

SOLSTICE AND SCORPIUS ALIGNMENTS OF THE JABOQUE PETROFORM MENHIRS

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BACKGROUND

Two Colombian geology students doing field work for their graduation theses discovered ancient irrigation canals and mounds along the Bogotá River between the towns of Chia and Soacha (1). This was the first discovery of ancient irrigation canals associated with the the Bogotá River system.

While mapping the Jaboque wetlands(2) (Fig. 1), they discovered four stone menhirs called "Piedras de Los Indios" (Indian Rocks) by local inhabitants. This author was asked to investigate the menhirs with regard to possible astronomical alignments. During the investigation more menhirs were found, bringing the total to 14 menhirs and one associated square rock. Pre-Columbian menhirs have been described in the northern Muísca territory of Boyacá, but never before in the southern Cundinamarca region.

HISTORY OF THE JABOQUE WETLANDS

Twenty thousand years ago the Bogotá savanna was a large lake called Tumha. It's shores were at an elevation of 2,600 meters above sea level. About 15,000 years ago the first hunter-gatherers entered the Bogotá region and found the lake during their search for large game. Sedentary cultures developed ceramic and agricultural skills around 3,200 B.C. in the Puerto Hormiga and Monsú areas of the Colombian Caribbean coast (Reichel-Dolmatoff 192), and the first agricultural communities probably developed in the high plains area around Bogotá about 3,000-1,000 B.C.

As lake Tumha slowly dried, wetlands formed creating an ideal habitat for a wide variety of fauna such as: fish, crabs, turtles, curies and birds. Pre-Columbian tribes fished, hunted and built drainage canals joining the wetlands with the Bogotá River. Fertile soil excavated during construction of those canals was used to build mounds for planting potatoes, corn and other crops. It is estimated that at the beginning of the 20th Century that there were 50,000 hectares of Bogotá wetlands. Today only 800 hectares of wetlands remain.

Jaboque is the name given to one of the remaining wetlands located near the town of Engativa, Cundinamarca (now a Bogotá barrio). Jaboque in the Chibcha language means "Firewood of God's forest" and Engativa means "a sub-chieftdom of Inga." Inga means a good natured person. Engativa was a settlement of the Muísca Indians (600-1500 A.D.) and the site of violent encounters between the natives and Spanish conquistadors (Fig. 1).



Fig. 1. Jaboque Wetlands Site Map



Fig. 2. Square rock #2



Fig. 3. Menhir #1; looking through hole at horizon azimuth 233° and 14° altitude.

During the early Colonial period natives were affected by continuous inundations from lakes and wetlands near the Bogotá River where they hunted, fished and raised crops for their livelihood. Much of the flooding stopped when Jaboque lost 20% of its area between 1956 and 1977 due to illegal filling and construction, and another 20% was lost during the 1980's. Today, most of the northwest part of Jaboque, where the menhirs are located, is covered by approximately two feet of water.

SITE DESCRIPTION

The menhirs are scattered in a flat, swampy area approximately 600 meters wide and 1,900 meters long beginning at the Bogotá River bank and are distributed southeast from the river. A manmade canal drains the center of the menhir area to 329° compass bearing, passing around a man made raised pond 15 meters in diameter, and continues at 326° to discharge into the Bogotá River. Menhir #1 is located at 4° 43.66" north latitude, 74° 8.89" west longitude at 2,545 meters elevation, 6.9 meters from the pond at azimuth 186°. It is 1.5 meters tall, 15 cms wide on two sides, and 30 cms wide on the other two sides. A 4 cm diameter hole was drilled through the menhir at a 14° angle beginning 1.30 meters from the ground. It is aimed a point in the sky over treetops on the horizon at 233° azimuth. A flat, square stone (20cms x 20cms) exposed 5cms above ground level, is located 2.86 mtrs from menhir #1 at 186° azimuth. It has a 2 cm diameter hole drilled to a depth of 3 cms in the center of the top (Fig. 2). A long, man made flat-topped mound or raised path begins approximately 15 meters from menhir #1 at 230° azimuth and continues for approximately 100 meters. The mound is approximately 1 meter tall and 3 meters wide. Another barely discernable mound runs 280° azimuth from the pond. Menhir #9 is located 837 meters from #1 at 105° azimuth. Menhir #9 is 1.25 meters tall and has sides 25cms x 27 cms x 28 cms x 20 cms. It is the only other menhir with a hole drilled through it. The 3 cm diameter hole is drilled horizontal 1.25 meters from the ground and is centered on 063°/243° azimuths with the south side at 066°/246° azimuths. The remainder of the menhirs range between 45 cms and 1.57 meters in height from ground level. Menhirs #10, #13 & #15 have fallen to a horizontal position. The menhirs are definitely not Colonial era stone fence posts and appear not to have been disturbed by man since their original placement. They are located in knee-deep water and mud. Water depth at the time of original construction is not known.

