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## Astronomy and Music

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## Astronomy and Music

by Weien Wang

(Honors Earth Science 1124)

The Assignment: Listen to music which references astronomical imagery. Did the musician use the science correctly? Can you draw any astronomical conclusions from it? What image were they trying to convey? Did it work for you?

*“...the morning stars sang together  
and all the angels shouted for joy...” (Job 38:7)*

Composer and master of the tone poem musical form Richard Strauss claimed that he could specifically describe a knife and a fork using music (with some even quoting him as saying that he could musically depict the journey of a fork from one side of a plate to the other) (Wu, par. 4). Apparently, a sensitive listener could determine the very hair color of some of the romantic partners of Don Juan in Strauss' symphonic poem of the same name, simply by the sound of the music alone. While this seems absurd or at least, an exaggeration of his composing skills, there is certainly no limit of composers and performers who have found that music can, even without words, express everything from emotion to seasons to magic to America to fossils. And countless composers and performers have found the bright, faraway celestial objects of the night (or day) sky highly “musigenic,” whether or not they have chosen to use words to create such music.

On one hand of the variety of music referencing astronomical objects, we have the narrative “program music” of classical music tradition (but not necessarily the Classical music era), while on the other hand we have the similarly broad category of what might be called “popular music,” which dates anywhere from the mid-19th century to the present. To use an abstract system of categorization, these two groupings can also be separated into pieces that have or do not have lyrics, and to further divide these sets, a piece of music can finally be judged as to how related to astronomy it actually is. The basis for creating such a complicated tree of categorization lies in the extremely substantial variety of music and, consequently, of “astronomical music” that has been written.

To begin with, we have the selection of music from the classical tradition. In overview, most works dealing with or alluding to subjects from astronomy from this time period did so very specifically and most often without words (works using words would be limited to songs from operas or other vocal works). Most famous of the astronomical pieces is Gustave Holst's orchestral suite *The Planets* (Holst). Meant to be a series of “mood pictures” as opposed to referencing astrology or astronomy specifically (though admittedly, Holst is known to have used Alan Leo's book, *What Is A Horoscope* as a guide), it is difficult to settle on the work's portrayal as particularly “correct” or not, either to astronomy or astrology. However, we can examine the movements of *The Planets* and see how exactly Holst attempted to capture, regardless of how vaguely, the mood of each planet; possibly, the composer might have been able to depict the planets with greater scientific accuracy than could the astrological authorities of the time, whether by chance or intuition. To test this speculation, we can scrutinize one of the movements as an example.

Holst's “Mars” is ferocious, march-like, and at times, blaring. Characterized by its unsettling 5/4 meter, it wields blatant dissonance and a somewhat inhuman, vertiginous fast march. Exhibiting some interesting features like sudden swells in volume and the rare *col legno* technique (in which the bowed strings strike the strings of the instrument with the wood of the bow rather than the hair), there is little question as to why this piece is the most famous of the seven Planets (and, consequently, the

most famous of all of Holst's works). But how does this musical picture match up with science and mythology? The full name of this first movement of *The Planets* is actually "Mars, the Bringer of War," which refers to the Roman god of war, who, as he became identified with the Greek god of battle Ares, also became associated with battle and war. In astronomy, the planet Mars is distinguished by its reddish appearance (earning it the title, "The Red Planet" and "Fire Star" in some cultures), two oddly-shaped moons, and its proximity to the earth (coupled with a maximum brightness bested only by Venus). But even with the astronomical, mythological, and musical aspects of this entity in mind, it is difficult to compare the traits with much confidence; the *col legno* and *timpani* drumbeat do clearly designate warlike themes, though the beat seems to be faster than a regular march. This feeling is bolstered by the many fanfares and rises in musical "heat" mixed into the composition, along with some very satisfyingly heroic moments which, unfortunately, tend to be subsequently doused down by equally disconcerting drops of spirits. From a purely astrological viewpoint, however, one could hypothesize that much of the "mood painting" done here actually draws more from the unique and prevailing redness of Mars: the color red itself is used culturally to indicate things like danger, emergency, evil, blood, and even martial law, and thus it could be argued that the iron (III) oxide on the surface of Mars could have been the main inspiration for Holst's motifs in the movement. This would be a bold argument, though.

