of Jenny” and “Girl of the Moment”) and makes passing reference to two others (“This Is New” and “My Ship”).

[21] These “abnormal” states of mind include the fantasies of a psychopathic murderer (*The Spiral Staircase* (Siodmak 1945)), the repressed memories of a victim of violence (*The Red House* (Daves 1947)), paranoid delusions (*The Pretender* (Wilder 1947)), the mental “tuning out” that supposedly happens when one is subjected to hypnosis (*Road to Rio* (McLeod 1947)), reactions to treatments by a doctor who calls herself a “nerve psychologist” (*Let’s Live a Little* (Wallace 1948)), terrifying nightmares (*Raw Deal* (Mann 1948)), amnesia (*Impact* (Lubin 1949)), and the “elevated” sensory state that results from using illegal drugs such as marijuana (*Wild Weed* (Newfield 1949) or opium (*Oriental Evil* (Breakston and Stahl 1951)). The composers for *The Spiral Staircase*, *The Red House*, *The Pretender*, *Road to Rio*, *Let’s Live a Little*, *Raw Deal*, *Impact*, *Wild Weed* (a.k.a. *She Shoulda Said No!*), and *Oriental Evil* were, respectively, Roy Webb, Miklós Rózsa, Paul Dessau, Robert Dolan, Werner R. Heymann, Paul Sawtell, Michael Michelet, Raoul Kraushaar, and Albert Glasser. In all of these films, as in *Spellbound* and *The Lost Weekend*, the theremin player featured on the soundtrack was Samuel Hoffman.

A podiatrist by training but a musician by calling, Hoffman purchased an RCA theremin early in the 1930s and for almost a decade performed, under the pseudonym Hal Hope, on weekends in an “electric dance band” in various nightclubs in the New York City area; in 1941 he moved to Los Angeles primarily to establish a medical practice in southern California, but he continued to perform; in 1945, when Rózsa decided to use a theremin in his score for *Spellbound* (Hitchcock 1945), Hoffman was the only “thereminist” registered with the musicians’ union. For more on Samuel Hoffman and his adventures in Hollywood, see Glinsky (Glinsky 2000: 254–55 and 279–91).

[22] In a book chapter on Grofé’s score for the film, John C. Tibbetts (Tibbetts 2010: 197) cites a letter from cinematographer Karl Struss to producer Wade Williams that confirms that the film “was made in 4–5 weeks—quickly—in order to be released prior to [the] Technicolor Color science fiction film [*Destination Moon*] produced and directed by George Pal”; the letter dates from October 1975.

[23] In the note that prefaces the published orchestral score for the *Grand Canyon Suite*, Grofé writes of the second movement:

The desert is silent and mysterious, yet beautiful. As the bright rays of the sun are reflected against majestic crags and spread across the sands in varying hues, the entire scene appears as a canvas thick with the pigments of nature’s own blending. The movement starts with a mysterious theme played by bass clarinet and viola and accompanied by weird chords in the lower registers of the orchestra. It is interrupted by strange harmonies from the woodwind and the upper register of the piano. A contrasting melody of lyric quality follows. This is succeeded by the mysterious music which opened the movement. (Grofé 1932: 2)

Likely not by coincidence, the “Painted Desert” movement of Grofé’s 1931 *Grand Canyon Suite* and his 1950 *Rocketship X-M* cue (labeled “Reel 6–Part 1”) have in common such features as a slow tempo, a triple meter, a tonal center of E, and a plodding pizzicato accompaniment. The most striking common feature, however, is the series of “weird chords” and “strange harmonies” that usually manifest themselves as four versions of the same six-note harmony iterated in an ascending or descending sequence. In clinical terms, this harmony might be described as, in the parlance originated in the 1960s by Howard Hanson, the “interval vector” $p^2m^4n^2s^4dt^2$ or, in the parlance developed in the 1970s by Allan Forte, the “pitch-class set” $\langle 1,4,2,4,2,2 \rangle$. For more on

the nomenclature, see Hanson (Hanson 1960) and Forte (Forte 1973).

[24] The idea to use the theremin in *Rocketship X-M's* extended Martian exploration scene apparently originated not with composer Grofé but with orchestrator Albert Glasser (Larson 1985: 80).

