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Jennie LaComb

University of Central Florida, jenilacomb@knights.ucf.edu



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The Building of Astronomical Observatories on Native American Sacred Sites

Jennie LaComb

In the past few years, there has been controversy about the use of the Hawaiian mountain Mauna Kea as a location for observatories. Astronomers are planning for a new telescope to be built while some native Hawaiian people are protesting it. This is one of the examples that will be used in discussing the general conflict between astronomy projects and Native Americans. Astronomers see mountains as prime locations for observing the sky; Native people can see them as extremely sacred places that, in some cases, are central to their traditional religion. Their differing worldviews are at the core of disputes over the use of these sites. This paper investigates the process of site selection for observatories (specifically if cultural significance is considered); tries to understand why astronomers and indigenous people hold the views they do about building observatories; and puts forth a way to lessen future conflicts.

The Site Selection Process

Journal articles about site selection protocols in the fields of astronomy and engineering were looked at to survey the mention of cultural significance as a factor in choosing a potential site. The only articles found that mentioned cultural significance while discussing properties of a potential site were those for the Thirty Meter Telescope (TMT) which is being constructed currently on Mauna Kea in Hawaii. The general idea in the astronomical community seems to be that the cultural significance of a site is outside of their selection process, which primarily includes things that are relevant to the planned telescope and astronomers. This is understandable given the enormous range of factors that affect the operation of an observatory and the quality of astronomical viewing. According to one article, whose purpose was to discuss some methods for quantitatively comparing sites, some factors when considering locations are: seeing, extinction (loss of starlight due to the atmosphere), scintillation (brightness changes due to the atmosphere), the brightness of the sky background (light pollution), the average number of clear night hours per year, wind at the site, temperature, humidity, and “many more problems... that concern accessibility, living conditions, etc.” [11]. A site testing paper for the TMT project adds to the list of factors that go into the decision: there is also atmospheric water vapor, dust concentrations, sodium layer properties, elevation, geological conditions, cost, and availability of labor [9].

Though among these considerations, this TMT site testing paper notes that “...cultural, environmental, and land use considerations...” are a factor too. Though the paper acknowledges these concerns they “... are not discussed in this series as they were not assessed as part of the site-testing work” [9]. This paper does, however, report briefly on the cultural significance of Mauna Kea to Native Hawaiians when discussing the properties of each candidate site: “Mauna Kea is of great cultural and archaeological significance to the local people. What effect this has on the potential construction of TMT at 13N is currently under investigation” [9]. The conclusion of this particular study narrowed down the initial five candidate sites to two sites for further consideration: Mauna Kea and Cerro Armazones in Chile. It is interesting to note that it mentions “No particular cultural or archaeological

significance of Armazones is known. An archaeological study of the mountain found no artifacts” [9]. Of course, in the end, the site that was chosen for the TMT was Mauna Kea. All five of the candidate sites were “excellent”, so it is interesting what weight was given to different factors when the decision was made.

There are more people involved in the process of site selection than just the project officials. According to a different, earlier, TMT site evaluation paper “The Site Selection Process is also reviewed twice by an External Advisory Panel (EAP). These steps serve to provide information for the parties involved in the site decision...” [10]. Whom these EAPs are comprised of and how much influence they have on the decision is unknown, but they certainly seem like an important part of the process. More questions are: who are “the parties involved”? How much influence do they have on the outcome? In the above-mentioned 2007 paper they set out to deal with “Cultural, environmental and land use issues” by “consultations with local groups; archaeological, fauna and flora studies; [and] assessment of historical preservation and environmental issues” [10]. So according to this, local groups were consulted for each candidate telescope site, but who exactly was met with and how much weight was put on their opinions is unknown.