Moving onto other works from the same period, there is one other well-known work about a planet. This work is Mozart's *Symphony* No. 41 in C-major, which is also known as (the) Jupiter (Mozart). Unfortunately, the title "Jupiter" was not given by Mozart, but was rather a nickname possibly given by a Johann Peter Salomon, who made an arrangement of the work for piano. On the bright side, the *Symphony* indeed carries a majestic, Olympian flair, with bold themes and remarkable subject treatment. Noted as Mozart's last symphony, this impressive subject treatment culminates in the fourth and final movement with a concluding five-theme fugue. With these things in mind, the 40th symphony fits considerably well under the name of the bright, gigantic, and Great Red Spot-sporting planet Jupiter.

A number of classical works also exist in reference to the moon. Including some more well-known pieces like Beethoven's "Moonlight Sonata" and Debussy's "Au Clair de Lune" (Beethoven; Debussy), they cannot be generalized into just one group due to their subject matter, though the two examples mentioned here are both works for the piano. Another famous work regarding the moon, this time with "lyrics" of sorts (and one of the few of this kind) is Antonin Dvorak's "Song to the Moon" (or, "O Silver Moon"), an aria from his opera, *Rusalka* (Dvorak). In this work, water-princess Rusalka asks the moon to be her messenger and tell the human Prince of her love. She sings:

*O, moon high up in the deep, deep sky,  
Your light sees far away regions,  
You travel round the wide, wide world  
Peering into human dwellings...*

Here, the moon is personalized as a being who sees and is seen by all, and who might speak on her behalf to this prince. While not a wholly scientific request (one Joshua-reminiscent line reads, "O, moon stand still for a while"), it is still a romantic and deeply poetic one. Which brings us to our next question: how well can or does popular music capture the scientific essence of astronomical objects, whether or not the pieces have lyrics?

To consider this uncertainty fully, the motives of "astronomical songwriting" beg to be studied. It seems that some pieces may come to exist as homage to the particular entity chosen, portraying the object through an artful marriage of music and lyrics. However, more often the celestial object appears to be more of an inspirational tool, which can release the songwriter's emotions (and likely affecting the recipients' as well) through a muse about which comparatively

little is known—which is why someone might be more likely to write about a mysterious spider web, apple seed, or cloud, rather than, say, a relatively less enigmatic scrap of beef jerky (though it is not at all the writer’s intention to demean the charisma of a bite of good jerky). Assuming that this theory is correct, the beings of outer space—particularly the somewhat familiar but still faraway sun and the moon—serve perfectly as hosts for vague, yet powerful musical works. And the sun and moon are certainly the namesakes of numerous pieces of popular music.

The variation that exists at this point revolves around the level of involvement and depth to which the astronomical reference is used. One might suppose that the properties of the “program music” of classical music extend to modern popular music pieces, and in many ways this proves to be true. Wordless music still has to express its meaning using just musical notes and the method in which the notes are executed, and this is demonstrated in some dazzling works like “Death of Neptune,” from television serial *The Sailor Moon*, which exhibits gaseous, cool tone qualities balanced with a rhythmic, almost circular pulsation played by a pad of strings. Danny Elfman’s “Moon Dance” also lives up to its title simply by instrument choice, featuring quietly plucked strings, an “ooh-ing” female choir, and light bells (Elfman). These two pieces, however, are much less specific in how they reference Neptune or the moon, respectively; at least, when compared to Don M’s “Cassini’s Theme,” which, as the composer notes, “celebrates the Cassini-Huygens space mission now currently studying Saturn and its moons” (Don M). The different parts of the musical piece are said to describe, in this order, the construction of the spacecraft, its use of nuclear fuel and the controversy surrounding that use, and finally, the launch of Cassini. Lyrics or not, Cassini’s “Theme” is a rarity among its peers.