[25] Along with the already-mentioned *Der schweigende Stern* (Maetzig 1960), *Forbidden Planet* (Wilcox 1956), *The Phantom Planet* (Marshall 1951), and *Red Planet Mars* (Horner 1952), this long list might include *Abbot and Costello Go to Mars* (Lamont 1953), *Cat-Women of the Moon* (Hilton 1953), *The Lost Planet* (Bennet 1953), *Project Moonbase* (Talmadge 1953), *Devil Girl from Mars* (MacDonald 1954), *From the Earth to the Moon* (Haskin 1958), *Missile to the Moon* (Cunha 1958), *The Angry Red Planet* (Melchior 1959), *12 to the Moon* (Bradley 1960), *Планета Бурь* (Planeta Bur; Planet of Storms) (Klushantsev 1962), *Journey to the Seventh Planet* (Pink 1962), *First Men in the Moon* (Juran 1964), *Robinson Crusoe on Mars* (Haskin 1964), *Terrone nello spazio* (Planet of the Vampires) (Bava 1965), *I Criminali della Galassia* (Criminals of the Galaxy; Wild, Wild Planet) (Margheriti 1965), *Flight to a Far Planet* (Queen of Blood) (Harrington 1966), *Women of the Prehistoric Planet* (Pierce 1966), *Planet of the Apes* (Schaffner 1968), and *Voyage to the Planet of Prehistoric Women* (Bogdanovich 1968).

The Lost Planet was not a feature-length film but, rather, a fifteen-part serial released by the Columbia studio. *Voyage to the Planet of Prehistoric Women* was a low-budget adaptation of Curtis Harrington's equally low-budget 1965 *Voyage to the Prehistoric Planet*; both American films incorporate footage, but not sound, from the 1962 Soviet film *Planet of Storms*.

[26] Both *Flash Gordon* (Stephani and Taylor 1936) and *Weltraumschiff* (Kutter 1937) were serials, in thirteen and eighteen parts, respectively. The scores for Universal's *Flash Gordon* consisted of "stock" music and original material by Clifford Vaughan; the music for Bavaria Film's *Weltraumschiff* was composed by Ludwig Kusche.

[27] Columbia's *Superman* (Bennet and Carr 1948) was a fifteen-part serial, accompanied entirely by "stock" music attributable, without screen credit, to such eventually well-known composers as Mario Castelnuovo-Tedesco, Friedrich Hollaender, David Raksin, Miklós Rózsa, and William Grant Still.

[28] These films range from the quasi-documentary *Дорога к звездам* (Klushantsev 1958) and the Jules Verne-inspired *From the Earth to the Moon* (Haskin 1958) to the comic *Have Rocket, Will Travel* (Rich 1959) and the horrific *First Man into Space* (Day 1959) to such action-packed fare as *War of the Satellites* (Corman 1958), *Небо зовет* (The Heavens Call) (Karyukov 1959), *素晴らしい* (Uchû daisensô) (Honda 1959), and *Il Pianeta degli uomini spenti* (Margheriti 1961).

[29] Listen, for example, to the *Studie I* (1953) and *Studie II* (1954) that Karlheinz Stockhausen created at the Nordwestdeutscher Rundfunk studio in Cologne; the *Mutazioni* (1955) and *Momenti* (1960) that Luciano Berio created at the Studio Fonologia Musicale of RAI (Radio Audizioni Italiane) in Milan; the *Sonatine* (1955) and *Variations électroniques* (1957) that Henk Badings created at the headquarters of the Philips electronics company in Eindhoven, The Netherlands; and the *Composition for Synthesizer* (1961) that Milton Babbitt created at the Columbia-Princeton Electronic Music Center in New York.

[30] Created by writer-producer Gene Roddenberry, *Star Trek* (Roddenberry 1966–69) first aired on the NBC network from 8 September 1966 until 3 June 1969. During this initial round of episodes, now almost reverentially identified by *Star Trek* fans as "The Original Series," accompanimental music was provided not only by Alexander Courage but by a team of composers that included George Duning, Jerry Fielding, Gerald Fried, Sol Kaplan, Samuel Matlovsky, Joseph Mullendore, and Fred Steiner.

[31] *Lost in Space* (Allen 1965–68) ran on the CBS network from 15 September 1965 until 6 March 1968. For lucid commentary on Williams's contribution, see Rodman (Rodman 2012).

[32] For a condensed yet thorough account of the title themes in the various *Star Trek* television series, see Lerner (Lerner 2012); for a somewhat breezy account of the music in all manifestations of the *Star Trek* phenomena, see Bond (Bond 1999).

[33] The "adventure" trope can be heard, for example, in Christopher Franke's title music for the television series *Babylon 5* (Straczynski 1994–98), Richard Gibbs's title music for the revived *Battlestar Galactica* (Eick and Moore 2004–09), Murray Gold's title music for the revived *Doctor Who* (Davies 2005–present), and Joel Goldsmith's title music for *Stargate Universe* (Cooper and Wright 2009–11).