Philosophical Underpinnings

Indigenous Peoples’ Relationship to Land

Indigenous people in general have a very important relationship with the land. Traditional indigenous religious practice and culture are intimately tied to the land upon which communities are built. According to Native American philosopher Viola Cordova land makes up a large part of indigenous people’s identity: “Within, for example, the land area of a particular related group of people there will be specific areas that specific ‘clans’ will see-not as their property- but as themselves”. Because of origin stories of how a community came to inhabit a place, Native people also “...see themselves as rightfully occupying a place that they are intended to occupy...” [5].

Native people also recognize that the construction of infrastructure and buildings on otherwise untouched land creates an imbalance in the ecosystem. According to indigenous author Taiaiake Alfred, indigenous people see justice as the maintaining of balance between humans, animals, spirit beings, and the earth; and also, as respecting each of these as parts of the interconnected whole. In this view, injustice is caused by an imbalance of one of these aspects of the whole [1]. Since everything physical and spiritual is connected in the indigenous worldview, an imbalance in one area can throw off the whole universe.

Since the spiritual practice of indigenous communities is so tied to the land, it is a big deal when a sacred place becomes threatened. Native American activist and author Winona LaDuke writes “The challenge of attempting to maintain your spiritual practice in a new millennium is complicated by the destruction of that which you need for your ceremonial practice”. It is unfortunate to note then that “More than 75% of [Native American] sacred sites have been removed from [their] care and jurisdiction” [8]. This loss of land and sacred sites is impactful to indigenous people in a social, spiritual, cultural, and physical way.

One specific impact is that Native American spiritual practices like praying at Dzil Nchaa Si An (or Mt. Graham) are regulated by the University of Arizona because the construction of telescopes there has led to the requirement of a permit to enter the area [8]. During a meeting between astronomers and Apaches, Brad Allison (an Apache) said of the mountain "This is where we pray. This is where our ancestors are. It's looking into the womb of a woman. We don't do that. Why don't you go somewhere else and do it? This is our home" [4]. In reference to the construction of the TMT, Native Hawaiian Joshua Lanakila Mangauil said "Our creation is connected to this mountain... This mountain is the oldest sibling that watches over all of us... It collects the clouds, it channels the water, it gives us life." [14].

The Astronomical Community and Development

The International Astronomical Union (IAU) says about development and astronomy that "The interdisciplinary scientific and technological skills related to the field of astronomy can be used to further the global development agenda throughout the world" [3]. This can be seen as the general attitude of astronomy towards "development". In a paper by sociologist Cherryl Walker and political scientist Davide Chinigò the developmental goals of large astronomy projects are questioned, and the Square Kilometer Array (SKA) telescope in South Africa is used as an example. They point out the competing wants of the local people and the SKA project and also show the unequal power dynamics between them. According to Walker and Chinigò "...global and national notions of development and the public interest emerge as hegemonic, over-riding local development concerns" [13]. They point out that the Western view measures the development of societies in terms of their technology, and with this view "...western political modernity is normalised as the ultimate model for the developmental trajectory of societies throughout the world" [13]. This perspective universalizes the western notion of progress and the well-being of societies to other groups of people who may not share the same worldview. The power dynamic at play reinforces the "...already widespread feelings of marginalisation among local people," and "at the same time, SKA officials' commitment to science and technology as drivers of human progress leads to perceptions of local critics as at best uneducated or ill-informed, at worst enemies of 'development'" [13].

This can be exemplified by some scientists' reactions to the opposition to telescope building. Some scientists view critics as trying to prevent "progress" or as being anti-science because they oppose a telescope project on a specific site. In a New York Times column, science writer George Johnson called the TMT opposition a "turn back toward the dark ages" [7]. This comment caused a bit of controversy and prompted Native Hawaiians to react. Bryan Kamaoli Kuwada, a PhD student at the University of Hawaii, says in response to these sorts of comments "any time Hawaiians -- or any other native people, for that matter -- come out in force to... protect our places from this kind of destruction, we are dismissed as relics of the past..." [7]. This speaks to the astronomers' concept of progress as linear and based on scientific advancement and the creation of technology. In reference to the building of a telescope on Dzil Nchaa Si An in Arizona, an opinion article by three astronomers and a biologist states about activists that "they began to claim that the 8.6-acre observatory represented 'cultural genocide' for the San Carlos Apache tribe, whose reservation lies 40 miles to the north" [2]. This shows some scientists' lack of knowledge about the people

opposing the telescope; they conclude that since their reservation (which is delineated by the US government) is 40 miles away, the telescope couldn't possibly impact the Apaches. This kind of cultural insensitivity on part of the scientists is unintentional and seems to stem from their lack of knowledge about the Apaches.

