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Star parties

An ethnographic exploration of amateur and professional astronomers

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The subculture of star party attendees has rarely been addressed within anthropology. Through an ethnographic approach, this paper explores the customs and motivations of those who sky-watch at star party gatherings. Some factors that motivate people to attend these gatherings include the sharing of technology, camaraderie, scientific learning, environmental advocacy, and emotional connections with the universe itself. Additionally, digital versus physical spaces are explored and contrasted. More broadly, this paper looks at possible reasons for the popularity of astronomy within our culture today.

KEY WORDS astronomy, star parties, pop culture

> It has been said that astronomy is a humbling and character-building experience. There is perhaps no better demonstration of the folly of human conceits than this distant image of our tiny world. To me, it underscores our responsibility to deal more kindly with one another, and to preserve and cherish the pale blue dot, the only home we've ever known.
>
> — Carl Sagan, *Pale Blue Dot: A Vision of the Human Future in Space* (1994)

Darkness fell upon Algonquin Park, and I knew that was my cue to gather my research essentials and head to the star party. As I walked towards the beach on that chilled September night, flashlight in hand to light the darkened pathway, I felt a buzz in the air. When I arrived, I turned my flashlight off, looked around, and saw several shadowy figures cast all across the area before me with telescopes set up for viewing. The buzz continued, and my excitement grew. Even though I was in an unfamiliar environment, a sense of familiarity warmed over me knowing that I was surrounded by others who were passionate about the cosmos. I headed over to one of my friends who had a telescope set up and she told me of the many sights that we might glimpse that evening. The anticipation heightened as I put my eye on the telescope…

Amateur astronomers love experiencing and learning about astronomical events. Yet, this particular sub-culture offers information, not only for themselves, but for society as a whole (Howe 2009). One of the ways amateur astronomers accomplish this is by holding

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public events known as "Star Parties." Typically located in public areas, as in a park at night, star parties allow people to gather together with their equipment and observe various objects within the night sky (Kopnina 2012). Using specialized gear, sometimes these gatherings happen during the day, depending on the event or object being witnessed, (i.e. a solar eclipse or most recently, the transit of Venus). Such events allow amateur astronomers to get involved and share their passions with others of like mind, and to engage people who may not normally be exposed to the discipline. Star parties occur year round, with frequent events in the summertime, but fewer in the winter. Some winter star parties are held in the southern United States, which brings people from all over to participate (especially those living in colder climates), and tends to lend to better viewing conditions. Before conducting research on amateur astronomers, my knowledge of astronomy and physics was limited. From this limitation, I wanted to explore more about what happens at these events.

I begin this article by giving a brief overview and background of astronomy. I then outline both the methods and methodology of my research and a literature review in order to provide a foundation for my findings. I was also interested in the motivations of star party attendees and their positionality within an educational perspective. The value of public education that amateur astronomers provide is great, to the point where much astronomy outreach would not even happen without them (Yucco et al. 2012). My expectations of attending a star party for the first time are also explored. Two other aspects of star parties that are addressed involve the feelings of camaraderie and the hunt for celestial bodies. Attending a star party is a social event in which friends and strangers interact to look for different objects in the sky. Therefore, these themes are also explored.

An important aspect regarding star parties that this paper addresses involves environmental concerns of light pollution. Dark-sky reserves are dedicated spaces that are kept free of as much artificial light as possible (Ministry of Natural Resources 2006). Light pollution becomes a problem for those stargazing, as it can interfere with the clarity of celestial objects being observed. Since the early twentieth century, astronomers have had to move to different places in order to avoid the effects of light pollution (Evans and Newman 2003:1375). The more I learned from my participants, the more I realized how much light pollution interfered with stargazing and learned more about the environmental concerns as well. Even during my attendance at a secluded place like Algonquin Park, the lighting conditions were not always ideal.

Virtual star parties are also explored, as people can participate wherever they have access to a computer. Several internet groups from around the world gather at different times to participate in what are known as virtual star parties. These virtual communities allow for some people to engage in conversation or to simply observe (Islam 2006). Online, participants discuss astronomical events, telescopes, and other related topics just as they would in person. Virtual star parties also facilitate those who cannot physically get to some of these gatherings in outdoors and remote areas. Therefore, they can experience a star party at home and still receive the benefits of learning and sharing in a virtual setting. This ethnography explores what role virtual parties play in people's experiences and differentiates it with face-to-face events. Situating astronomy within North American culture today, I also reflect on the various reasons for the apparent popularization of space within Western society.