- [34] The eleven-day Apollo 7 mission was launched on 11 October 1968; Stanley Kubrick's *2001: A Space Odyssey* (Kubrick 1968) had its first showing, in Washington, D.C., on 2 April 1968.
- [35] See, for example, Barker and Skotak (Barker and Skotak 1994); Csicsery-Ronay, Jr. (Csicsery-Ronay, Jr. 2010); and Kaminskij (Kaminskij 2013).
- [36] For a clear account of how the various compositions by Györgi Ligeti are used in this film, see McQuiston (McQuiston 2013: 126–162).
- [37] Kubrick's decision to abandon the originally composed music by Alex North and to use, instead, pre-existing compositions by Györgi Ligeti has been the subject of much scholarly attention in recent years. See, for example, Merkley (Merkley 2007); Heimerdinger (Heimerdinger 2011); McQuiston (McQuiston 2011); and Matias (Matias 2013).
- [38] The Moscow film festival transpired from 7–22 July 1969; the Apollo 11 mission landed on the moon on 20 July 1969.
- [39] The music for *Solaris* (Tarkovsky 1972) is by Tarkovsky's long-time collaborator Eduard Artemyev, and much of it utilized the ANS synthesizer.
- [40] "Appel interstellaire" was composed in 1971, a year before Messiaen began to think about a piece reflective of the natural beauties of Bryce Canyon in the American state of Utah. It was written as a memorial for the young French composer Jean-Pierre Guézec; appropriately, the score is prefaced by a pair of epigrams, one of which—from Psalm 147—sheds light on the piece's title: "C'est Lui qui sait la nombre des étoiles, appellant chacune par son nom" (It is He who determines the number of the stars, and calls each of them by name). For more on "Appel interstellaire" and *Des canyons aus étoiles ...*, see Griffiths (Griffiths 1985: 225–234).
- [41] The Berlin School and its characteristic sound, curiously, get little attention in the scholarly literature. For an example of what little commentary exists on the popularity of "space music" and "progressive rock" in general, see Holm-Hudson (Holm-Hudson 2005); for an overview of the Berlin School in particular, see Prendergast (Prendergast 2001: 278–306).
- [42] The story originated with an interview in the early 1970s when Stockhausen, who had recently completed his 1971 *Sternklang* (Star Sound), an "outdoor" piece for five groups of four performers each, bought a dog for his daughter Julika and named it Sirius. Shortly thereafter, he informed the Italian writer Mya Tannenbaum, he came across a mention of the star Sirius in a book by Jakob Lorner, and this stirred his imagination. He said: "Other snippets of vitally important information then came to me through a couple of revelatory dreams. Crazy dreams, from which it emerged that not only did I come from Sirius itself, but that, in fact, I completed my musical education there" (Tannenbaum 1987: 34–35).
- [43] The lecture was presented at the Internationale Ferienkurse für Neue Musik in Darmstadt, West Germany, and in 1959 it was published in *Die Reihe* 5: 67–72. In 1961 the entirety of that particular issue of *Die Reihe* was translated into English, with Stockhausen's essay (translated by Ruth Koenig, and titled "Music in Space") appearing on pp. 67–82. The original German text is reprinted in Stockhausen (Stockhausen 1963: 152–175).
- [44] See Beyer (Beyer 1928). The title of Beyer's essay – "Das Problem der 'kommenden Musik'" – might be translated as "the problem with the 'emerging music'."
- [45] These perhaps problematic words, which are often quoted in part or in whole on non-reviewed Internet pages having to do with "space music," appear only in the 2002 edition of Holmes's book. They are not to be found in, for example, Holmes's *Electronic and Experimental Music: History, Instruments, Technique, Performers, Recordings* (New York: Charles Scribner's Sons, 1985), in his *Electronic and Experimental Music: Technology, Music, and Culture* (New York and London: Routledge, 2008), or in his *Electronic and Experimental Music: A History of New Technology* (New York and London: Routledge, 2009). In any case, in the 2002 version of Holmes's book the words of Stockhausen are attributed to a set of liner notes for a recording of *Hymnen* that – obviously incorrectly – is said to date from 1959.
- [46] Created and hosted by Stephen Hill in 1973 as a weekly three-hour program for San Francisco FM radio station KPFA, *Hearts of Space* as a one-hour program has been airing on the National Public Radio network since 1983. Similar programs are *Star's End* (broadcast in Philadelphia since 1976), *Musical Starstreams* (broadcast in San Francisco since 1981), and *Ultima Thule Ambient Music* (broadcast in Australia since 1989).
- [47] Along with electronic music recorded on magnetic tape, *Déserts* calls for fourteen brass and woodwind players, five percussionists, and one pianist.
- [48] Varèse's comments first appeared in Georges Charbonnier, *Entretiens avec Edgard Varèse*

(Charbonnier 1970: 156). Although not so specified, the translation offered here is presumably Sitsky's.

A rather different translation can be found in Griffiths (Griffiths 2011: 140). As Griffiths translates the conversation with Charbonnier, Varèse said that *Déserts* concerned “all those [deserts] that people traverse or may traverse: *physical* deserts, on the earth, in the sea, in the sky, of sand, of snow, of interstellar spaces or of great cities, but also those [deserts] of the human *spirit*, of that distant *inner* space no telescope can reach, where one is alone.” The emphases in this case, presumably, are Griffiths's.