Protests After Site Selection Decision

Protests at Mauna Kea and Dził Nchaa Si An exemplify the reaction of some Native American people to the proposed (or already started) building of an observatory on a site considered sacred to them. As mentioned above, the cultural significance of a site is something rarely considered when making decisions as to where a telescope will be built. So, when a chosen telescope site happens to also be somewhere that is sacred to a local indigenous group, it is not surprising that the local people protest. In the case of the TMT, protestors physically blocked construction as well as took legal action in court. According to an article in *Nature* “[demonstrators] say that the TMT would violate... indigenous rights that have not been properly valued by astronomers” [14]. Before the building of the TMT, project officials tried working with native Hawaiian interests more, but the building of the TMT was still protested [14]. In addition to protests of the TMT, Apaches in Arizona have protested the building of additional telescopes on Dził Nchaa Si An. Anthropologist Elizabeth Brandt explains the significance of the mountain to the Apaches: “...this mountain is a living being which must be protected at all costs... Without that site, Apache practice is irrevocably impaired, and the Apache cease to be who they are” [4]. These conflicts and controversies have made people start thinking about cultural sensitivity among scientists [7]. This at its core is an issue of differing worldviews and lack of knowledge about Indigenous cultures.

Efforts to Resolve the Problem

Helping with cultural sensitivity could be achieved by educating people involved in the site selection process on indigenous cultures. This would make them understand, to an extent, Native Americans' ties with the land and lead to more consideration when picking a site to build on. Not all astronomers are completely pro-telescope construction and have sympathy for Native Americans' views. For example, Emily Rice, an astrophysicist that has used telescopes on Mauna Kea for her research, says of the conflict with the TMT: "Astronomy is awesome, but it's not life or death. We can take the time to do things right & set an example" [7]. Another astronomer wanting resolution is Doug Simons who has tried to build bridges between astronomers and Native Hawaiians opposing the TMT. He organized a talk to be given by Native Hawaiian activist Joshua Lanakila Mangauil to a group of interested astronomers during a meeting of the IAU [14]. This kind of education is useful because most astronomers do not know there is any kind of issue until protests happen.

A report of various Hawaiians' views on Mauna Kea and its controversies (including the TMT) called “Report of the Hui Ho'olohe” (which translates to report of the listening group) was published. This got a lot of different Hawaiian people together to give their input about the mountain. They talked to Hawaiians of all ages and from all backgrounds (from traditional native people to business people) with the goal of hearing different peoples' views of the mountain and their visions for its future [6]. This is the kind of thing that is good for getting scientists and native people in the same room, talking to each other, on equal footing.

As stated on the TMT and Mauna Kea website, the project has seemingly implemented a lot of programs and ideas to be more culturally sensitive in its interactions with Mauna Kea. For example, they have all their employees do a “Cultural and Natural Resources Training Program” [12]. These programs appear to have developed in reaction to protests, and the question lingers of why there are still protests against the TMT if these programs are really sensitive to the views of Native Hawaiians. It is suggested that meetings with local indigenous groups should take place before a site is chosen. I also suggest that astronomers and other people working on site selection should be educated on the worldviews of indigenous peoples in the areas they consider building. In this way, astronomers might agree that the cultural significance of a potential site should be given more consideration than it currently receives. I think the idea of education for astronomers would be a good start to a resolution that did not lessen the validity of either Native spiritual practices or scientific exploration.

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