Method and Methodology

My methodology consisted of interviewing people who had run star parties, those who were frequent attendees and some who were new. Demographically, I interviewed people who were between the ages of 19 to 80 years old. I intentionally asked both male and female participants so that each gender would be represented equally on this topic. Specifically, I asked the female participants about their experiences to learn their points of view, since typically more men attend these events. Participants consisted of members from the Royal Astronomical Society of Toronto, Mississauga and Niagara chapters, virtual star party attendees, and professors and students at York University. The following eight participants include: Jean-Luc, Will, Geordi, Miles, Beverly, Deanna, Tasha, and Keiko, all of which were given pseudonyms.

All participants were interviewed face-to-face and typically in areas of familiarity for them, such as their place of work or school. One participant was interviewed via email due to distance and time constraints. Most of the participants I knew personally or had met in the past, while one person I had not met before. My interviewing method was qualitative and flexible, allowing my informants to express their views more freely (Bryman et al. 2009). The interviews were "semi-structured" such that some questions were prepared ahead of time, as well as spontaneous questions that were to be asked depending on the path of the conversations (O'Reilly 2005). Interviews ranged from approximately half an hour to forty-five minutes in length and they were conducted on an individual basis, in order to lessen distraction. Reflexively, having a background in counseling and psychology, I chose not to take notes while interviewing in order to attend and engage fully with my interviewees. All participants were informed that the interviews would be recorded and were required to sign a form of consent which clearly outlined the purpose of the research, the roles of those involved, and confidentiality statements.

Iwaniszewski (2011) suggests that the aim of studying cultural astronomy is to examine the activities of stargazing. Therefore, in order to examine the culture surrounding astronomy within Southern Ontario, I attended a few star parties throughout the year in order to compare and contrast the differences and similarities between them. The anthropological method known as "multi-locale fieldwork" was executed throughout my research by attending star parties in several different locations (McGarry 2012). I chose to attend multiple star party locations and online events so that my experiences would be varied and I would get a more holistic view of the activities involved. Hugh Gusterson calls this method "polymorphous engagement," which means engaging in many different areas including virtual ones, in order to get eclectic data from different sources in different ways (1997:116). All of the star parties I attended were located in Southern Ontario, and in particular, River Place Park in Ayton, Algonquin Park, and Georgina with the York University Astronomy Club. Ayton was where StarFest was held last year in the summertime, which also boasts the largest star party in Canada. I decided to attend because of its size, despite the hefty admission's cost. I was only able to attend for one day, but managed to get a good feel for the atmosphere. For the other two star parties, I engaged fully with the participants, looking through telescopes, asking questions, as well as monitoring reflexively my own emotional and cognitive states. I also participated in some virtual star parties, one through a Google+ group (Virtual Star Party 2012) and also through the York University Observatory's online public viewing (OPV) website (York University Observatory 2012). Gusterson mentions,

"[i]f virtual space increasingly becomes a real space of social interaction then we will need virtual anthropologists to follow our subjects there" (1997:116). This point is important as virtual worlds can offer anthropologists cultural information on social groups by looking at how they interact and use virtual technology. Online presence and identities become salient and provide a new site for research into human interactions and kinship.

One obstacle I had with my research was taking notes in the dark. Other than being at Starfest during the day, both the Algonquin and Astronomy Club parties were at night. Following James Clifford's methodology of utilizing "inscription notes" (1990), I was able to jot down bits of information and then rewrite them in the daytime. Another obstacle was trying to attend parties during the school year. I had attempted several times to attend a star party during the winter in Mississauga, but much to my frustration, the weather gave no sympathy for my plight. Alas, one downside to star parties that cannot be predicted is the weather. In the end though, I managed to attend three different events in the allotted time.

There is a need for research on amateur astronomers, especially in regards to who attends star parties. Currently, research on amateur astronomers as a culture is lacking and even more so in regards to star parties. The American Anthropological Association (AAA) mentions in their code of ethics that "researchers should do all they can to preserve opportunities for future fieldworkers to follow them to the field … and disseminate their findings to the scientific and scholarly community" (Robben and Sluka 2012). Therefore, the aim of my research is twofold: to contribute to the research on amateur astronomers and to inspire others to explore star parties or to simply learn more about the ways in which amateur astronomers observe the night sky.

Background

The person credited for inventing the telescope was a Dutch lens maker by the name of Hans Lippershey, since he was the first to apply for a patent in 1608. In 1609, Galileo Galilei made his own adjustments to the original design and used it to study the stars, for which he was famous for (Cox 2013). The optical telescope allows for people to see far objects close up by collecting and focusing light. Author Christopher Dewdney explains that "the stars have dazzled humans since prehistoric times—they have always conveyed a sense of magnificence and celestial mystery" (2004:209). Many cultural myths arose from watching the night sky including Greek and Indian mythologies, but none more so than the Egyptians and Mayans. Dewdney writes: "Both the Mayans and Egyptians made their observations from their temples, which doubled as observatories and places for the performance of religious rituals" (2004:223). Today, telescopes are used in backyards or in massive observatories around the world. Typically, locations are chosen based on the clarity of atmosphere and some of the larger observatories can be found in Hawaii, Chile, Puerto Rico, California, India, and even in the South Pole.