METHODOLOGY

GPS latitude and longitude coordinates of the menhirs were taken with a Garmin 12 GPS device by the geology thesis candidates and their assistants(3).

The author assisted recording menhirs #4-10 with GPS and photographically recorded all menhirs. Coordinates were mapped in computer digital format using the MapSource 2.1 program. Distances and bearings were taken from the program map and most were field confirmed using a German-made topographical surveyor-type hand-held internal-view compass accurate to 1/4 of 1°. Some measurements of length and azimuth orientation of canals and mounds were taken from an aerial photograph taken on Dec. 2, 1949 by the Instituto Geografico de Colombia "Agustin Codazzi"

ASTRONOMICAL ALIGNMENT INVESTIGATION

Investigation began in the area of the circular, 15 mtr. diameter, man-made pond. Sides of the pond are approximately 1 meter tall and 2 meters thick. While the pond is mostly filled in with sediment and reeds, it was probably once deeper and cleaner. A person can comfortably walk around the rim circumference. One practical purpose of the pond may have been a storage area for captured game such as ducks, geese, turtles, freshwater crabs and fish. It may have also been used for ceremonial offerings following an approach from a long raised path or mound oriented at 230° azimuth from the pond. Lakes, lagoons, ponds and streams were often used by the Muisca for votive offerings. An early historian described this type of ceremony that was overseen by a priest or *Chicua* who instructed and supervised the person desiring to make an offering to a god. The ceremony took place at night at a sacred lake, pond or laguna.

“...they removed all their clothes and stood naked, looking first to see if any noise was heard, and if none was heard they walked with great reverence.... and reached the sanctuary raising in both palms the figurine that they carried.... they said some words explaining the necessity of making the offering, and asked for help.....then they threw the figurine into the waters.....” (Simon/1625/1981/III:386)

Muisca approached their sacred lagunas on roads or wide trails especially designed and maintained for ceremonial processions to make their offerings of gold, emeralds, shell or stone necklace beads (Rojas de Perdomo 139). A possible astronomical connection with the pond will be discussed further along in this paper.

Menhir # 1, located a short distance between the pond and the long raised path to the southwest, is 1.5 meters tall with a hole at the 1.3 meter level.(Fig. 3) This would have been a convenient height for Muisca Indians who were of short stature. Archaeologist Silva Celis estimated the height of Muisca Indians at about 1.6 meters (Rojas de Perdomo 130). One skeleton of a 35-39 year old male late-Muisca Indian studied by the author was estimated to have had an approximate height of 1.5 meters (Marriner 1991:5). The height of the hole in menhir # 1 would be comfortable for a native Colombian to stand and look through it.

Before investigating a possible celestial alignment for the hole in menhir # 1, a survey of relationships between the menhirs was completed to see if any alignments could have been used to mark the extreme rise and set points of the sun during its yearly cycle at Summer Solstice Sunrise (SSSR) at 066° azimuth, Summer Solstice Sunset (SSSS) at 246° azimuth, Winter Solstice Sunrise (WSSR) at 114° azimuth and Winter Solstice Sunset (WSSS) 294° azimuth. Results of that survey are summarized in the following list of Jaboque menhir alignments:

SSSR

#3 to #4=066°

#15 to #14 to #7=066°

SSSS

#1 to #3=294°

#11 to #6=294°

#9 to #8 to #7=294°

WSSR

#3 to #1=114°

#6 to #11=114°

#7 to #8 to #9 to #10=114°

WSSS

#7 to #14 to #15=246°

#4 to #3=247°

It's obvious that a Muísca priest, trained in observation of celestial events, would have no trouble using the Jaboque menhirs to determine the exact day of any of the solstice sunrises or sunsets. He simply looked over the top of the correct menhirs to see the sun rise or set in the distance. (Figs. 4, 5, & 6) Since many of the menhirs are short and a long distance from each other, a field study suggests that poles may have been lashed to the menhirs to make the exact locations more visible. Poles and sticks were commonly used by other cultures as astronomical alignment tools. Inca astronomers used forked sticks (Fig. 7) to make precise celestial observations. As recently as 1948 the Ixil people of Guatemala at Nebaj, a village near the Guatemala-Honduras border, marked the sun on the horizon with great care, preserving the art of calendar keeping practiced by their ancestors. They sighted over a menhir from an observation point to an indentation in a hill to determine dates for planting and harvesting. (R.C.E. Long 214 in Aveni 281). Other Mayan astronomers simply used crossed sticks for their observations (Fig. 8). The Mayan "astronomer glyph" shows a seated person sighting through the V formed by crossed sticks

It should be noted that the WSSR alignment of menhirs #3 to #1, #6 to #11, and #7 to #8, #9 and #10, at 114° azimuth aligns with Cerro Escobal, a small peak in the middle of a low pass in the La Calera region of the hills directly to the east of Bogotá. (Fig. 9) This was one of the eastern mountain passes used by the Muiscas to reach their sacred Lakes Siecha and Guatavita.

A close examination of the hole drilled horizontally in menhir #9 at a height of 1.1 meters shows that it aligns with the SSSR at 066° azimuth in one direction and SSSS at 246° azimuth in the other direction (Fig 10).

Since all the menhirs except for #12 and #13 were associated with at least one solstice alignment, these two were set aside for further investigation. Through lengthy discussions and calculations from another archaeoastronomer(4) it was discovered that the 127-128° azimuth from menhir #1 to menhirs #12 and #13, and the 233° azimuth (at 14° altitude) for the hole in menhir #1 were associated with the acronical and heliacal rise and set of the stinger stars (Shaula and Lesath aka: V Scorpius) in the constellation Scorpius. Heliacal Rise being defined as the first morning of the year that the star can be seen rising before the dawn, and Heliacal Set being defined as the last

Fig. 4.

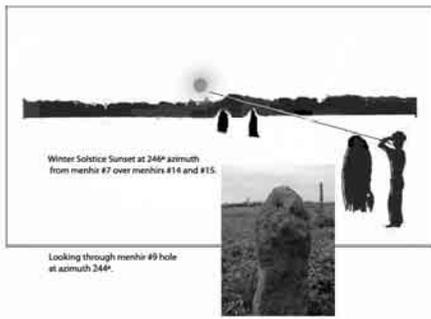
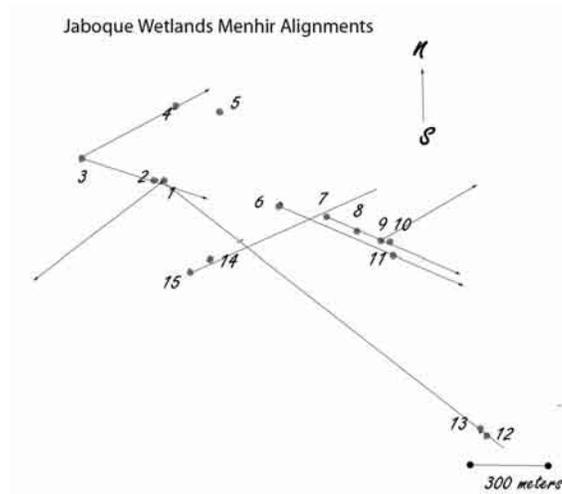


Fig. 5

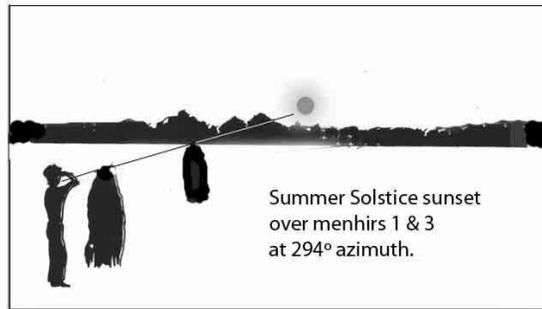


Fig. 6



Fig. 7. Inca Astronomer

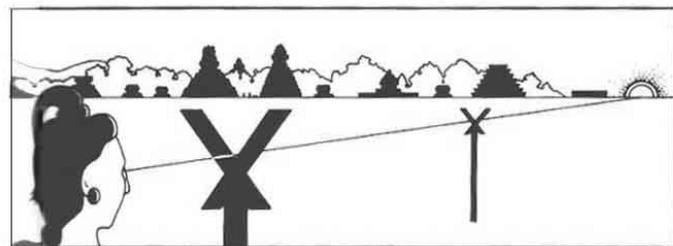


Fig. 8.

evening of the year on which the star can still be seen after sunset. Acronical rising is when a star rises at the instant of sunset. Acronical setting is when a star sets opposite to the rising sun.

