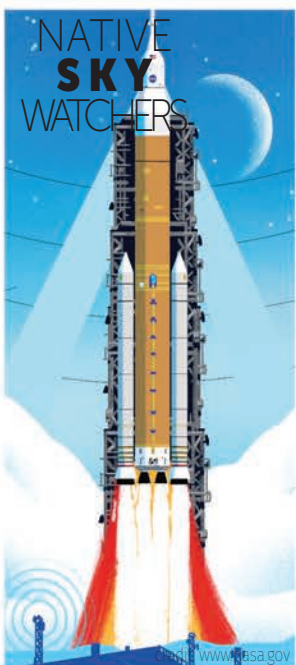
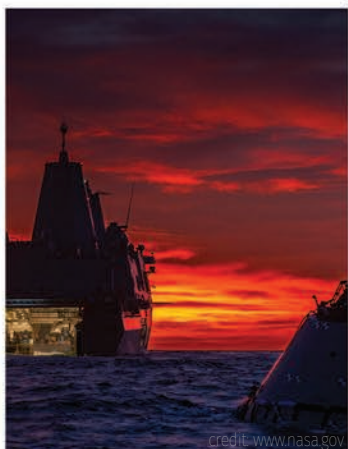


NATIVE
SKY
WATCHERS

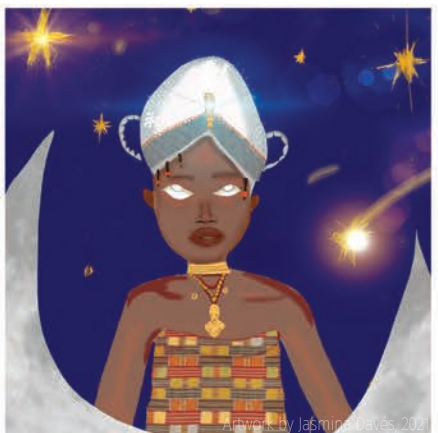


TWO-EYED SEEING: AFRICAN INDIGENOUS ASTRONOMY & NASA MOON TO MARS



FEB. 26
FRIDAY
2021
10:30 AM CST

LIVE
VIRTUAL
EVENT



Two-Eyed Seeing, Etuaptmumk

As shared by our Mi'kmaw colleague, Carola Knockwood and her elders: "Two Eyed Seeing or 'Etuaptmumk' is learning to see from one eye with the strengths of Indigenous knowledges and ways of knowing and from the other eye with the strengths of Western knowledges and ways of knowing and to use both these eyes for the benefit of all." - Bartlett, Marshall and Marshall, 2021

Land Acknowledgment

The *Native Skywatchers* research and programming initiative would like to acknowledge that the land under our feet is the original homelands of the Dakota people, *Mni Sota Makoce*, "Land where the waters reflect the skies". Later Anishinaabe began settling in Northern Minnesota, (the Great Migration). We acknowledge both the Dakota and Anishinaabe's painful history of genocide and forced removal from this territory, and we honor and respect the many diverse Indigenous peoples still connected to this land on which we gather.

Chukwu abiam, Eke kere uwa, ekele muo

Elu na Ala ndewo ni

Ala nna dirikwa

Ndiche, ekelem unu

Cha, Cha, Cha, Igbo kwenu! kwezuo!

Greetings Creator of the World

Greetings, heaven and earth

Greetings our ancestors

Long live, our native land

Our umbilical cords are buried in the land to continue our linkage to Ala (earth) and Ndiche (ancestors). We have a duty to sustain the land and leave it clean, healthy and just for posterity.

"The land was stolen from Indigenous peoples and enslaved Africans were brought en masse to build these cities. This is occupied Indigenous territories of many nations and these cities are built with stolen African labor and resources. One cannot be remembered without the other. We invite you into a tradition with us of acknowledging and remembering whose territory you are on wherever you are in the Americas (from the North to the Caribbean and to the South) and also remembering and acknowledging that it was built with stolen African & Black labor and resources as well." -<https://poderff.org/land-acknowledgement>

Feb. 2021

Feb. 4 3rd Quarter

Feb. 11 New Moon

Feb. 19 1st Quarter

Feb. 27 Full Moon

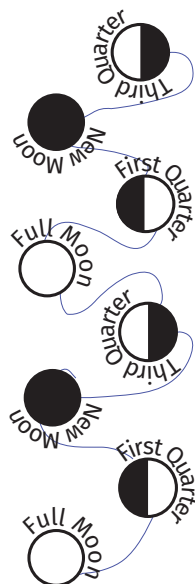
Mar. 2021

Mar. 5 3rd Quarter

Mar. 13 New Moon

Mar. 21 1st Quarter

Mar. 28 Full Moon



Madagascar Indigenous Moons

Going to the African Island of Madagascar, the names of the phases of the Moons are as follows among the Tanala people:

New Moon is Velombolona

First Quarter is Rimbamborana

Full Moon is Vorifotsy

(No record of 3rd quarter name.)