Literature Review

Star parties have not been explored in depth in academic research thus far. Information about amateur astronomers themselves has been represented more frequently and in several different areas including books and films (Moore 2006, Ferris 2006). Current

academic research has offered much information on the benefits of amateur astronomers through topics such as education outreach and environmental preservation (Gibbs and Berendsen 2007; Storksdieck et al. 2011; Yocco et al. 2012). An article by Bob Berman categorizes 'types' of astronomers, labeling them as the following: "the professionals, the telescope makers and gadgeteers, amateur specialists, backyard amateurs, beginners, photographers, sci-fi crowd, space travel advocates, nuts and visionaries, prisoners, cosmology zealots, spouses, navigators, and people who don't have a clue" (2013:11).

Star parties become venues and mediums through which the knowledge on many facets of science becomes accessible to the public. "Science hobbyists who are engaged in outreach … strive to share their passion and excitement—with knowledge as a means to that end" (Storksdieck et al. 2011:19). Students can learn about astronomy on different levels ranging from simply looking at beautiful photos, to questioning how the universe works and how celestial bodies are created (Motta 2006). Howe points out that star parties "have been designed to bolster the validity of research conducted by amateur and professional astronomers and provide increased visibility for … communities in order to attract the general public" (2009:140). In Ontario, elementary school teachers can provide a space curriculum as early as Grade 6 (Canadian Astronomy Education 2009). Jean-Luc told me that many years ago people could not study astronomy as a specialty in post-secondary education and they had to take physics instead. John Lankford mentions, "In England and America the new specialty of astrophysics did not develop in the university context" (Lankford 1981:277). Based on the changes today, science education seems to be more accessible now to younger people than in the past. Ecklund and colleagues mention that within certain fields, the jobs of both women and men have attracted academic inquiry (2012). Yet, research suggests that males are still the dominant gender of amateur astronomers (Berendsen 2005).

A study conducted by Gibbs and Berendsen (2007) showed that amateur astronomers, as public outreach educators, are at least on par with professionals when teamed up with teachers in the classroom and are therefore valued for their knowledge. Different ways that amateur astronomers convey information to the public involves star parties, professional collaboration, informal meeting groups, photography, and virtual settings. Through these avenues, the general public has an easier time accessing resources that may have been more difficult to find on their own (Howe 2009). An interesting way in which star parties contribute to public outreach is through virtual communities. "Current trends in education are calling for alternatives to typical classroom learning … and virtual programs can offer a connection to others globally" (Fanson 2002:24). Online star parties provide a virtual space for people to interact with each other and learn from not only amateur astronomers, but professionals in the field as well. People can offer help to one another or simply provide information (Blanchard 2004).

An important challenge that amateur astronomers face is the issue of light pollution. In order to observe the night sky in greater detail, stargazers hope for as little light as possible. Dark sky reserves boast a partial answer to this problem. Outlying areas near Muskoka, Ontario, offer a perfect example of the conflict for star party locations trying to stave off the environmental impacts of light pollution. Due to the ongoing battle of development, the "sky is relatively dark. But the area sits amid some of the most desirable cottage country in the province. A steady increase in night lighting throughout the region is blurring

the view close to the horizon" (Jenish 2000). Taking the issue a step further, astronomy writer Terence Dickinson considers the night sky to be akin to an "endangered species" (Mittelstaedt 1999). Stars in the sky become less visible, especially for those living in cities or developing areas. In part, star parties give people a reminder of what the canopy of stars look like from Earth. Psychologists suggest that psychological well-being is potentially tied into our connections with nature and that, "we as a species are losing rich and diverse forms of interaction with nature: the awe, for example, of … sleeping under the night sky or of even seeing the night sky in our urban settings" (Kahn et al. 2010:327). Amateur astronomers will continue to support the dark sky reserve initiatives for continued inspiration and promote education for the community for generations to come. Understanding the motivations behind star parties, the benefits of educational outreach, and its effects on the environment all become important aspects of the amateur astronomer sub-culture.

Pop-Culture and Media

Cultural astronomy "offers a perspective from which we may observe, analyze and discuss the various types of relationship between astronomy and culture" (Iwaniszewski 2011). Therefore, there is another story to be told beyond the raw data that delves into the culture surrounding those that observe the night sky. Pop culture and media have offered evidence to support the idea that space is 'cool' as mimicked in today's society by the popularization of astronomy shows with physicists such as Dr. Michiu Kaku and Dr. Neil deGrasse Tyson, the hit television show *The Big Bang Theory* and increased ratings of spectacle events such as the Mars Rover landing. A quote from Tony Riggins at Ustream said, "More people tuned in to watch the NASA Mars landing coverage on Ustream than many of the top cable news networks during Sunday primetime" (Robertson 2012). Another possible reason for the popularity of space today is that certain technologies are no longer in the realm of science fiction. For example, on the television show *Star Trek,* characters used a handheld device called a "tricorder" which performs several different tasks, including medical diagnosis and treatments. The "medical tricorder" is no longer an imaginary of the future. The XPRIZE foundation is currently holding a contest to make this technology for the average citizen to use as a medical assessment tool (2014).