The very best heliacal and acronical dates are in mid May. Their rising and setting would signal the upcoming dry season (June-August) which signaled the time to harvest potatoes and corn. The rising and setting also announced the approach of the summer solstice marking the sun's extreme northern rise and set point. For instance, sunset on May 15, 1000 A.D. was about 6:00 p.m. The "stinger stars" of Scorpius would rise approximately one hour after sunset in a sky now dark enough to see them at approximately 127° azimuth. The next morning sunrise would be at approximately 5:40 a.m. An observer looking through the hole in menhir #1 at 233° azimuth would have seen the stingers setting about 45 to 50 minutes before sunrise. (Fig. 11) Since this area of Colombia has another dry season (December-February), the heliacal rise of the Shaula and Lesath stinger stars at the end of November would signal the end of the rainy season and the beginning of the other dry season. For example, the stinger stars would first be seen rising around November 28, 1000 A.D. at 6:00 a.m. at 127° azimuth. As the month of December proceeded, people would have seen the stingers rise earlier and earlier in the morning sky. By the time of winter solstice (December 21) they would be prominent in the sky about 1.5 hours before the solstice sunrise. This would be an excellent predictor of the coming solstice.

An interesting observation is that an exact alignment at azimuth 233° only occurred between 400-500 A.D. By looking at the edge of the hole the observation could have been made anytime from 400 to 1,000 A.D., but not later or earlier. This would indicate that the menhirs may have been erected during that time frame. It should also be mentioned that between 1,000-1,200 A.D., the star Fomulhaut could have been seen setting through the hole in menhir #1 at 8:10 p.m. on June 21st at the summer solstice, but there are no references that Fomulhaut was ever used by South American native cultures as a solstice marker. No other bright star or constellation rises at 127° and sets at 233°.

SCORPIUS AND ITS CALENDRIAL USE

A review of the literature shows that the rise and set of Scorpio was used in many cultures as the basis for their calendar systems and that the constellation was not always viewed as a scorpion. The Mayas regarded Scorpio with special importance because of the time it undergoes helical rise and set.

The Batak culture of Sumatra begin their lunar year when Scorpio rises. The first day of their new year begins at the new moon immediately following this event, during the month of May. Fourteen days later the rising full moon in the eastern sky goes along north in Scorpio. They also observed the rising of Scorpio to insert a leap month once every 3 years (Winkler v. 45:438-447 in Kimball 39).

Andean people of Peru still use the Pleiades and the tail of Scorpio to represent two opposing groups of stars, which they employ in the ordering of terrestrial space. Rising and setting in opposition, they are connected by an axis in the plane of the horizon which passes through the local village. The appearance and disappearance of these star groups are used to set up the local agricultural calendar (Urton 1981 in Aveni 297).

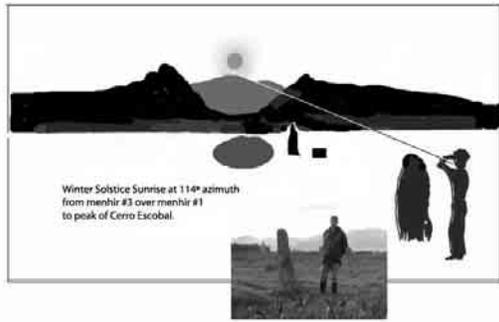


Fig. 9

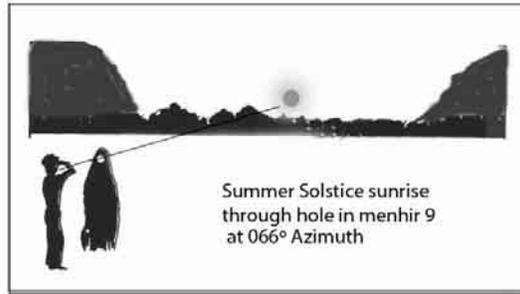


Fig. 10.