Bibliography

Adorno, Theodor W. (1973). *Philosophy of Modern Music* (trans. Anne G. Mitchell and Wesley V. Blomster). New York: Seabury Press.

Barker, Lynn, and Robert Skotak (1994). “Klushantsev: Russia's Wizard of Fantastika.” *American Cinematographer* 75/6–7: 78–83.

Beyer, Robert (1928). “Das Problem der ‘kommenden Musik’.” *Die Musik* 20/12: 861–866.

Bond, Jeff (1999). *The Music of ‘Star Trek’*. Los Angeles: Lone Eagle Press.

Bouzereau, Laurent (1998). *The Making of ‘Close Encounters of the Third Kind’* [DVD]. Burbank: Columbia TriStar Home Entertainment.

Brend, Mark (2012). *The Sound of Tomorrow: How Electronic Music Was Smuggled into the Mainstream*. London: Bloomsbury.

Burgan, Michael (2009). *Nikola Tesla: Physicist, Inventor, Electrical Engineer*. Mankato, MN: Compass Point Books.

Carlson, W. Bernard (2013). *Tesla: Inventor of the Electrical Age*. Princeton: Princeton University Press.

Charbonnier, Georges (1970). *Entretiens avec Edgard Varèse*. Paris: Belfond.

Chequers, James, Stephen Joseph and Debbie Diduca (1997). “Belief in Extraterrestrial Life, UFO-related Beliefs, and Schizotypal Personality.” *Personality and Individual Differences* 23/3: 519–521.

Chion, Michel (1994). *Audio-Vision: Sound on Screen* (trans. Claudia Gorbman). New York: Columbia University Press.

Christensen, Peter G. (2000). “Women as Princesses or Comrades: Ambivalence in Yakov Protazanov's *Aelita* (1924).” *New Zealand Slavonic Journal*: 107–122.

Christensen, Thomas (1993). *Rameau and Musical Thought in the Enlightenment*. Cambridge: Cambridge University Press.

Csicsery-Ronay, Istvan Jr. (2010). "DEFA's Floating Islands" (a review of the DVD set *The DEFA Sci-Fi Collection*). *Science Fiction Film and Television* 31: 121–130.

Flammonde, Paris (1971). *The Age of Flying Saucers: Notes on a Projected History of Unidentified Flying Objects*. New York: Hawthorn Books.

Forte, Allen (1973). *The Structure of Atonal Music*. New Haven: Yale University Press.

Forte, Allen (1981). "The Magical Kaleidoscope: Schoenberg's First Atonal Masterwork, Opus 11, Number 1." *Journal of the Arnold Schoenberg Institute* 5/2: 127–168.

Glinsky, Albert (2000). *Theremin: Ether Music and Espionage*. Urbana: University of Illinois Press.

Griffiths, Paul (1985). *Olivier Messiaen and the Music of Time*. Ithaca: Cornell University Press.

Griffiths, Paul (2011). *Modern Music and After*. Third edition. New York: Oxford University Press.

Grofé, Ferde (1932). *Grand Canyon Suite*. Miami, FL: Belwin Inc..

Hanson, Howard (1960). *Harmonic Materials of Modern Music: Resources of the Tempered Scale*. New York: Appleton-Century-Crofts.

Heimerdinger, Julia (2011). "I Have Been Compromised. I Am Now Fighting against It': Ligeti vs. Kubrick and the Music for *2001: A Space Odyssey*." *Journal of Film Music* 3/2: 127–143.

Holmes, Thom (2002). *Electronic and Experimental Music: Foundations of New Music and New Listening*. London: Routledge.

Holm-Hudson, Kevin (2005). "'Come Sail Away' and the Commodification of 'Prog Lite.'" *American Music* 23/3: 377–394.

Kaminskij, Konstantin (2013). "The Voices of the Cosmos: Electronic Synthesis of Special Sound Effects in Soviet vs. American Science Fiction Movies from Sputnik 1 to Apollo 6." In Dmitri Zakharine and Nils Meise (eds.), *Electrified Voices: Medial, Socio-Historical and Cultural Aspects of Voice Transfer* (trans. David A. Brenner) (pp. 273–290). Gottingen: Vandenhoeck & Ruprecht.

Keller, Hans (1974). "Schoenberg: The Future of Symphonic Thought." *Perspectives of New Music* 13/1: 3–20.

Larson, Randall (1985). *Musique Fantastique: A Survey of Film Music in the Fantastic Cinema*. Metuchen, N.J.: Scarecrow Press.

Lerner, Neil (2004). "Nostalgia, Masculinist Discourse and Authoritarianism in John Williams's Scores for *Star Wars* and *Close Encounters of the Third Kind*." In Philip Hayward (ed.), *Off the Planet: Music, Sound and Science Fiction Cinema* (pp. 96–108). Eastleigh: John Libbey.

