DOWNLOAD PDF THE REMARKABLE SCIENCE OF ANCIENT ASTRONOMY

Chapter 1 : The Remarkable Science of Ancient Astronomy

In The Remarkable Science of Ancient Astronomy, he takes you inside a worldview that knew nothing of telescopes, stars, or galaxies, yet was able to chart and predict the movements of the heavens. He puts modern theories about ancient astronomy to the test, separating the reasonable from the improbable; and he paves exciting new ground with his.

Great achievements in science and technology in ancient Africa By Sydella Blatch Despite suffering through the horrific system of slavery, sharecropping and the Jim Crow era, early African-Americans made countless contributions to science and technology 1. This lineage and culture of achievement, though, emerged at least 40, years ago in Africa. Unfortunately, few of us are aware of these accomplishments, as the history of Africa, beyond ancient Egypt, is seldom publicized. Sadly, the vast majority of discussions on the origins of science include only the Greeks, Romans and other whites. But in fact most of their discoveries came thousands of years after African developments. While the remarkable black civilization in Egypt remains alluring, there was sophistication and impressive inventions throughout ancient sub-Saharan Africa as well. There are just a handful of scholars in this area. Here, I attempt to send an electrical impulse to this long-deadened nerve. I can only fly by this vast plane of achievements. Despite this, it still should be evident that the ancient people of Africa, like so many other ancients of the world, definitely had their genius. Math Surely only a few of us know that many modern high-school-level concepts in mathematics first were developed in Africa, as was the first method of counting. More than 35, years ago, Egyptians scripted textbooks about math that included division and multiplication of fractions and geometric formulas to calculate the area and volume of shapes 3. Distances and angles were calculated, algebraic equations were solved and mathematically based predictions were made of the size of floods of the Nile. Eight thousand years ago, people in present-day Zaire developed their own numeration system, as did Yoruba people in what is now Nigeria. The Yoruba system was based on units of 20 instead of 10 and required an impressive amount of subtraction to identify different numbers. Scholars have lauded this system, as it required much abstract reasoning 4. Astronomy Several ancient African cultures birthed discoveries in astronomy. Many of these are foundations on which we still rely, and some were so advanced that their mode of discovery still cannot be understood. Egyptians charted the movement of the sun and constellations and the cycles of the moon. Clocks were made with moving water and sundial-like clocks were used 3. A structure known as the African Stonehenge in present-day Kenya constructed around B. The Dogon people of Mali amassed a wealth of detailed astronomical observations 6. Many of their discoveries were so advanced that some modern scholars credit their discoveries instead to space aliens or unknown European travelers, even though the Dogon culture is steeped in ceremonial tradition centered on several space events. Hundreds of years ago, they plotted orbits in this system accurately through the year 6. They knew this system contained a primary star and a secondary star now called Sirius B of immense density and not visible to the naked eye. Metallurgy and tools Many advances in metallurgy and tool making were made across the entirety of ancient Africa. These include steam engines, metal chisels and saws, copper and iron tools and weapons, nails, glue, carbon steel and bronze weapons and art 2 , 7. Advances in Tanzania, Rwanda and Uganda between 1, and 2, years ago surpassed those of Europeans then and were astonishing to Europeans when they learned of them. Architecture and engineering Various past African societies created sophisticated built environments. Of course, there are the engineering feats of the Egyptians: The largest of the pyramids covers 13 acres and is made of 2. Later, in the 12th century and much farther south, there were hundreds of great cities in Zimbabwe and Mozambique. There, massive stone complexes were the hubs of cities. One included a meter-long, 15,ton curved granite wall 9. The cities featured huge castlelike compounds with numerous rooms for specific tasks, such as iron-smithing. In the 13th century, the empire of Mali boasted impressive cities, including Timbuktu, with grand palaces, mosques and universities 2. Medicine Many treatments we use today were employed by several ancient peoples throughout Africa. Before the European

invasion of Africa, medicine in what is now Egypt, Nigeria and South Africa, to name just a few places, was more advanced than medicine in Europe. Some of these practices were the use of plants with salicylic acid for pain as in aspirin , kaolin for diarrhea as in Kaopectate , and extracts that were confirmed in the 20th century to kill Gram positive bacteria 2. Other plants used had anticancer properties, caused abortion and treated malaria â€" and these have been shown to be as effective as many modern-day Western treatments. Furthermore, Africans discovered ouabain, capsicum, physostigmine and reserpine. Medical procedures performed in ancient Africa before they were performed in Europe include vaccination, autopsy, limb traction and broken bone setting, bullet removal, brain surgery, skin grafting, filling of dental cavities, installation of false teeth, what is now known as Caesarean section, anesthesia and tissue cauterization 3. In addition, African cultures preformed surgeries under antiseptic conditions universally when this concept was only emerging in Europe 2. Navigation Most of us learn that Europeans were the first to sail to the Americas. However, several lines of evidence suggest that ancient Africans sailed to South America and Asia hundreds of years before Europeans. Thousands of miles of waterways across Africa were trade routes. Many ancient societies in Africa built a variety of boats, including small reed-based vessels, sailboats and grander structures with many cabins and even cooking facilities. The Mali and Songhai built boats feet long and 13 feet wide that could carry up to 80 tons 2. Genetic evidence from plants and descriptions and art from societies inhabiting South America at the time suggest small numbers of West Africans sailed to the east coast of South America and remained there 2. Contemporary scientists have reconstructed these ancient vessels and their fishing gear and have completed the transatlantic voyage successfully. Around the same time as they were sailing to South America, the 13th century, these ancient peoples also sailed to China and back, carrying elephants as cargo 2. People of African descent come from ancient, rich and elaborate cultures that created a wealth of technologies in many areas. Hopefully, over time, there will be more studies in this area and more people will know of these great achievements. Science in Ancient Egypt Science , â€" Leaders, Civilizations and Cultures of Ancient Africa. An Ancient African City-State. Sydella Blatch sblatch stevenson.