There is at least one last grouping of music which references astronomical imagery, and that is popular music that has lyrics. After browsing a sample of nearly two dozen of such musical pieces, it became quite clear that their handling of astronomical nuances varied widely, from songs which very intimately correlated strong emotions with repeated references to the celestial object(s) of choice, to songs that may have been titled something like “Intergalactic” (i.e. the piece by Beastie Boys) but treated the actual astronomical topic as just another word that rhymed with the rest of the rap. This latter sect of songs can generally be understood as ultimately having almost nothing to do with even the nuances of the astral subjects; pieces titled “Shadow On the Sun” (Audioslave), “Dead Stars Still Burn” (Covenant), and “Life On Mars” (David Bowie) each contained only one distinct line dealing with the title, that being the title itself repeated throughout the song.

On the bright side, many other songs with more or less astronomical titles indeed did reference the title object in a more or less significant way. On the less relevant end of the spectrum, the celestial object tended to carry little meaning and rarely had light shed on its purpose in the piece, as in “Black Hole Sun,” where Soundgarden performs the following chorus accompanied by thick power chords (Soundgarden):

*Black hole sun  
Won't you come  
And wash away the rain*

Some pieces show more scientific promise, like Mae’s “The Sun and the Moon,” but in these, the astronomical subject still feels too abstract to actually serve much of a purpose beyond “just sounding good,” though perhaps some additional time spent in discussion regarding the lyric meanings could be useful (Mae):

*Painted skies.  
I've seen so many that cannot compare,  
To your ocean eyes.  
The pictures you took  
That cover your room,  
And it was just like the sun  
But more like the moon.*

Of course, some popular music pieces do successfully use astronomical metaphor or setting, though generally without digging too deep into the science. One of the less “scientifically correct” pieces, T.M.Revolution’s “Meteor” manages to hold it’s sad but energetic feel even when translated into English (T.M.Revolution). More of a complex study of hinted love and traded fire than one on the behavior of meteors as they enter the earth’s atmosphere, he sings:

*My flawed heart still embraces the night, even as it burns out  
That feeling that glittered off in the distance for a split-second –  
If it's love, I'll try for that vision  
The light is freed and falls through the sky, sacrificing its warmth only for hope  
The flame that's born of dying stars burns on in this, my final dream*

Other pieces of varying charm and scientific accuracy include “White Dwarf” by a-ha, where the singer mentions a “big black picture... and in the left hand corner, perhaps a small white dwarf...” which (taken out of context) almost sounds like a vague reference to an H-R diagram (a-ha); Sound Like Fall’s “Moon to Midnight,” where an observer notices “...satellites whizzin by... covered up by the stars up in the sky,” noting the way satellites tend to be difficult to pick out of the night sky (Sound Like Fall); and “Drops of Jupiter,” by Train, which avoids transparent scientific statements but rather mixes and matches the way we might sense and think about objects, and overall produces an air of bitter defiance against outer space for having taken away the singer’s lover, in words that include the following (Train):

*Now that she's back in the atmosphere  
With drops of jupiter in her hair...  
...Tell me, did you sail across the sun  
Did you make it to the milky way to see the lights all faded...  
...Tell me, did you fall for a shooting star...  
...And tell me, did venus blow your mind?*

In conclusion, what does this study of music and astronomy (but honestly, more music than astronomy) tell us? In a way, we’re required first to determine the aim of the music, and what it seeks to accomplish: is the goal to add scientific truth to the realm of fine arts and literature, is it to make music that the listener enjoys, or is it simply a matter of letting out the music when, as Beethoven has been quoted saying, “the spirit moves [you]” (Blum 230)? Perhaps the wordless songs of the old classical ages may be the more potent and culturally effective viaducts to a musical-astronomical bond. But to satisfy both the objectives of musical excellence and scientific propagation, it may be that popular, emotional music, which grows with the zeitgeist, may have the advantage. Then again, for some truly astounding material loaded with both musical brilliance and fine-tuned astronomical accuracy, we have AstroCappella, “a marriage of astronomy and music, developed by astronomers and educators and professionally recorded by the ‘rocking’ a cappella group The Chromatics” (AstroCappella). Enjoy, if nothing else.

*Here's a story of a pair of stars called Cygnus X-1  
One's a black hole many times the mass of the Sun  
With a disk of gas surrounding it, spiraling in  
Sucked from the companion star's outermost skin  
We see the high-speed flickering as star stuff flies in  
A one way trip beyond the event horizon...*

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