Lerner, Neil (2012). "Hearing the Boldly Goings: Tracking the Title Themes of the *Star Trek* Television Franchise, 1966–2005." In K.J. Donnelly and Philip Hayward (eds.), *Music in Science Fiction Television: Tuned to the Future* (pp. 52–71). New York: Routledge.

Matias, Natalie (2013). "Scoring Kubrick's *2001: A Space Odyssey*: A Comparative Analysis of Györgi Ligeti and Alex North, as Their Music Would Appear in the Film." Paper presented at the Music and the Moving Image Conference, New York.

McQuiston, Kate (2011). "'An Effort to Decide': More Research into Kubrick's Music Choices for *2001: A Space Odyssey*." *Journal of Film Music* 3/2: 145–154.

McQuiston, Kate (2013). *We'll Meet Again: Musical Design in the Films of Stanley Kubrick*. New York: Oxford University Press.

Merkley, Paul (2007). "'Stanley Hates This But I Like It!': North vs. Kubrick on the Music for *2001: A Space Odyssey*." *Journal of Film Music* 2/1: 1–34.

Meyerowitz, Jan (1967). *Arnold Schönberg*. Berlin: Colloquium.

Neibur, Louis (2010). *Special Sound: The Creation and Legacy of the BBC Radiophonic Workshop*. Oxford: Oxford University Press.

Peebles, Curtis (1994). *Watch the Skies!: A Chronicle of the Flying Saucer Myth*. Washington, D.C.: Smithsonian Institution Press.

Prendergast, Mark (2001). *The Ambient Century: From Mahler to Moby—The Evolution of Sound in the Electronic Age*. New York: Bloomsbury.

Rodman, Ron (2012). "John Williams's Music to *Lost in Space*: The Monumental, the Profound, and the Hyperbolic." In K.J. Donnelly and Philip Hayward (eds.), *Music in Science Fiction Television: Tuned to the Future* (pp. 34–51). New York: Routledge, 2012.

Ryan, Judith (2000). "Ich fühle Luft von anderem Planeten': Schoenberg Reads George." In Reinhold Brinkmann and Christoph Wolff (eds.), *Music of My Future: The Schoenberg Quartets and Trio* (pp. 81–93). Cambridge, MA: Harvard University Press.

Sagan, Carl (1985). *Contact*. New York: Simon & Schuster.

Schoenberg, Arnold (1992). "Bemerkungen zu den vier Streichquartetten." In Ivan Vojtech (ed.), *Stil und Gedanke: Aufsätze zur Musik (1909–1950)* (pp. 409–436). Frankfurt: S. Fischer.

Simms, Bryan (2000). *The Atonal Music of Arnold Schoenberg, 1908–1923*. New York: Oxford University Press.

Simms, Bryan (2003). "My Dear Herzerl': Self-Representation in Schoenberg's String Quartet No. 2." *19th-Century Music* 26/3: 258–277.

Sitsky, Larry (2002). *Music of the Twentieth-Century Avant-Garde: A Biocritical Sourcebook*. Westport, CT: Greenwood Press.

Stockhausen, Karlheinz (1963). *Text zur elektronischen und instrumentalen Musik*. Köln: DuMont Schauberg.

Stupple, David, and Abdollah Dashti (1977). "Flying Saucers and Multiple Realities: A Case Study in Phenomenological Theory." *The Journal of Popular Culture* 11/2: 479–493.

Tannenbaum, Mya (1987). *Conversations with Stockhausen* (trans. David Butchart). New York: Oxford University Press.

Telotte, J.P. (1999). *A Distant Technology: Science Fiction Film and the Machine Age*. Middleton, Connecticut: Wesleyan University Press.

Telotte, J.P. (2001). *Science Fiction Film*. Cambridge: Cambridge University Press.

Tesla, Nikola (1901). "Talking with the Planets." *Collier's Weekly*, 19 February: 4–5.

Thieme, Richard (2000). "Stalking the UFO Meme." In Barbara M. Kennedy and David Bell (eds.), *The Cybercultures Reader* (pp. 230–236). New York: Routledge.

Thomas, Dave (1995). "The Roswell Incident and Project Mogul." *Skeptical Inquirer* 19/4: 15–18.

Tibbetts, John C. (2010). "Rocketship X-M: The Sounds of a Martian Breeze." In

Matthew J. Bartkowiak (ed.), *Sounds of the Future: Essays on Music in Science Fiction Film* (pp. 194–209). Jefferson, N.C.: McFarland and Co..

Vaingurt, Julia (2013). *Wonderlands of the Avant-Garde: Technology and the Arts in Russia of the 1920s*. Evanston: Northwestern University Press.

Verne, Jules (1899). *All Around the Moon* (trans. Edward Roth). New York: David McKay Co..

Wells, H.G. (1901). *The First Men in the Moon*. London: George Newnes, Ltd..