Despite some of the aforementioned physicists' popularity, space nerds were not always so highly praised for their public education efforts. The infamous physicist Carl Sagan received backlash in the early 1990's from the academic community because they did not believe that someone could be charismatic and be a serious scientist at the same time (Diamond 1997). He was denied a seat in the National Academy of Sciences, but two years later was given the Public Welfare Medal by the same academy. Times have changed, as Neil deGrasse Tyson is hosting a new rendition of Carl Sagan's *Cosmos* series, produced by Seth MacFarlane (*Family Guy*) and will be aired on the FOX Network and National Geographic Channel in 2014.

The literature also offers another suggestion, that the reason for the rise of the nerds is due to the reinvention of society's perception of them. One of the richest men in the world is Bill Gates, a computer geek extraordinaire. *The Big Bang Theory* characters are not as exploited as in the past, contrasting with pocket protectors and taped black rimmed glasses as in *Revenge of the Nerds,* but are also celebrated and looked up to (Hoppenstand 2009).

Popular physicist Jim Al-Khalili is quoted as saying, "It's not embarrassing anymore to say I'm a theoretical physicist at a party … the geeks are on the march again" (Ghosh 2011).

Other evidence supporting the popularization of space is seen in the recent emergence of private space companies such as Space X and Virgin Galactic. These companies offer flights to the upper atmosphere for the average citizen who can currently afford a $200,000 for upper atmosphere trips, or $500,000 for a future trip to the planet Mars. Therefore, modern times allow for space to be accessible for non-astronauts. The implication for astronomy means that people, other than astronauts, will have first hand accounts of the experience of being in 'space.' This new type of space tourism could very well be considered the ultimate Other: move over Antarctica, space is the new isolated and exotic 'frontier' to be explored. Lastly, the international year of astronomy was celebrated in 2009 and consequently led to the very first star party that was celebrated on the White House lawn (Pompea and Norman 2009). Governments are now taking time out of their schedules to bring recognition to the field of astronomy.

Social sites and television have been prominent factors showing the 'geek chic' factor within media. Sometimes, people look up to characters in television shows and want to become close to that life in some way. Cheryan and colleagues suggest that "role models can also transmit stereotypes … television and movies, for example, often depict scientists and engineers in a stereotypical manner (e.g., the CBS television show *The Big Bang Theory* and the movies *Revenge of the Nerds* and *Real Genius*)" (Cheryan et.al, 2013:73). *The Big Bang Theory* has four main characters: two physicists, one astrophysicist, and a space engineer. Bentley et al (2007) note that "almost by definition, 'popular culture' reflects the effects of most people imitating those around them" (p.151). This may possibly lead to higher enrollments or even greater numbers at astronomy events and clubs. News and social media also becomes a factor in creating a more visible space culture. Tasha reported,

> Events make news, like when the first man walked on the moon … when there is a period where there is not a lot of exploration going on, then interest wanes. But there are so many probes out there now, more and more information keeps coming in, and pictures from Hubble, which has really brought the view of the universe to anyone with a computer and that wasn't around back then … you don't have to wait six or eight months, the information is instantaneous now… we have seen an increase in membership, especially since we've been on Facebook and Twitter, social media has helped a lot. [Tasha. Rayna Slobodian, February 19, 2013]

Jean-Luc suggests that space has always been of interest, but only seems more visible today because of the internet. He has not seen an increase in astronomy majors per se, but the general education course at York called Life Beyond Earth, has become increasingly popular among non-majors. These students may be the ones who have become interested in space topics, but may not have the commitment or mathematical drive for enrolling in an astronomy stream. Cultural anthropologist Kevin Anderson suggests, "the super-nerd embodies one of the primary obsessions of our current times: the ability to access information" (Sloan 2012). In this modern age of technology, being someone who knows a lot about accessing information may be attributed to becoming popular and acquiring status. Keiko mentions, "There are amazing missions and discoveries happening all

the time. The internet has really helped to let people access information…I've seen the interest in astronomy growing since 12 years ago." The first Canadian Commander of the International Space Station, Chris Hadfield, has won over the public with his Twitter updates and musical performances. Commander Hadfield did a musical duet with Ed Robertson of the popular band The Barenaked Ladies (CBC 2013). He has well over 1 million followers on Twitter and growing. Therefore, various forms of media have made space related missions and events more salient in the minds of the general public. Both the Mars Curiosity mission, and most recently the Planck mission, informs us almost instantaneously about what is happening 'out there' by analyzing the oldest light in the universe that will lend to the knowledge of the origin of the universe. Scientists are trying to understand and answer many of the grand cosmic questions that humanity has been asking for a very long time. Education of these themes permeates culture more easily nowadays and through various news outlets and prime time shows, we see and learn about the work of those in the space field.