Moon is Ambolona.

- (Linton, 1933)



credit: Efra Gomez, Aug 2011

Ghana Indigenous Moons

To the Balsa people of Ghana the Moon is Chiik which also means soul...



credit: Joseph08, "Crescent Moon Today, 2020"

Chii-paalik (New Moon)

Chii-bulik (young Moon) - waxing crescent

Chii-kauk (half Moon) - which is first quarter/third quarter

Chii-pomik (Full Moon)

Chii-kum - the death of the Moon - waning crescent.

(Kroger, 1984 & Apentiik, 2003).

Zambia Indigenous Moons

Going to Zambia, the Bemba people have the following names of months and their meanings.

Langáshe - The full term is langáshe nkamya mimana - the very great heat that dries up the rivers.

Kupunda-Milimo - the month when people begin to work in the fields.

Kabengele Kanono - The time when a few mushrooms appear.

Kabengele Kakalamba - the time when many mushrooms appear.

Kutumpu - the time of raising up mounds of turves (plural of turf) basically piling up dirt as part of cultivation in preparation for the next year.

Shinde - the time of plenty of food.

Kapepo Kanano - The small cold wind

Kapepo Kakalamba - The bigger cold wind

lcikungulupepo - the greatest cold wind

Ipukutu - When leaves and twigs fall.

Akasakantobo - When the mulobo trees begin to have new leaves.

Ulusuba Lunono - The small heat.

Ulusuba Lukalamba - the big heat.

The thirteenth month is reflective of reconciling the lunar and solar years. Their 13th month is Ipukuku.

(Chaplin, 1967).



Photo by Image by David Mark

NASA Apollo Missions

"That's one small step for a man. One giant leap for mankind."
- Neil Armstrong (Apollo 11 Commander, July 1969)

Apollo's Goals: The national effort that enabled Astronaut Neil Armstrong to speak those words as he stepped onto the lunar surface fulfilled a dream as old as humanity. Project Apollo's goals went beyond landing Americans on the moon and returning them safely to Earth. They included:

- Establishing the technology to meet other national interests in space.
- Achieving preeminence in space for the United States.
- Carrying out a program of scientific exploration of the Moon.
- Developing human capability to work in the lunar environment.



Photo by www.nasa.gov

NASA Artemis Program

With the Artemis program, NASA will land the first woman and next man on the Moon by 2024, using innovative technologies to explore more of the lunar surface than ever before. We will collaborate with our commercial and international partners and establish sustainable exploration by the end of the decade. Then, we will use what we learn on and around the Moon to take the next giant leap – sending astronauts to Mars.



Photo by www.nasa.gov

Greek Twin Gods -Sun & Moon

The first NASA mission to the moon was named the Apollo mission after the Greek god that was associated with the Sun. Whereas Artemis is the Greek goddess that was born first, and is the twin of Apollo. Artemis is associated with the Moon. According to legend, Artemis drives the chariot that pulls the Moon across the sky, while Apollo drives the chariot that pulls the Sun across the sky.

Where is Benin?

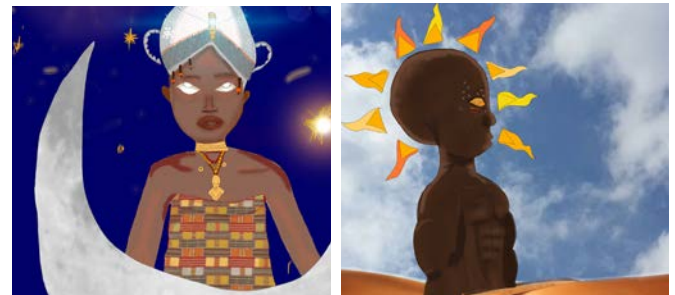
Country in West Africa. Benin, a French-speaking West African nation, is a birthplace of the vodun (or "voodoo") religion and home to the former Dahomey Kingdom from circa 1600-1900. In Abomey, Dahomey's former capital, the Historical Museum occupies two royal palaces with bas-reliefs recounting the kingdom's past and a throne mounted on human skulls.



Photo by <https://earth.google.com/web/>

Benin Twin Gods -Sun & Moon

The idea of the Sun and Moon being twins as well as the Sun being male and the Moon being female is also found in Africa. Among the Fon people of Benin, Mawu and Liza are twin gods, thought of as one great sky god. Mawu is female and connected to the Moon, while Liza is male and connected to the Sun.



Images of Mawu & Liza, Artwork by Jasmina Davé



By Michel wal, Benin Bronzes, wikipedia

The people of Benin are famous for their cast bronzes which artist Jasmina Davé has used for inspiration for her drawings of Mawu and Liza.