Wierzbicki, James (2002). “Weird Vibrations: How the Theremin Gave Musical Voice to Hollywood’s Extraterrestrial Others.” *Journal of Popular Film and Television* 30/3: 125–135.

Wierzbicki, James (2005). *Louis and Bebe Barron’s Forbidden Planet: A Film Score Guide*. Lanham, MD: Scarecrow Press.

Wierzbicki, James (2008). “Shrieks, Flutters, and Vocal Curtains: Electronic Sound/Electronic Music in Hitchcock’s *The Birds*.” *Music and the Moving Image* 1/2: 10–36.

Wierzbicki, James (2012). “Music in *The Twilight Zone*.” In Kevin Donnelly and Philip Hayward (eds.), *Tuned to the Future: Music in Science Fiction Film and Television* (pp. 1–13). London: Routledge.

Filmography

Allen, Irwin (Producer). (1965–68). *Lost in Space* [Television series]. USA: CBS.

Arnold, Jack (Director). (1953). *It Came from Outer Space* [Motion picture]. USA: Universal.

Bava, Mario (Director). (1965). *Terrore nello spazio* (Planet of the Vampires) [Motion picture]. Italy: Castilla Cooperativa Cinematográfica, et al.

Bennet, Spencer Gordon, and Thomas Carr (Directors). (1948). *Superman* [Motion picture]. USA: Columbia.

Bennet, Spencer Gordon (Director). *The Lost Planet* [Motion picture]. USA: Columbia.

Bernhardt, Curtis (Director). (1933). *Der Tunnel* [Motion picture]. Germany: Vandor Film, Bavaria-Filmkunst, et al.

Bogdanovich, Peter (Director). (1968). *Voyage to the Planet of Prehistoric Women* [Motion picture]. USA: Filmgroup, Roger Corman Productions, et al.

Bradley, David (Director). (1960). *12 to the Moon* [Motion Picture]. USA: Columbia.

Breakston, George P., and C. Ray Stahl (Directors). (1951). *Oriental Evil* [Motion Picture]. USA: Breakston-Stahl Productions.

Browning, Tod (Director). (1936). *The Devil-Doll* [Motion picture]. USA: MGM.

Butler, David (Director). (1930). *Just Imagine* [Motion picture]. USA: Fox.

Cahn, Edward L. (Director). (1957). *Invasion of the Saucer Men* [Motion picture]. USA: Malibu Productions.

Cooper, Robert C., and Brad Wright (Writers). (2009–11). *Stargate Universe* [Television series]. USA: The Sci-Fi Channel.

Corman, Roger (Director). (1956). *It Conquered the World* [Motion picture]. USA: Sunset Productions.

Corman, Roger (Director). (1958). *War of the Satellites* [Motion picture]. USA: Allied Artists.

Cunha, Richard E. (Director). (1958). *Missile to the Moon* [Motion picture]. USA: Layton Film Productions.

Curtiz, Michael (Director). (1932). *Doctor X* [Motion picture]. USA: First National Pictures.

Daves, Delmar (Director). (1947). *The Red House* [Motion picture]. USA: Sol Lesser Productions.

Davies, Russel T. (Producer). (2005–present). *Doctor Who* [Television series]. UK: BBC.

Day, Robert (Director). (1959). *First Man into Space (Satellite of Blood)* [Motion picture]. UK: MGM British.

Eick, David, and Ronald D. Moore (Producers). (2004–09). *Battlestar Galactica* [Television series]. USA: The Sci-Fi Channel.

Freund, Karl (Director). (1935). *Mad Love* [Motion picture]. USA: MGM.

Harrington, Curtis (Director). (1966). *Flight to a Far Planet (Queen of Blood)* [Motion Picture]. USA: MGM.

Hartl, Karl (Director). (1933). *F.P. 1 Doesn't Answer* [Motion Picture]. UK: Gaumont British.

Haskin, Byron (Director). (1958). *From the Earth to the Moon* [Motion picture]. USA: Waverly Productions.

Haskin, Byron (Director). (1964). *Robinson Crusoe on Mars* [Motion picture]. USA: Aubrey Schenck Productions.

Hillyer, Lambert (Director). (1936). *The Invisible Ray* [Motion picture]. USA: Universal.

Hilton, Arthur (Director). (1953). *Cat-Women of the Moon* [Motion picture]. USA: Z-M Productions.

Hitchcock, Alfred (Director). (1945). *Spellbound* [Motion picture]. USA: Selznick International Pictures.

Hitchcock, Alfred (Director). (1963). *The Birds* [Motion picture]. USA: Alfred J. Hitchcock Productions.

Honda, Ishirō (Director). (1959). *素晴らしい (Uchû daisensô; Battle in Outer Space; The Great Space War)* [Motion picture]. Japan: Toho Company.

Horner, Harry (Director). (1952). *Red Planet Mars* [Motion picture]. USA: Melaby Pictures Corporation.