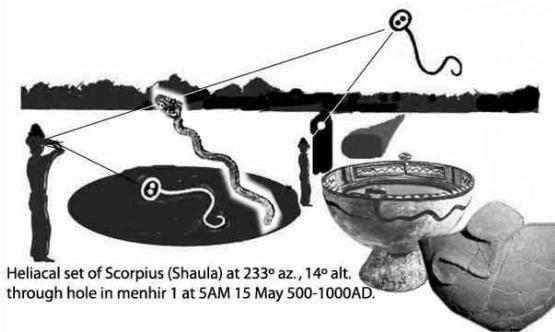


Fig. 11.

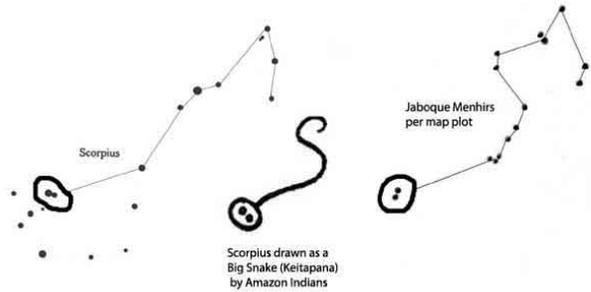


Fig. 12.



Fig. 13. Muisca cup possibly representing Bachue and son returning to die as snakes in Lake Iguaque.

Fig. 14. Gold tunjo possibly representing Bachue and son emerging from Lake Iguaque.



Since Scorpius rises with the sun at mid December at 4:30a.m., a few days before the winter solstice, the Guayanas Indians found this constellation useful to mark one of their annual counts. They have 3 annual counts; one beginning with the heliacal rise of Scorpius (Arias de Greiff 51).

In South America, Scorpius was seen by many cultures as a Big Snake:

1. An ancient version of a Tupi myth from the lower Japura River, Brazil speaks of a boa constrictor snake being transformed into the constellation that corresponds to Scorpius (Arias de Greiff 50).

2. The Kogi, a Colombian Chibcha speaking culture related linguistically to the Muísca, call Scorpius Tarbi (the snake). Its rise point with the sun in the southeast at the end of December is called Nuibaje and the set point in the southwest also in December is called Lagakenka.(Arias de Greiff 60).

3. When Shaula sets towards December it signals the time to fish for *toruno* for the Piapoco Indians of the Orinoco region (Arias de Greiff 109).

4. Scorpius represents the father of the god Yurupary for some Colombian Vaupes area tribes.

5. The Kaliña, a tribe on the Suriname border, begin the year with the heliacal rise of Scorpius (Arias de Greiff 51).

6. The North American Pawnee regarded Scorpius as a snake on their sky chart.

7. Claude Levi-Strauss identified Scorpius in some South American cultures as a “big snake” (Levi-Strauss 232). Comparing this star cluster to the *Keitapana* (big snake in the Boiasu language) form of Scorpius as a snake with two eyes, we discover that the stinger stars of Shaula and Lesath may be the snake’s eyes.

8. The northwest Brazil/Colombian Siusi Indians used the disappearance of the Big Snake constellation to mark the season of the year when very little or no rain falls, and the water level of the rivers reaches its lowest level (Koch - Grunberg 191-193). This is a very important fact for our study since a comparison of the overall layout and design of the Jaboque menhirs closely resembles the *Keitapana* snake figure and the Levi-Strauss drawing. If this relation is true, menhirs #12 and #13 correspond to the snake’s eyes (Shaula and Lesath) (Fig. 12). The 127° azimuth alignment from menhir #1 to menhirs #12 and #13 indicating the rise azimuth for Shaula and Lesath indicates the great importance of these two stars to the people who constructed and used the Jaboque menhirs for astronomical alignments. Menhir layout in the form of the Big Snake constellation also confirms the importance of these stars to the ancient Jaboque astronomers..

The question now is “How does the Big Snake relate to Muísca culture and tribal legends?” There is only one recorded legend about snakes and how they relate to the Muísca beliefs. The following Muísca creation myth centers around the goddess Bachue, her son, and Lake Iguaque located between Villa de Leiva and Tunja, in the northern Muísca territory.

