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|XAM SKYLORE OF THE KAROO DESERT, SOUTH AFRICA

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ABSTRACT

The Square Kilometre Array (SKA) will be the largest radio telescope facility in Africa when it is completed which is estimated to be a decade into the future. The |Xam group of the San people of South Africa lived in the region of the Karoo Desert where the Square Kilometre Array is being built. Several European countries are part of the SKA collaboration (Spain, Sweden, Italy, the Netherlands, the United Kingdom, Portugal, Malta, France), Asian countries (China, India, Japan, and South Korea), the Americas (Brazil, USA, and Canada), Russia, Australia, New Zealand, and South Africa, making up 20 major partners (SKA Communication and Outreach Team, 2015). In the 1870s the folklore, cultural practices and way of life of the |Xam were documented through interviews with a handful of |Xam individuals, mostly men that were serving prison sentences in Cape Town. Considered extinct since the early 1900s, in 2011 de Prada-Samper discovered that |Xam folklore, although transformed, is alive in the Afrikaans-speaking "Coloured" population in that region of the Karoo. In 2014, the SKA created the "Shared Sky" art exhibit to highlight the celestial art of the indigenous people of South Africa along with those of Australia where the second part of the telescope is being built. It offered the authors an opportunity to collect interviews with storytellers in the Karoo focused on local astronomy and skylore. Among the information the storytellers gave, they included details of the Milky Way, the Pleiades, and how to predict weather by the moon, but no mythological narratives about these heavenly bodies were recorded. An analysis of the information recorded points to the connections still present with the 19th century lore, though the original language has been lost and contemporary elements have been incorporated.

KEYWORDS: Square Kilometre Array (SKA), Indigenous Astronomy, Karoo Desert, the |Xam (South Africa), the San (Bushmen), "Coloured" people, Milky Way, Pleiades, Moon

1. INTRODUCTION

The Square Kilometre Array (SKA) is the name of the next generation radio telescope, which is currently being built in South Africa and Australia. It is an international collaboration involving 20 partner countries including eight European countries, each country has made a financial commitment to the project. When completed it will be the largest radio telescope ever built and it is estimated that it will be operational for fifty years into the future. To ensure that future, the telescope is situated in underpopulated regions across Africa and Australia where there is little radio interference - radio quiet zones. The telescope will consist of hundreds of radio dishes that are coupled together to create one big telescope. Though physically located in the Southern Hemisphere, the headquarters are in Europe in the United Kingdom. Every major step of the SKA, from site proposals to headquarters location, has been an international competition. Though current orientation of the SKA was announced in 2012, in some way the rivalry between countries was still present. To promote unity, SKA decided to create an art exhibit showcasing the indigenous art of Australia and South Africa that would circulate through the SKA partner countries (Collison, 2015; Garnier, 2014).

"Australian and South African artists in a collaborative exhibition celebrating humanity's ancient cultural wisdom. Embodies the spirit of an international science and engineering collaboration - SKA; bringing together many nations around the two sites in Australia and South Africa to study the same sky.[1]"

The South African part of the exhibit consisted of tapestries depicting the origin myths and skylore of the |Xam, a San (Bushman) people that used to inhabit the Karoo desert region where the core of the African SKA is being built and whose descendants still live there. Also included were interviews with local storytellers that had been previously identified by de Prada-Samper (de Prada-Samper, 2014). The focus of these interviews matched those of the tapestries in that the goal was to collect people telling the contemporary versions of stories connected to the sky. Video clips of some of these storytellers appeared in the exhibition, but most were not used. However, the interviews are a new source of cultural astronomy information about a little studied population in Africa, and as such the materials have been analysed for their historical connections to the |Xam people, the San group whose ancestral lands surround where the SKA is being built, and for their contemporary sky knowledge.

[1] *Quote from the SKA Communication and Outreach Office, Personal Communication.*

2. THE INTERVIEWS

In 2014, four storytellers were interviewed in the little settlement of Swartkop and in the proximity of Vanwyksvlei, and Kenhardt. In 2011, de Prada-Samper, who for some years had been conducting fieldwork in the former |Xam territory of the Karoo following the seminal research of Janette Deacon (1986, 1988), began interviewing local people living in farms and townships. The purpose was to gather personal histories and generational memories, but quite unexpectedly he realized that the contemporary descendants of the |Xam, in spite of the language loss and the radical (and forced) change in their lifestyle, still have a rich oral literature that, although transformed and "creolized" to a large extent, can in many ways be considered the continuation of that documented by Bleek and Lloyd in the 19th century.