Why has Western society's current interest in space become so popular? In a BBC news article by Pallab Ghosh, numbers suggest a 40% increase in British university applications for astronomy since 2011. The article also suggests possible reasons for this increase are due to "students thinking more about their future employment prospects" and "because physics has become 'cool' again" (Ghosh 2011). This data shows a possibility of romanticism becoming a motivator for those taking astronomy classes. The romantic view of astronomy plays a role since, as Deanna pointed out, "it shows the pretty side of science, makes people more comfortable to being open to it, science isn't always numbers, and there is beautiful stuff too." If students are not prepared for the amount of math and physics involved, then astronomy may become disheartening and challenging. The romanticism itself may stem from wanting to know fundamental human questions surrounding who we are and where we come from. Astronomy is one way of knowing about the past as a species. Another way is through material culture of the past, specifically within archeology. A beautiful film, *Nostalgia for the Light* by Patricio Guzman, looks at how humans come to learn about their past and current identities by juxtaposing astronomers and archeologists in Chile (2011). Participant Jean-Luc gave his own ideas as to what motivates people to want to know their origins:

> I really do think it's a part of our genes; it's a part of our DNA. It's a throwback to the time where the vast majority of our lives revolved around the importance of understanding daily motions in the sky. All the way from, I got to be home by dark otherwise I'm going to get eaten, uh, to when do I plant my crops, to I want to meet with these people on a regular basis. There was no such thing as wrist watches. I really do think it is part of our coding, uh, so when people go outside and they look up, regardless of whether it's the day or the night, there is literally an in-built fascination that just comes from within. [Jean-Luc. Rayna Slobodian, January 17, 2013]

He offers an evolutionary perspective here as to why we look towards the sky. This idea of being "hardwired" is somewhat deterministic. Mary Orgel et al. suggest "scientific knowledge is always produced in conversation with the social conditions in which it is situated"

(2005:150). People tend to use scientific knowledge to explain our behavior through evolutionary views, but in doing so, tend to leave out environmental contexts. Jean-Luc used the terms "genes" and "DNA" to describe why we look up. Barbara Duden has done some research into this crossover of scientific terms outside of laboratory into the general life. She has dubbed this phenomenon the "pop-gene" and says "genes have become the answer to, who am I?" (2009:257). Therefore, stargazers can use astronomy as a way of answering the large questions of who they are and where they came from.

Expectations

As I put my eye on the eyepiece of the telescope, I felt confused, and experienced conflicting emotions all at once. I had to ask, "Uh, just to be sure … that cloudy, white, fuzzy spot is a galaxy?" "Yes," Beverly answered. It took me a minute or two to get my bearings as I tried to sift through all of the thoughts in my head. Firstly, the view of the Andromeda galaxy through the telescope was nothing like the images I was used to looking at on the internet, beautifully enhanced, detailed, and in colour. Therefore, this blurry, white cloud was not what I had expected. I knew intellectually, on some level, that the view would not be the same, but the experience of seeing a fuzzy white blob was somewhat disappointing. As participant Miles pointed out, "people feel that … you are going to see an amazing display, and it's not necessarily true, they expect to see amazing sights, and there are, but not necessarily enormous or the way they expected." That is exactly what happened to me. Yet, at the same time, I also felt a sense of elation and excitement. A part of me went beyond the cognition of the simple visual effect and felt something greater, a feeling of connecting with the universe and being aware of the fact that I was 'directly' looking at an entire galaxy. Miles also added, "People want to see something they have never seen before and the telescope presents a structure to see things that you can't see with the naked eye." Having been to a few star parties and having interacted with many knowledgeable people in the field, I began to learn more and expand my own general knowledge of the cosmos.

First-year astrophysics major, Deanna said regarding the night sky, "It looks beautiful, and a sense of connection to the universe, it almost gives you a spiritual feeling in a way, it touches people to just look up and go wow." And succinctly put by William, "There are no words." In some ways, for many, astronomy becomes a way through which a new found connection to the universe is experienced. So, the juxtaposition of conflicting thoughts of disappointment and excitement, enticed me even more to look through more telescopes and to learn from others as to why they sky-watch. Geordi said, "There's a sense of awe when you see objects in the night sky with your own eyes. Instead of just reading about the stars, you can see them. It's about turning something conceptual into something real." When I looked into the telescope, there was also a feeling of "realness" to the objects that I observed, just as Geordi mentioned. An object, like the planet Jupiter for example, became vibrant when I was able to see actual characteristics, cloud formations and different tones on its surface. Those details brought that object 'closer" to me and added to the sense of connection and depth that does not happen when the eyes are unaided. Perhaps this is important for observers on two levels. Firstly, details provide a feeling of being next to the object. A sense of closeness is felt to this far away celestial body. Secondly, there is a sense of rarity, separateness from the average person. In order to view these objects, one either

needs a computer or an expensive telescope if looking at distances outside the capabilities of the naked eye. Therefore, privilege becomes part of the story.