By Takkk Benin Bronzes, wikipedia

How Many Countries are in Africa?

Many people of all ages are confused about Africa, most think that Africa is one giant country. They have no idea of how many countries are in Africa and that Africa has countries that are in the Northern Hemisphere and others that are in the Southern Hemisphere.

This map of Africa shows where the equator lies in Africa.

Depending upon which country you live in, you will see the Northern Hemisphere stars, the Southern Hemisphere stars, or if you live near the equator, you can see some of both.



Photo by <https://earth.google.com/web/>

Water in the Moon?

The very notion of water in the moon sends ripple excitement to the scientific community as they continue to search and probe for evidence of life in space. Astrochemists earlier thought the moon was dry. In 2009, hydration was detected on the sunny side of the lunar surface through observations of a characteristic absorption feature at 3 microns (μm , micrometers) by three independent spacecraft. The aircraft used at the time could only measure the infra-red (IR) signals at 3 μm . Water has an unambiguous IR signal at 6 μm . Scientists do not know yet whether the hydration observed was molecular water (H_2O) or other hydroxyl (OH) compounds.

In 2018, Honniball and her colleagues observed the Moon at 6 μm using the NASA/DLR Stratospheric Observatory for Infrared Astronomy (SOFIA) and confirmed the existence of water on the sunlit moon. They observed the 6 μm signal on the sunlit lunar surface at high southern latitudes but not at lower latitudes.

The water the scientists observed is neither ice nor liquid; it exists as lone molecules. The researchers don't know whether these molecules are trapped inside glasses formed by meteorite impacts or tucked between grains of lunar dust. Honniball says they are planning follow-up observations that might nail that down. Water could be brought to the moon on meteorites, form during meteorite impacts, or come from inside the moon. (Honniball, 2021)



Photo credit Clavius Crater on the Moon. Credit: NASA/USGS

Moon & the Feminine

Back to the Balsa people of Ghana, they have a time related saying "I will return in the pregnancy of moon" which means they will come back during the time that the moon will be full given that now the moon is still an embryo - taken from Kroger 1986 p. 149 (Kröger, 1986). Thus, you see the connection between the monthly phases of the moon as a female having a pregnancy. Then after the full moon would be the time that a woman loses weight after giving birth.

Think about this: How long does it take a woman to have a baby? About 9 months. If we think of the moon as having a baby, it gives birth after 15 days.

These are two very different lengths of time! However, human women aren't the only ones to give birth, for example mice and hamsters give birth after 20 days. Also, bird eggs can hatch as early as 14 days after being laid.



Photo credit: Andre Van de Sande

Somali Moon Guides

My great-grandfather used to use his hands to measure the distance of lighting and the amount of water that the land would get based on just oral knowledge passed down in the family. This knowledge was used to predict droughts, storms and rain. Listening to the story from my grandmother who was the one that took this knowledge from him would tell us at night how the Moon in that area meant this and how the stars meant more than just the constellations seen.

There are 28 stations/days in which the Moon aligns along with the stars and this positions are associated with weathers. Somali people use the moon and stars as guides for weather. These Moon's alignment falls in certain times and predicts weather. This is also used as sign of either good or bad will to the ones born under it. In a book by Galaal, he calls them stations and each stations falls on a certain prediction of the weather and predicts the fate of the child born then. These alignments are based on oral traditions and the meaning and names are taken from oral traditions.

In addition, however, to the 28 stations along the visible path of the Moon during each lunar month, there are said by Somalis to be one or two nights stars, seasons and weather in Somali pastoral traditions in every month during which the Moon is not visible. -
Written by Educator Amun Said



Photo credit: Jack LeFor

Somali Awrka-Cirka (Sky-Camel)



“Awrka-Cirka, the “Sky-Camel”. This is a black image in the sky at night in the region of Wadaamo-Xooro or Waadaamo-Lugud (the Southern Cross), caused by the fact that there are no important stars in that area; and in the blackness is said to appear the shape of a huge male camel on dark nights in the months of April and May. Somali folklore has a legend about this Sky-Camel. It says that the camel was once, long ago, positioned in the north, above the mountains of Cir-Shiida, in the Warsangeli district of Erigavo.

One year there was a severe drought, and the people of the district attacked the great sky-camel and tried to kill it for meat.

Photo by Diana Robinson

First they built a huge platform on top of the highest mountain of the Cir-Shiida, tall enough for the people standing on it to reach up to the tail of the sky-camel and cut it off. The camel felt the pain and raced off to the south - where it is still to be seen. The Milky Way is said to be the path taken by the Sky-Camel on its hurried journey southwards.