“Between these mountains and peaks, there is a lake where the Indians explain how light first appeared and how everything else was first created. A woman named Bachue arose from the lake. She also had another name for the good things she did. It was Furachogua, which means beautiful woman, because Fura means woman, and Chogua means a good thing. She arose from the lake holding onto a 3 year old child and both walked down from the mountains to the plains to where the town of Iguaque is located. There they built a house where they lived until the boy was old enough to marry her. The marriage was very important and the woman was so fertile and fecund, that each time she gave birth, 4 to 6 children were born. This is how the entire world

was populated.....After many years the couple became very old and they returned to the same town.....Bachue gave a speech asking everyone for peace and to preserve amongst themselves teachings and laws that she had given them.After she finished, she bid them farewell amongst much shouting, weeping and crying by all parties, then she and her son changed into two very big snakes, and immersed into the lake waters.” (Rojas de Perdomo 134-135).

Snakes represented both life and death to the Muisca since Bachue rose from a lake to populate the territory, and was transformed into a snake at death. Looking at Muisca ceramic cup design we find a consistent representation of Bachue and her son as snakes looking at each other across the center part of the cup representing the sacred Lake Iguaque (Fig. 13). Note the similarity between the snake figure on the cup and the Jaboque menhir layout. A gold “tunjo” figurine holding a small child may represent Bachue and her son after they immersed from Lake Iguaque (Fig. 14). A gold “tunjo” snake emphasizing the eyes (Fig. 15) may represent Bachue returning to submerge in Lake Iguaque. The Jaboque snake petroform or geoglyph may possibly symbolize the Bachue legend and menhirs #12 and 13 may possibly represent the eyes of the snake. If this is true, then the stars Shaula and Leseth represent Bachue and her son rising from the lake, passing across the sky, and setting in the form of the eyes of a big snake in the west.

Observation of the Jaboque-snake layout (Fig. 16) shows that the petroform is in fact a mirror image of Scorpius as a snake as it would be seen reflected in water at its heliacal rise in mid-May. Water played an important part in Muisca mythology. Guatavita Lake was used for the purification bathing ceremony of the Zipa or southern Muisca chief, to gain strength and wisdom necessary to govern his kingdom. Many other water bodies served a similar function for chiefs under the Zipa. Since menhirs #12 and #13 are seen from menhir #1 and the pond at azimuth 127°, it is suggested that the heliacal rising of the Big Snake was observed by standing on the northwest rim of the pond and looking into the still water at night to see the constellation with Bachue and her son moving upwards into the sky. This would explain why the petroform was constructed as a mirror image. (Fig. 17)

Some cultures are known to have viewed reflected celestial events in ponds of water. It has been suggested that a stone water pond in the Peruvian Machu Picchu “Torreon” building was used to observe astronomical events. A petroform made of rocks in the mirror image of Scorpius was found at the Kolterman Mounds, Dodge County, Wisconsin, USA. It was suggested that Scorpius was observed by looking at its reflection in a pond of water(5).

One stone element (rock #2) at the Jaboque compound remains unexplained. It is a flat, squared block 20cms x 20 cms buried so that 5 cms shows above ground level. A 2cm diameter hole was drilled 3 cms deep in the center of the top. This block was placed 2.9 meters from menhir #1. Kogi *mamas*, or priests, in the Colombian Sierra Nevada de Santa Marta used stone blocks for seats to make astronomical observations. Sitting on the block (rock #2) a person looks at the hole in menhir #1 at 060° azimuth, but the hole is angled down, away from the observer, focusing on the side of the pond and therefore the stone block wouldn't have been an observation seat. One possible use of the stone might be a fixed base for a sighting stick. A forked or crossed stick was the main tool used by Inca and Maya astronomers for sighting. This base may have been used by native Colombians to locate the exact spot for placing their sighting sticks.

It should be noted that a high resolution scan of an aerial photo of the Jaboque site taken in 1949 shows some unexplained anomalies in an area 360 meters from

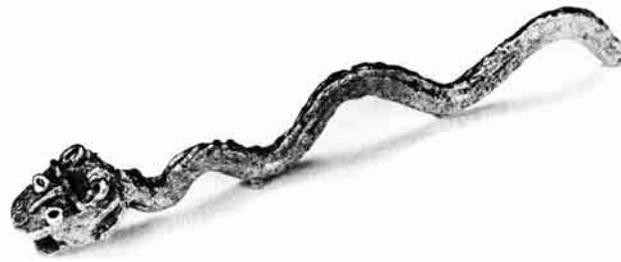


Fig. 15. Gold snake possibly representing Bachue as the Big Snake (Scorpius) constellation.