The four people filmed in 2014, who had already been interviewed on previous occasions by De Prada-Samper (but never in connection with the sky), were Klaas Mouton (c. 70), Klaas Priega (c. 80), Griet Skei (69), and her husband Jan Skei (c. 80) (Figure 1). The video recorded interviews were a minimum of 1.5 hours and up to four hours. In anticipation of these videos being part of the Shared Sky exhibit, the storytellers were filmed primarily outdoors in culturally relevant locations such at some the many rock art sites and archaeological sites connected to the |Xam people.

Figure 1: Griet and Jan Skei.

The |Xam were hunter-gatherers that lived in the Upper Karoo and neighbouring areas of the Northern Cape until their territory was invaded by farmers, mostly Coloured (of mixed Khoi and European descent) and white. As the policy of the intruders was to exterminate the original inhabitants of the land or force them to work for them in very harsh conditions, by the early 20th century only a few remnants still spoke the |Xam language, the majori-

ty having adopted the Afrikaans tongue of their oppressors.

These survivors were by then considered as part of the "Cape Coloured" population, like many of their fellow Khoisan descendants, and lived as squatters in what had been their ancestral lands, in many cases also wandering about as migrant farm-labourers. Because they were perceived as acculturated "residues" of the first peoples of South Africa, these "Coloured" communities received little attention from anthropologists.

3. THE |XAM IN THE 19TH CENTURY

Beginning in the 1870s, linguist Wilhelm Bleek, together with his sister-in-law Lucy C. Lloyd, gathered an impressive collection of texts and other materials from |Xam people that had been brought to Cape Town to serve sentences of hard labour in the Breakwater prison, in most cases their "crimes" being connected with stock-theft.

The Bleek and Lloyd interviews span 155 handwritten notebooks, of these, 138 notebooks are on the |Xam people (Bleek and Lloyd, 2007). The contents include, among other things, mythological narratives, personal histories, descriptions of rituals and lists of stars and others heavenly bodies identified with the help of an astronomer, Thomas Maclear of the Royal Observatory, Cape of Good Hope.

There were six |Xam informants, ||kabbo was the informant from the region we visited in 2014. He stayed with Bleek and Lloyd for more than two years (1871-1873) and time beyond his imprisonment to share his knowledge of the |Xam.

4. ASTRONOMY CONTENT

All four of the people interviewed in 2014 provided information about celestial bodies and the night sky. Storytellers were asked at first to tell traditional stories in general, trying then to steer the conversation towards what they knew about the sky.

The information presented here are from those interview questions particularly about the sky.

4.1 The Milky Way

Griet Skei, Klaas Mouton, and Klaas Priega called the Milky Way "Hemelstraat." "Hemelstraat" is an Afrikaans term meaning Heaven's Street or the street of Heaven. Griet Skei gave the most physical details about the Milky Way. She said that the Milky Way lies East-West in Summer and South-North in Winter. The video clip of this part of the interview is online at https://youtu.be/7G5seBITvVc. This information is misleading because the Milky Way rotates over the night and can have both an East-West alignment and a South-North alignment during the same night.

This information was checked using Stellarium – a night sky simulation program (Chéreau, 2003). For example in Winter, at 21:30 on June 21st the Milky Way lies East-West, whereas at 01:00 it lies South-North.

Figure 2: Milky Way in June (Winter). Stellarium image of the Milky Way aligned roughly East-West in Winter, as seen from Carnarvon (Latitude 30°58'05" S, Longitude 22°07'58" E , Altitude 1249 m) at a time of about 21:30.

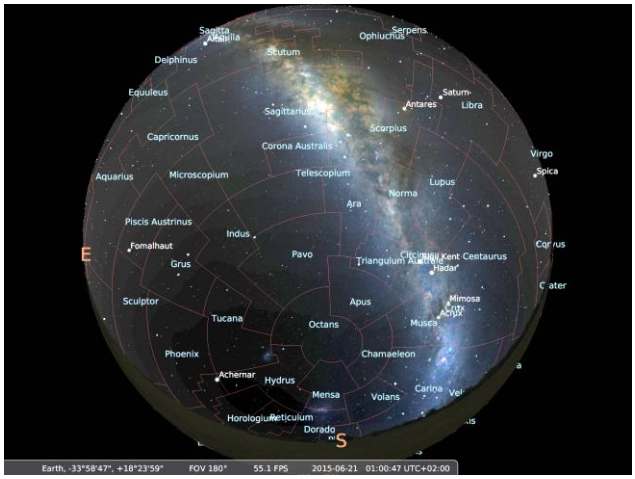

Figure 3: Milky Way in June (Winter). Stellarium image of the Milky Way aligned roughly South-North in Winter, as seen from Carnarvon (Latitude 30°58'05" S, Longitude 22°07'58" E , Altitude 1249 m) at a time of about 01:00.