Participant Keiko found that stargazing made her question many aspects about life, "The feeling of not knowing what the universe has, the whole mystery, where we came from, how it all began, you are looking at all of these stars and galaxies, it's like, we are so small, how do we fit into all of this?" In the book, *The View from the Centre of the Universe*, Primack and Abrams mention questions asked by prescientific people such as, "Has the universe always existed, or did it come into being? If it had a beginning, how did it start? What is it made of? How does it work? How do we humans fit in? People hardly even ask such fundamental questions anymore…" (2006:4). Participants Deanna and Keiko still ask these questions today, and possibly others wonder about these questions if universe becomes salient in their daily lives.

Camaraderie

Star parties offer more than simply viewing the night sky with a telescope. A major component that motivates people to attend is the camaraderie. Doug Scobel suggests, "You instantly have something in common … you may meet some folks you're not too likely to meet otherwise" (2008). As with any gathering involving people with common interests, having the ability to share information and hang out with people of like mind adds to the enjoyment. I was aware that I would run into some people that I had met before through various space lectures and had looked forward to seeing them again at the star parties. All of the participants I interviewed mentioned the social aspect as being a reason for attending. Jean-Luc pointed out that

> it's not just looking through the eyepiece, I love that, but I do like talking to people, invariably you end up talking with other visitors … I'm floating around the place, I obviously become engaged talking to other visitors about the love of astronomy … the social component of it … the people who are putting on the star party itself, the amateur astronomer or if it's my observing team, just chatting with them and being in a social environment is a very positive event. [Jean-Luc. Rayna Slobodian, January 17, 2013]

Beverly mentioned, "Amateur astronomers love to share their joy of the night sky, amateur astronomers are there to guide people through it, not to party necessarily, but get together and talk about the night sky." The social aspect becomes an important part of these astronomical events as people get a chance to both share and learn about the cosmos with each other.

A connection can also be made with others who are observing together. Dewdney writes while observing the sky, "We all saw a brilliant falling star that was greeted by a few gasps" (2004:223). I also experienced this during the Algonquin star party. Everyone looked up to see an object and for those who did catch it, 'oohs' and 'ahhs' ensued. I missed it of course, but I caught the sense of emotional contagion that occurred. Research suggests that "an individual's emotions can have a particular intensity which can undergo transformations when combined with others' emotions" (Vijayalakshmi and Bhattacharyya

2012). This happens at star parties to a lesser degree. Those who are observing feed off of each other with anticipation, recognizing that despite the huge sky above them, they can use their telescopes to pinpoint an exact place and watch a celestial event in real time. People connect with the same visual spectacles, as well as the "buzz" or excitement that goes along with being there in the first place, anticipating the night.

Technology and Hunting

Besides socializing, star party attendees also enjoy the technology of the telescopes. MacKenzie and Wajcman suggest that "technologies can be designed, consciously or unconsciously, to open certain social options and close others (1999:3). They also suggest that, "[a]rtifacts—things humans have made—are involved in most of the ways human beings relate to each other" (1999:42). Star parties are an example of how the technology of telescopes brings about social connection within the astronomy community. I had the chance to look at the Andromeda galaxy through different scopes and noticed how each one offered a different view. For a newbie, I was a little intimidated. Most of the time, I managed to leave the telescope operations to the experts. At the Astronomy Club star party, one member showed me the basics of manually maneuvering a telescope. I ended up contorting my body in ways I never thought possible just trying to get some celestial objects into view. After some time had passed, I at least managed to get a nice shot of the Pleiades. Jean-Luc said, "I like being able to look through a number of different telescopes, seeing them in different formats; reflecting telescopes, refracting telescopes, short focal length, long focal length, there are subtle differences … I like doing that type of comparison." Miles reminisced about how telescopes were in the past: "I had heard about making your own telescope … I attended some star parties and knew some people that were there who made their own. I made a small reflecting telescope out of a piece of plastic made to put under chair legs, I ground that into a reflective surface." Geordi also told me how he loves learning everything he can about other people's gear and their techniques.