Juran, Nathan (Director). (1958). *Attack of the 50 Foot Woman* [Motion picture]. USA: Woolner Brothers Pictures.

Juran, Nathan (Director). (1964). *First Men in the Moon* [Motion picture]. UK: Ameran Films.

Karyukov, Mikhail (Director). (1959). *Небо зовет (The Heavens Call; Battle Beyond the Sun)* [Motion picture]. USSA: A.P. Dovzenko Filmstudio.

Karzhukov, Mikhail (Director). (1963). *Мечте навстречу (Toward Meeting a Dream; Encounter in Space)* [Motion picture]. USSR: Odessa Studios.

Kenton, Erle C. (Director). (1932). *Island of Lost Souls* [Motion Picture]. USA: Paramount.

Klushantzev, Pavel (Director). (1958). *Дорога к звёздам (The Road to the Stars)* [Motion picture]. USSR: Leningrad Popular Science Film Studio.

Klushantzev, Pavel (Director). (1962). *Планета Бурь (Planeta Bur; Planet of*

- Storms) [Motion picture]. USSR: Leningrad Popular Science Film Studio.
- Kolditz, Gottfried (Director). (1970). *Signale: Ein Weltraumabenteurer* (Signal: An Outer Space Adventure) [Motion picture]. East Germany: VEB DEFA-Studio für Spielfilme et al.
- Kubrick, Stanley (Director). (1968). *2001: A Space Odyssey* [Motion picture]. USA: MGM.
- Kutter, Anton (Director). (1937). *Weltraumschiff* (Space Ship) [Motion picture]. Germany: Bavaria Film.
- Lamont, Charles (Director). (1953). *Abbott and Costello Go to Mars* [Motion picture]. USA: Universal.
- Lang, Fritz (Director). (1927). *Metropolis* [Motion picture]. Germany: Universum Film.
- Lang, Fritz (Director). (1929). *Frau im Mond* (Woman in the Moon) [Motion picture]. Germany: Fritz Lang-Film, Universum Film, et al.
- Larson, Glen A. (Producer). (1978–79). *Battlestar Galactica* [Television series]. USA: ABC.
- Leisen, Mitchell (Director). (1944). *Lady in the Dark* [Motion picture]. USA: Paramount.
- Lopushansky, Konstantin (Director). (1989). *Посетитель музея* (A Visitor to a Museum) [Motion picture]. USSR: CSM Productions, Goskino, et al.
- Lubin, Arthur (Director). (1949). *Impact* [Motion picture]. USA: Cardinal Pictures.
- Lucas, George (Director). (1977). *Star Wars* [Motion picture]. USA: Lucasfilm.
- Maetzig, Kurt (Director). (1960). *Der schweigende Stern* (The Silent Star; First Spaceship on Venus) [Motion picture]. East German/Poland: VEB DEFA-Studio für Spielfilme.
- Mann, Anthony (Director). (1948). *Raw Deal* [Motion picture]. USA: Edward Small Productions.
- Margheriti, Antonio (Director). (1965). *I Criminali della Galassia* (Criminals of the Galaxy; Wild, Wild Planet) [Motion picture]. Italy: Mercury Film International, Southern Cross Feature Film Company.
- Margheriti, Antonio (Director). (1961). *Il Pianeta degli uomini spenti* (The Planet

of Extinct Men; Battle of the Worlds) [Motion picture]. Italy: Sicilia Cinematográfica et al.

Marmouliau, Rouben (Director). (1931). *Dr. Jekyll and Mr. Hyde* [Motion picture]. USA: Paramount.

Marshall, William (Director). (1961). *The Phantom Planet* [Motion picture]. USA: Four Crown Productions.

MacDonald, David (Director). (1954). *Devil Girl from Mars* [Motion picture]. UK: Danziger Productions.

McLeod, Norman Z. (Director). (1947). *The Road to Rio* [Motion picture]. USA: Paramount.

Melchior, Ib (Director). (1959). *The Angry Red Planet* [Motion picture]. USA: American International Pictures.

Méliès, Georges (Director). (1902). *Le Voyage dans la Lune* (A Trip to the Moon) [Motion picture]. France: Star-Film.

Menzies, William Cameron (Director). (1936). *Things to Come* [Motion picture]. UK: London Film Productions.

Neumann, Kurt (Director). (1950). *Rocketship X-M* [Motion picture]. USA: Lippert Pictures.

Newfield, Sam (Director). (1949). *Wild Weed* [Motion Picture]. USA: Roadshow Attractions.

Nyby, Christian (Director). (1951). *The Thing from Another World* [Motion picture]. USA: Winchester Pictures.

Pierce, Arthur C. (Director). (1966). *Women of the Prehistoric Planet* [Motion picture]. USA: Standard Club of California Productions.