Thus, for Griet Skei's statement that in the Winter the Milky Way lies South-North, the observing time must be in the early morning hours. Figure 2 Shows the Stellarium image from June 21 (winter solstice) at 19:30 with the Milky Way aligned East-West. In contrast, the nights are much shorter in Summer and so the Milky Way does not have enough time to rotate to an East-West alignment, thus is seen in a South-North alignment (see Figure 4).

Griet Skei said that the Milky Way is brightest in winter. The brightest part of the Milky Way is in the direction of the centre of the galaxy, which is in the constellation of Sagittarius. Sagittarius is visible during the South African winter. Griet Skei is correct.

Figure 4: Milky Way in December (Summer). Stellarium image of the Milky Way aligned roughly South-North in Summer, as seen from Carnarvon (Latitude 30°58'05" S, Longitude 22°07'58" E , Altitude 1249 m) at a time of about 00:30. The later time is used because the Sun sets later in summer. The shorter nights also mean that the Milky Way does not have enough time to rotate to an East-West alignment.

4.2 THE PLEIADES

The Pleiades are a star cluster that is visible in both the Northern and Southern Hemisphere. It is in the constellation Taurus and appears as a small but bright group in the night sky. Griet Skei told us that her grandmother taught her that the Pleiades are the Seven Stars, but emphasized that your eyes have to be very good in order to see all seven. Most people do only see six stars, but the cluster has hundreds of stars that are too faint to see.

Griet Skei recited a riddle about the Pleiades which seems to be connected to the spring rains. It goes as follows:

Raai, raai, raai -- Guess, guess, guess
Akkeldis, akkeldis is hemel toe --
Lizard, lizard went to heaven
Trou jakkals op sy agterklou --
Married Jackal on his hind claw
My bles jou bles -- My bald pate, your bald pate
Sewe takke uitgeblom -- Seven branches flowered

This riddle has a number of metaphors that are very local and would puzzle most Afrikaans-speakers, not to say people not familiar with the language! *Akkeldis* no dobut is a dialectal form of *akkedis*, Afrkiaans for a lizard of the genus *Mabuya* known in English as skink. There is a lizard in the Karoo that folk wisdom says looks in the direction towards the coming rain. Thus the second line might be the anticipation of rain. The next line about the Jackal, is a local way of saying that it is raining but the sun is still shining, thus there is both rain and sunshine. Also, dark rain clouds are referred to as "Jackal Clouds" in the |Xam notebooks (Bleek and Lloyd, 2007) (See http://lloydbleekcollection.cs.uct.ac.za/stories/815/index.html). The next line has not been verified, but it might be a veiled reference to the sexual activities of spring. The final line is the answer which is the Pleiades, but also the fertility and growth of spring after the rains. However, this interpretation is tentative because the lizard associated with rain is the agama which is called *koggelmander* in Afrikaans, whereas the akkedis is the skink.

As so many things in the lore of the |Xam and their contemporary descendants, this riddle is quite obscure but it seems to refer to sexual activities in the spring and, in thus, to fertility in general, which in the area definitely means rainfall. The |Xam described the Pleiades as a 'summer's thing' (de Prada-Samper, 2016: 138) so very likely they also associated them with sex, rain and fertility

4.3 The Horns of the Moon

Griet Skei, Jan Skei, and Klaas Mouton all contributed information about how to predict rainfall using the moon. They spoke of the crescent moon that was orientated horizontally such that the moon appears to be holding the water. They would look for the crescent moon in the west, thus it was the first crescent. When the moon was in the holding position, there would be no rain. When the moon appeared to be in more of a "C" position, it could pour out the water and there could be rain.