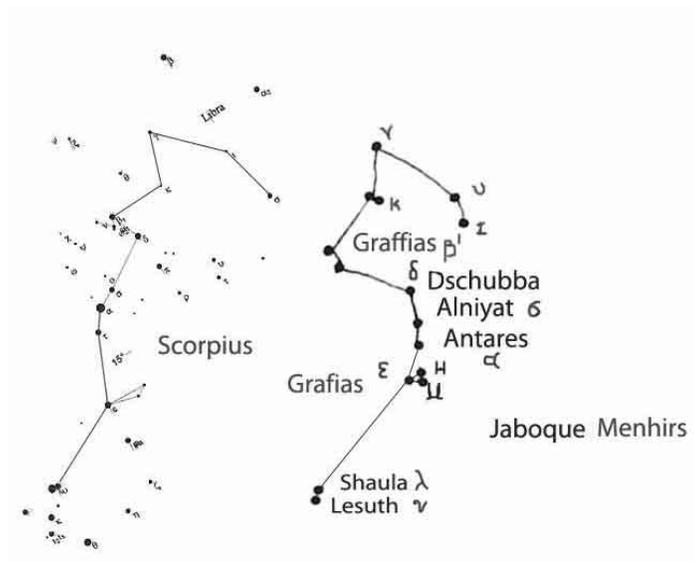
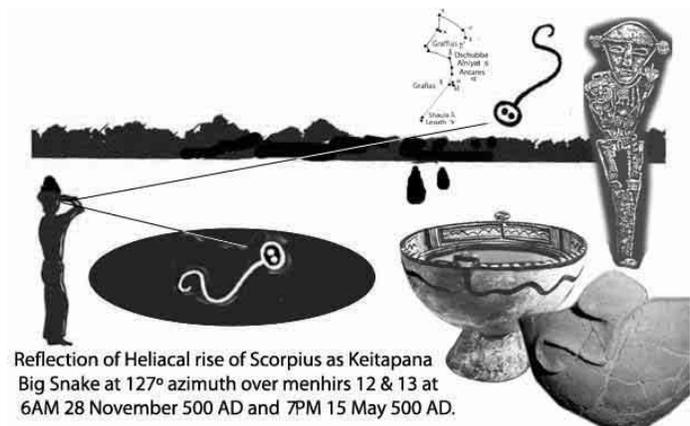


Fig. 16. Stars in Scorpius Constellation and Jaboque Menhir Layout.

Fig. 17



menhir #1 at 290° azimuth, near menhir #3. A large circular shape approximately 30 meters in diameter and various rectangular shapes may indicate the remains of a native living site or possibly a different design used for the raised agricultural mounds. In another area, presently located in a recreational park 660 meters from menhir #1 at 355°, two sets of six mounds each in parallel lines point towards menhir 1 in 1949. These mounds were not found during a June 2003 search for them. The area is now used for in-line trick skating and a soccer field.

Unfortunately, it will never be known if more menhirs existed in the area since the city of Bogotá recently constructed a bridge over the Bogotá river and a bicycle path on the northeast part of the wetlands and did not make an archaeological or environmental survey before beginning construction. The southern part of the wetlands has also been filled and developed commercially.

CONCLUSIONS

Stone menhirs, a pond, a raised mound or path, and canals in the Jaboque wetlands of Engativa were man-made and show a high degree of thought and planning in their construction. Fourteen stone menhirs and one associated stone block were cut by hand, transported from an unknown distant location, and placed in pre-determined spots. Location and alignment of the menhirs made it possible for them to be used as sighting devices to mark the position of summer solstice sunrise, summer solstice sunset, winter solstice sunrise, and winter solstice sunset.

The layout or planned design of the menhirs strongly suggests that it was constructed to resemble the constellation Scorpius, seen as the Big Snake constellation by many South American native cultures. The heliacal rising and setting of the stars Shaula and Leseth (eyes of the Big Snake) in the Scorpius constellation are also part of the overall scheme. Standing on the northwest rim of the pond next to menhir #1, these stinger stars first rise over menhirs #12 and #13 at azimuth 127° announcing arrival of the solstices and the two annual dry seasons in the Bogotá savanna area.