Technology, whether through binoculars or telescopes, becomes the vehicle by which amateur astronomers get their information, as the naked eye offers a limited view of the universe. Star parties are not always about the view per se, but the chance to talk to others and try out various telescopes. Interestingly, feminist scholar Donna Haraway suggests that creating technologies to see into the solar system leads to "unregulated gluttony" (1988:581). Whether or not we can attribute observing the solar system as being gendered is open to debate, but an important point nonetheless. Is there ever too much eye feasting? Or not enough?

Author William Burroughs writes in his book *The Survival Imperative* "the average person has not taken Astronomy 101 and knows next to nothing about science in general … people think that Pluto was named after a dog and meteorologists study meteors" (2006:59). A natural consequence of star parties is that people can become more educated about science and the universe. Generally, amateur astronomers are assured that their information and inspiration gets passed onto others in order to help society become more scientifically literate (Motta 2006). Geordi elaborates, "It's our hope that we can encourage that desire to learn more for people to become amateur astronomers. There's also a lot of science going on during star parties, which we're able to explain as we go." Participant

Tasha did not come from a science background initially, but that did not hinder her in any way: "I knew nothing. I'm still not great on physics, but if I read it enough, the information comes, there is so much that I have learned that makes sense to me, even with my limited scientific background." Astronomy outreach can go beyond scientific mechanisms. During my time at Starfest, I attended a few lectures and one was on the US. Antarctic search for meteorites. Keiko also told me about how she enjoys hearing about the latest space related research while attending star party lectures.

Astro Ladies

Issues pertaining to women in the sciences could be the topic of a research paper on its own. I briefly include the experiences of my female participants, as star parties are mostly attended by men. Research suggests that women are underrepresented in physics and science fields (Ecklund, Lincoln and Tansey 2012:696; Lee 2002:349). I decided to leave out research on how racial minorities are also less represented, due to my ethnography being limited to Southern Ontario and because I am white, I did not feel as though I could accurately portray that side of the issue. The lack of racial equality with astronomy within North America needs to be addressed in future research.

Out of the four women that I interviewed, no one reported any major issues with being a woman within the astronomy community. My own experiences of attending star parties and lectures also found no experiences of discrimination or prejudice. However, there were small incidents where the participants were reminded of their gender. Beverly told me a story that happens on occasion: "I'll be setting up my telescope with my husband and people will come over to ask a question. They turn to my husband and automatically assume it's his, and he will say, 'No, no, I'm just the astro-spouse, talk to her." Deanna pointed out that she has "had surprised reactions from guys, like, 'Oh wow you are in astrophysics?' They are not expecting you to be in the sciences." As for Tasha, she reported that she never had any problems at all other than noticing that in the past there were not as many females attending star parties as there are now. These are very minor instances of women being treated differently than their male counterparts, despite the high male attendance at star parties in general. Ecklund suggests that "researchers maintain that both formal structures and implicit biases in science create a negative social environment for women and discourage them from entering" (2010:697). Future research may want to look at how star parties may help women to get into the field of astronomy, considering the low levels of prejudice experienced by women at these events. Star parties may offer a safe environment for young women who wish to explore astronomy more before pursuing it as a career.

Cloudy Skies

I mentioned to Beverly, "Hmm, that area over there looks brighter and I can't see the stars as much as I could before!" It was only 10:00 pm, so I knew that it could not be the sun rising. Someone else overheard and replied, "Yes, looks like the clouds have started to roll in … the lights from the surrounding towns reflects off the clouds and makes the sky brighter." Well, that was disappointing. If I looked directly above me, the sky was much darker, but looking near the horizon made for some problematic sky watching. Light pollution is a

growing concern among amateur astronomers. Dark sky reserves are helping minimize light impact within certain areas. "The current lack of development both within and beyond the conservation reserve has made the area attractive for astronomy (stargazing) outings. The absence of light pollution in the night skies over the conservation reserve is remarkable" (Ministry of Natural Resources 2006:13). Tasha explained, "I was down in Chile and it was a completely different sky … you look at those light maps and it's frightful … most people don't know what the sky looks like … having more people aware and more dark sky preserves, people will appreciate it more." William also informed me about a website, www.globeatnight.org, which allows people from around the world to raise awareness about light pollution. Astronomy enthusiasts measure the brightness of the night sky and upload that information to the website and compare data with other people internationally. Beverly told me about the benefits of star parties in regards to light pollution:

> Star parties are a way to educate people and let them know about the lighting options available, not to mention the negative health effects of light pollution on humans and birds and other wildlife, so you might refer people to FLAP (Fatal Light Awareness Program) for example or send people to the International Dark Sky associations website … by promoting less light pollution, people realize that it also saves a lot of money on lighting and not wasting energy … light pollution is something that we try to educate people about … we can talk about why is it that we can't see as many stars in Toronto. I speak to kids that have no idea what the Milky Way looks like. [Beverly. Rayna Slobodian, January 23, 2013]