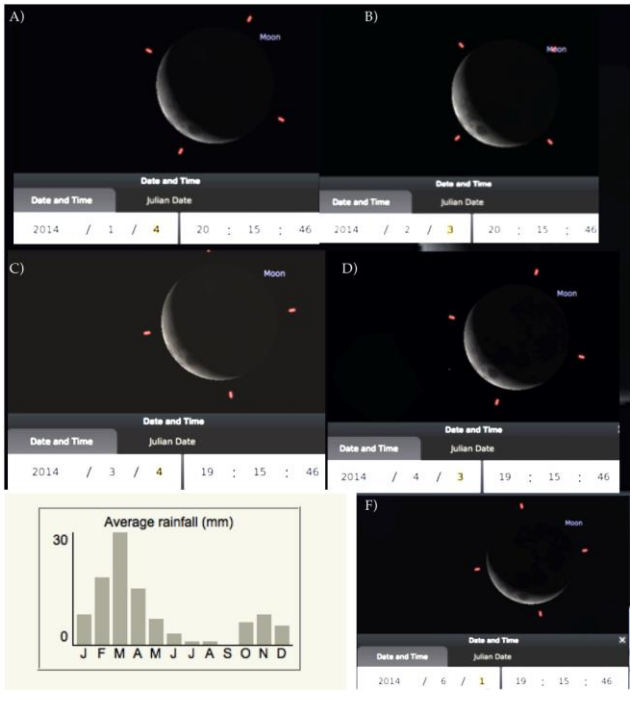

Figure 5: Carnarvon Crescent Moons and Rainfall. The lower left panel is the average monthly rainfall for Carnarvon (SA Explorer, 2014). Panel A) is the first crescent for January, B) February, C) March, D) April, F) June. Only the June crescent moon looks significantly different and more like a 'water-holding' moon.

There is no physical relationship between the phase of the moon and rainfall, however the angle of the "horns" of the crescent moon does change angles over the year. There is a similar practice among the Ngas of Nigeria, however they look for a different angle of the horns to indicate rain (LaPin and Speed, 1984). Aveni plotted the crescent moon angle against the rainfall for Nigeria and found that there is a visual correlation (Aveni, 1993). Comparing the rainfall for Carnarvon, Northern Cape, to the horns of the crescent moon there is a visual correlation (Figure 5).

For the most part, the crescent moons for January, February, March, and April do not differ. They all appear to be 'water-pouring' moons. Since they do correspond to the rainy season, there is no conflict. Predicting the weather is not exact and thus any system must be likewise inexact. The first crescent moon occurs on a different day each year repeating every nineteen years (the Metonic cycle). We estimated that the day of the first crescent moon varies by up to twenty-six days within each month, that mean that one year it may be on the 1st day of the month and another year it can be on the 27th day of the month, but other years falls somewhere between the two. This variation of the day that the first crescent moon falls during the month is another level of inexactness in this prediction method. A working assumption is that people in this region of the Karoo would only search for the first crescent if the rains were late. Imagine that it is February and there is still no rain, and the first crescent is near the middle of the month but it is cloudy so cannot be sighted. If it rains before the next first crescent in March, then all is well. If not the next first crescent orientation is important to make sure that it is a 'pouring moon'. Thus, the inexactness allows the system leeway to work for predicting rainfall, in that it allows time for the rains to start within the window of January through April.

5. CONCLUSIONS

The storytellers of the Karoo have lost the connection to the |Xam language, however their knowledge of the night sky reflects some of the |Xam concepts.

Griet Skei, Jan Skei, and Klaas Mouton provided details of the connection between the sighting of the first crescent and prediction rainfall for the month. Their description of the position of the moon, the pouring moon position, is visually correlated to the four months of measured higher rainfall in that part of the Karoo – January, February, March, and April.

The Milky Way according to the |Xam was created when a girl threw the coals, ashes, and embers from a fire into the air (Bleek and Lloyd, 1911: 72–79). The |Xam word for the Milky Way is *!ko* which can be translated as white ashes (de Prada-Samper, 2016: 134). The girl wanted to have light, but also made it possible for people travelling at night to have "a little light … that they might return home" (Bleek and Lloyd, 1911: 75). Griet Skei did not know this myth, told by ||kabbo in 1873, yet it is worth noting that the story is essentially a mythopoeic description of the rotation of the Milky Way, about which she told us a lot (see above).

The |Xam terms for moon are ||auru, !ka!ká uru, among others (de Prada-Samper, 2016: 136). The |Xam had a notion of a good and bad crescent moon with a good moon having the crescents pointed upwards (Bleek and Lloyd, 1911: 399). This is the equivalent of a "holding moon" in terms of the rain prediction method today. The 19th century|Xam did not mention rain in this connection, yet the association with it could very well have been known to them. Compared to the rich skylore documented by Bleek and Lloyd in the last third of the 19th century, these results tend to indicate that most of the knowledge about the heavens was not passed down when the |Xam were incorporated into the farm economy, especially the narratives that explained the origin of the moon, the sun and certain stars. The most likely reason for this is that these narratives, as those more closely connected with the hunting and gathering mode of life, ceased to have a function in the new order. Yet considering that so far only a handful of people have been interviewed, and that the former |Xam territory covers a vast area, it would be rash to jump to conclusions. Some pleasant surprises may lie ahead.

ACKNOWLEDGEMENTS

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