In the month before the start of the gu rains, the Sky-Camel is seen with its head down towards the east. Then it is said to be drinking water — Wuu Afku-Rubadlaynayaa. In April and May, its image is upright again, and can be seen clearly between eight and twelve o'clock at night, apparently satisfied, and chewing the cud heartily. In June and July, its head appears to be turned upwards towards the zenith, its back falling towards the west, apparently cropping the tops of the trees. In fact, the three different periods of the grazing year in this region of Africa are closely pictured by the onset of the gu rains, all the livestock are busy drinking the spring waters. Towards the middle of the rains, when there is plenty of green grass and water, the animals have fed so well that they spend long periods contentedly sitting and chewing. And when the rains are finished, and the green grass parches, the camels begin cropping from the trees. -Written by Educator Amun Said



Photo Credit: ESO Bardon LaSilla



Photo by Mariam Soliman

Observing the Milky Way

Astrophysicists use observatories situated on mountaintops around the world in order to study the physical properties of celestial bodies including our own galaxy the Milky Way. We had the opportunity to do a virtual visit with Prof Raja GuhaThakurta and his team as they observed distant stars in the halo of our galaxy. They are determining the Milky Way's collision with the Large Magellanic Cloud has shifted our galaxy's dark matter halo.

San & Sotho People of South Africa

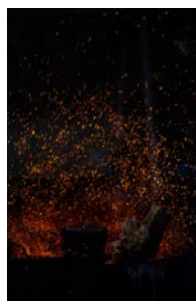


Photo by April Cox

The San people of Southern Africa - Young girl with magical properties throws the fire up into the sky which makes the Milky Way to show the hunters the way to come home. Among the Sotho people also of Southern Africa, they saw the many stars as a herd of elephants that was so big that there are too many elephants to count. Thus, the Milky Way is called the Path of Elephants - Gwara Renzou (McCosh, 1979).

NASA Space Launch System (SLS)

NASA's Space Launch System, or SLS, is a super-heavy-lift launch vehicle that provides the foundation for human exploration beyond Earth's orbit. With its unprecedented power and capabilities, SLS is the only rocket that can send Orion (the space craft), astronauts, and cargo to the Moon on a single mission. Offering more payload mass, volume capability, and energy, SLS is designed to be flexible and evolvable and will open new possibilities for payloads, including robotic scientific missions to places like the Moon, Mars, Saturn, and Jupiter. <https://www.nasa.gov/exploration/systems/sls/overview.html>



Photo by www.nasa.gov

African Thunder Gods

Thunder and lightning are dramatic physical events that merit their own gods!

Ngai is the supreme god of the Gikuyu people of Kenya and when he stretches his joints in preparation for battle it makes thunder. Amadioha is the thunder god of the Igbo people of Nigeria. Bwaza is the thunder god of the Gurage people of Ethiopia. Deng is the rain god that is also connected to thunder of both the Nuer and the Dinka people of South Sudan. Khebioso is the lightning god of the Ewe people of Ghana and Togo. Xevioso is the god of thunder & lightning of the Fon people of Ghana and Togo, and is related to So the Thunder God of the Anlo people of Ghana. Kiwanuka/Sserubwatuka is the god of thunder of the Ganda people of Uganda. Sserubwatuka previously was a human and his twin brother is Musoke the rainbow God. Shango is the thunder god and god of the forge (blacksmith) of the Yoruba people of Nigeria.

What if we had the ability to rename the Space Launch System (SLS) rocket after one of the African Thunder gods?



Photo by Steve Kietzi

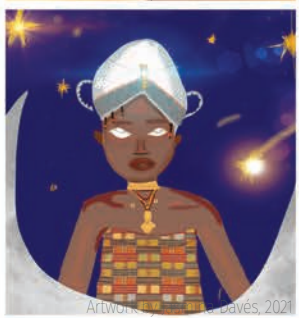


Thank you!

Credit for this work:

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References:

Apentiik, R. A. (2003). An ethnoecological study of Balsa land use, Upper East Region of Ghana: Implications for sustainable development [Ph.D., University of Calgary (Canada)]. <http://search.proquest.com/docview/305349582/abstract/28512158BBE94EBAPO/3>

Chaplin, J. H. (1967). Vernacular month names from Zambia. *African Studies*, 26(3), 145-169. <https://doi.org/10.1080/00020186708707262>

Honniball, C.I., Lucey, P.G., Li, S. et al. Molecular water detected on the sunlit Moon by SOFIA. *Nat Astron* 5, 121-127 (2021).

Kröger, F. (1986). The notion of the moon in the calendar and religion of the Balsa (Ghana). *Systèmes de Pensée En Afrique Noire*, 7, 149-151. <https://doi.org/10.4000/span.610>

Linton, R. (1933). THE TANALA: A HILL TRIBE OF MADAGASCAR. Publications of the Field Museum of Natural History. Anthropological Series, 22, 1-334. JSTOR.

McCosh, F. W. J. (1979). The African Sky. In NADA (Vol. 1-Book, Section, pp. 30-44).



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