Pink, Sidney W. (Director). (1962). *Journey to the Seventh Planet* [Motion picture]. USA and Denmark: Cinemagic.

Polák, Jindřich (Director). (1963). *Ikárie XB-1* (Icarus XB-1; Voyage to the End of the Universe) [Motion picture]. Czechoslovakia: Filmové studio Barrandov.

Protazanof, Yakov (Director). (1924). *Аэлита* (Aelita, or Aelita: Queen of Mars) [Motion picture]. Soviet Union: Mezhrabpom-Rus, Ruscico, et al.

Rich, David Lowell (Director). (1959). *Have Rocket, Will Travel* [Motion Picture]. USA: Columbia.

Robertson, John S. (Director). (1920). *Dr. Jekyll and Mr. Hyde* [Motion picture]. USA: Famous Players-Lasky Corporation.

Roddenberry, Gene (Screenwriter). (1966--69). *Star Trek* (Television series). USA: Desilu Productions.

Schaffner, Franklin J. (Director). (1968). *Planet of the Apes* [Motion picture]. USA: Twentieth Century-Fox, APJAC Productions, et al.

Sears, Fred F. (Director). (1956). *Earth vs. the Flying Saucers* [Motion picture]. USA: Clover Productions.

Siodmak, Robert (Director). (1945). *The Spiral Staircase* [Motion picture]. USA: RKO.

Spielberg, Steven (Director). (1977). *Close Encounters of the Third Kind* [Motion picture]. USA: Columbia.

Stephani, Frederick, and Ray Taylor (Directors). (1936). *Flash Gordon* [Motion picture]. USA: Universal.

Straczynski, J. Michael (Writer). (1994-98). *Babylon 5* [Television series]. USA: Prime Time Entertainment Network.

Talmadge, Richard (Director). (1953). *Project Moonbase* [Motion picture]. USA: Galaxy Pictures.

Tarkovsky, Andrey (Director). (1972). *Солярис* (Solaris) [Motion picture]. USSR: Mosfilm.

Wallace, Richard (Director). (1948) *Let's Live a Little* [Motion picture]. USA: United California Productions Inc.

Whale, James (Director). (1931). *Frankenstein* [Motion picture]. USA: Universal.

Whale, James (Director). (1933). *The Invisible Man* [Motion picture]. USA: Universal.

Whale, James (Director). (1935). *The Bride of Frankenstein* [Motion picture]. USA: Universal.

Wiene, Robert (Director). (1920). *Das Cabinet des Dr. Caligari* [Motion picture]. Germany: Decla-Bioscop AG.

Wilcox, Fred (Director). (1956). *Forbidden Planet* [Motion picture]. USA: MGM.

Wilder, Billy (Director). (1945). *The Lost Weekend* [Motion picture]. USA: Paramount.

Wilder, William Lee (Director). (1947). *The Pretender* [Motion picture]. USA: W. Lee Wilder Productions.

Wise, Robert (Director). (1951). *The Day the Earth Stood Still* [Motion picture]. USA: Twentieth Century-Fox.

Zemeckis, Robert (Director). (1997). *Contact* [Motion picture]. USA: Warner Bros.

Abstract

This essay explores how the idea of the ‘sounds of space’ has been articulated in popular culture since the late nineteenth century through the early years of the Space Age. The primary focus is on sound and music in science-fiction films from Europe, the former Soviet Union, and the United States, and the four main topic areas are the sounds of signals from space, the sounds of outer-space technology, the sounds of ‘heavenly bodies,’ and the sounds/music associated with space travel. Framing this central portion of the essay, however, is a discussion of ‘space music’ by various composers for whom writing for the cinema was perhaps one of the furthest things from their minds. The essay argues that, in terms of depictions of weightlessness, perhaps certain works by composers Arnold Schoenberg and Edgard Varèse, and by the rock groups Popol Vuh and Tangerine Dream, have something in common with the music of sci-fi cinema.

James Wierzbicki is a Senior Lecturer in musicology at the University of Sydney. Before taking up this post, he taught in the United States at the University of Michigan and the University of California-Irvine, and for more than twenty years he was chief classical music critic for the *St. Louis Post-Dispatch* and other large American newspapers. Along with exploring questions of modernity and the postmodern, his research focuses on twentieth-century music in general and film music in particular. His articles have appeared in *Beethoven Forum*, *Music and the Moving Image*, *Opera Quarterly*, *Perspectives of New Music*, the *Journal of the American Musicological Society*, and *Musical Quarterly*; his books include a monograph on the electronic score for the 1956 film *Forbidden Planet* (Scarecrow Press, 2005), *Film Music: A History* (Routledge, 2009), and *Elliott Carter* (University of Illinois Press, 2011). Wierzbicki’s recently completed large project is a study of the full range of American music in The Fifties, regarded through such societal ‘filters’ as post-war technology, the Arms Race, the Red Scare, race relations, and sexual politics.