Two stone menhirs have holes drilled through them. The hole in menhir #9 allows direct observation of the summer solstice sunrise in the morning and winter solstice sunset in the afternoon six months later by reversing the observation direction. Scorpius stinger stars Shaula and Leseth may have been observed through the hole in menhir #1 during their set in the early morning hours of late November to mark the beginning of one of the two local dry seasons. Noting the importance placed on the solstice dates and the rise/set of Scorpius, the Jaboque complex appears to have been used to prepare for agricultural activities during the dry seasons, and not the wet seasons.

Possible ceremonial and practical uses of a long mound and a pond associated with menhir #1 and rock #1, and the possibility of the reflection of Scorpius being seen in the pond as a big snake were presented. The possible relationship between the eyes of the snake, the alignment of menhir #1 to menhirs #12 and #13, and the Muisca goddess Bachue with her son, were discussed.

Anomalies seen in an aerial photo of the area taken in 1949 were mentioned as sites for further investigation by archaeologists.

It is important to note that the Jaboque site is the first southern Muísca area identified with agricultural canals and mounds. It is the first discovery of standing stone menhirs with astronomical alignments, and is the first petroform or geoglyph found in Colombia other than a snake design cut into the soil in a Muísca cemetery in the La Ramada farm in Funza, Cundinamarca.

FOOTNOTES

1. Inspiration for this study came from preliminary research done by the following persons: a) Miguel Etayo during his graduate thesis in Geology for the Universidad Nacional de Colombia studying aerial photographs of the Bogotá River system and identifying ancient agricultural canals, and b) Jhon Meyer Muñoz under the auspices of GAIA Geosciences Ltda. doing research for his graduate thesis “Humedal de Jaboque: Evolucion geomorfologica y geologico, y su relacion con las culturas prehispanicas.” Geology Department, Universidad Nacional de Colombia.
2. A wetland is defined as an ecosystem between aquatic and terrestrial, with humid, semi-humid and dry areas characterized by the presence of unique flora and fauna.
3. GPS coordinates and menhir measurements were made by Jhon Meyer Muñoz, Miguel Etayo, Rafael Manjares and Harry Marriner.
4. The author would like to express his appreciation to Herman Bender of Fond du Lac, Wisconsin for his suggestions, analysis, calculations and convincing arguments regarding the constellation Scorpius and its relationship to the Jaboque menhirs, Mr. Bender is a geologist, geophysicist, Native American Tribal consultant, archaeoastronomer, historian, author, lecturer, and founder of the Mid-American Geographic Foundation, Inc.
5. Personal comment by Herman Bender to author. International Rock Art Congress 1999. Field Trip No. 1. May 29, 1999. Kolterman Mounds, Kolterman Farm, Dodge County, Wisconsin.

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FIGURES

Fig. 1 -Jaboque Site Wetlands Map by DAMA (Dept. Administrativo Medio Ambiente, Colombia).

Fig. 2. Square rock #2. Photo by author.

Fig. 3. Menhir #1 and hole. Photo by author.

Fig. 4. Menhir locations and alignments. Drawing by author.

Fig. 5. WSSS alignment. Drawing by author.

Fig. 6. SSSS alignment. Drawing by author.

Fig. 7. Inca Astronomer by Felipe Guaman Poma de Ayala (1980:829 [1615:883(897)]). *El primer nueva coronica y buen gobierno* [1615]. Edited by J.V. Murra and R. Adorno and translated by Jorge I. Urioste. 3 vols. Mexico City; Siglo Veintiuno.

Fig. 8. Mayan Astronomer. Diagram by P. Dunham in Aveni. Fig. 26. Page 65.

Fig. 9. WSSR alignment. Drawing by author.

Fig. 10. Menhir #9 hole looking at SSSR. Photo by author.

Fig. 11. Scorpius stinger stars setting. Drawing by author.

Fig. 12. Comparison of Scorpius, Amazon Indian snake (Scorpius) constellation, and menhir layout.

Fig. 13. Muisca cup and snakes representing Bachue and her son at Iguaque Lake. Museo de Oro Collection in Rojas de Perdomo, page 171.

Fig. 14. Gold Tunjo offering. Possibly Bachue and her son. DAMA page 18. Engraving by Barreto.

Fig. 15. Gold Snake. Possibly Bachue as snake returning to die in Lake Iguaque. Museo de Oro Collection. In Rojas de Perdomo page 137.

Fig. 16. Menhir layout compared to Scorpius stars. Drawing by author. Scorpius drawing drawing by Herman Bender.

Fig. 17. Scorpius Rise over menhirs 12 and 13. Drawing by author.