The literature supports Beverly's statement: "The Milky Way itself is rarely visible to the naked eye anymore except outside cities in places unpolluted by electric lights" (Primack and Abrams 2006:91). From these testimonies, it becomes clear that people living in highly light polluted areas are having different experiences of the night sky. If star parties do in fact educate people and persuade others to change their lighting habits, then the environmental impact will be greater outside of the events alone. Upgren suggests other problems with light pollution: "Bright lights … can confuse migratory birds … the circadian rhythms of some plants can change … [lights] can misdirect newly hatched sea turtles … also the waste of energy" (1996:22). Geordi also mentioned part of the benefit of virtual parties: "I think we're helping to increase the awareness of how we're losing the night sky. Many people participate in our star parties because they have too much light pollution at their location." Preserving the night sky becomes a concern for those who enjoy stargazing. Star parties are one avenue that can help to raise awareness of light pollution and contribute to conservation.

Virtual Skies

As Geordi said, virtual communities can offer some perks compared to outdoor star parties, "I hope we can provide some of the camaraderie and knowledge that you might get at a real star party. Our parties let you enjoy the night sky from the comfort of your living room." The aspect of convenience is crucial here. I attended three different star party nights in the city of Mississauga from November until February. On all three occasions, the sky was

cloudy and so we did not get the chance to take out any scopes. Needless to say, it was frustrating, but at least the lectures were a nice consolation prize. While online, I could always count on the virtual parties to offer clear views of the night sky in other parts of the world. Jean-Luc explained to me in detail about the virtual experience and about being a part of York University's Online Public Viewing (OPV):

> any astronomer, amateur or professional, will tell you that being present at the eyepiece of a telescope … being present … at a star party is the best way to go … it's the thrill of the hunt, it's the whole experience, OK, it's sort of like test driving a vehicle on the showroom floor versus being out on the open road, it might be the same vehicle, but the actual experience of doing it … you have to be a part of the process, but, that said, it's not always convenient … when we mount our OPV it was never intended to take away from people coming to the actual public viewing experience, but OPV has a greater stretch. For example, people in the southern hemisphere could be tapped into our OPV and be looking at objects in the northern sky which they can never see in the southern sky, so there are all sorts of reasons why OPV would be a really good experience, but it is, in my mind, never designed to take away from the actual physical experience of being there. [Jean-Luc. Rayna Slobodian, January 17, 2013]

While participating in an online star party, I had the opportunity to ask questions just as I would outdoors and having the opportunity to see objects around the world, that you normally would not be able to see, became intriguing. During the online party, people may watch static images or live shots. While participating online, I was able to witness various star formations in the sky that I would not have been able to see by living in Toronto. I became amazed at how people from all over the world could share information and connect instantly by looking at the same objects in the sky together. Suddenly the world became smaller, in that the immediate images create a community reaction in real-time. Virtual parties also give those people who have physical disabilities a way for them to still participate and sky watch. Overall though, Keiko mentioned the difference between the virtual and outdoor parties: "You miss out on the whole experience of being there live, virtually you could possibly see clearer or better quality images, other people experiencing it together, but, if you are at a telescope and operating one, the whole experience of that is something amazing, searching and finding something." In society today, virtual environments (VE) are becoming more popular within education. It is possible that online astronomy communities will be a part of that growing movement. "The Internet is … flooded with information on astronomical events and many computer games are situated in outer space and involve planetary or cosmic objects … astronomy teaching can benefit immensely from the powerful attributes of VR" (Yair et.al, 2001:297).

Conclusion

Star parties are a fairly new phenomenon in relation to the world of astronomy. People gather together to sky watch for various reasons such as camaraderie, technology, a sense of connection, entertainment, and education. The experience draws people from many

different backgrounds, but still mainly holds to the white male demographic. The consequences may be an increase in interest for people to pursue science fields or pondering questions about our connection with the universe. Considering the lack of academic research on star parties, this ethnographic study hopes to have contributed information to both the public and academic communities. This paper offers a better understanding of the motivations behind why people participate in star parties, the different views of how the public and participants become educated in science and environmental pursuits, and the pros and cons of virtual settings. I have also explored the effects of the popularization of space in society today. Star parties are multi-layered events and they encompass a diverse range of demographics. Going forward, future research has many options within this sub-culture. Research may want to focus on, in greater detail, the role of women and ethnic minorities within astronomy and physical science fields. Moreover, visual anthropologists may look towards further understanding the idea of astrophotography and its role within the astronomy community. An ethnographic approach is also needed to study the roles of amateur and professional astronomers and their contributions to scientific data, known as 'citizen science' and how those roles interact on different levels. Astronomers of all types enjoy their connection with others. I hope my journey has brought to light some information on how we may view the universe and our place among fellow stargazers. Ad astra: to the stars!

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