Chapter 2 : Stonehenge: A Remarkable Relic of Archeoastronomy

The Remarkable Science of Ancient Astronomy Taught By Bradley E. Schaefer, Ph.D. Louisiana State University In a world without artificial lights, the night sky was ablaze with over a thousand stars, whose patterns illustrated stories people had heard since childhood.

Home Science Astronomy Stonehenge: A Remarkable Relic of Archeoastronomy Stonehenge: Louisiana State University Ancient astronomers achieved remarkable feats that were built on many thousands of years of watching the sky. Welcome to the study of archeoastronomy. Ancient astronomers had different toolsâ€"and different goalsâ€"than do modern astronomers. Yet despite these differences, we also have a rich heritage coming to us from ancient astronomy. Ancient astronomers made remarkable discoveries and achieved remarkable feats that were built on many thousands of years of watching the sky. Perhaps the most famous example from ancient astronomy is Stonehenge. The basic structure is a set of standing stones set in a circle that surrounds a horseshoe-shaped set of standing stones. The central set of stones consists of 5 pairs of very tall stones topped by a horizontal stone, called a lintel. Each of these so-called trilithons have the lintel stone pegged to the vertical stones with a mortise-and-tenon joint, which has a knob sticking out of the top of the standing stone that fits into a hole in the lintel so that the lintel cannot easily fall off. The tallest stone reaches 24 feet from the ground; the biggest stones weigh 40 tons. The horseshoe of trilithons is surrounded by a circle of stones. The basic circle originally consisted of 30 standing stones, each topped by 2 lintels to form a continuous ring running around the top. The stones in the circle are made of a sandstone rock type called sarsen. Each of the stones has been pounded into a roughly rectangular shape. This shaping of stones is rare among stones at other contemporaneous stone circles around the British Isles. Many of the original stones have fallen down or been taken away. The immediate vicinity of Stonehenge has a complex array of remains that go far past the basic monument. Centered on the monument is a circular ditch with a radius of feet. The chalk dug out from the ditch was heaped into a bank running just inside the ditch. The opening toward the northeast forms part of a long linear feature called the avenue, which is defined by 2 parallel ditches running out from the circular ditch around the monument. This avenue goes perfectly straight for feet before veering to the right and ultimately running down to the River Avon. At the start of the avenue, where it touches the circular ditch, is a now-fallen dressed, or cut, rock known as the Slaughter Stone. This name invokes an image of ritual sacrifice, and people imagined the victim laid out on the stone. There are many more stones and pits within the central ditch area, including a circular array of 56 pits called the Aubrey Holes. Nearly on top of these Aubrey Holes are 4 undressed stones that define a rectangle called Station Stones, 2 of which are surrounded by small ditches. Close around the basic stone circle are 2 more rings of holes that are irregularly spaced, and the center of the whole circle has a stone called the Altar Stone, which is now fallen and lying mostly buried under a lintel fallen from a trilithon. Stonehenge and its surroundings were made by a culture of Neolithic farmers known as Beaker people. Stonehenge was built in stages, from roughly B. The larger area surrounding Stonehenge is filled up with contemporaneous monuments that are dominated by burial mounds of many types. And there are a variety of other circles, or henges, throughout the area. Stonehenge was built with only primitive tools. Archaeologists find many broken antler tips inside the pits and ditches. These were the tools used to dig in the ground. Perhaps the most impressive point about the construction is that the extremely heavy stones were transported tremendous distances to be brought to Stonehenge. The big sarsen sandstones were dragged 18 miles from Marlborough Downs to the north. The smaller bluestones were dragged, and perhaps floated by raft, from quarries in Wales about miles away. But there is also a much more specific meaning having to do with how ancient peoples built monuments aligned to the stars. The basic paradigm of archaeoastronomy is that ancient peoples incorporated astronomy into their old temples and other structures by pointing to a particular direction on the horizon where something significant happens. Such directional symbolism is universal in all cultures. The reasons are widely varied, but they always exist, always

go back to the astronomy, and often are charged with strong cultural traditions. For most ancient peoples, these alignments are a common way to interact with the sky. But the astronomical origins might have been partly lost on the common folk. The basic setup of archaeoastronomy is that some now-ancient building is pointing at some direction on the horizon. This pointing might use some obvious main axis of the building plan, or the architecture can somehow indicate a position for an observer to stand, plus some stone marking a direction to look. The position for the observer to stand could be given by the center of a circle, a throne, a statue, or the top of a grand staircase. The direction to look might be marked as down some central axis, along a wall, perpen- dicular to a wall, or by some distant stone. The astronomically significant direction on the horizon is usually one of the 4 cardinal directions or one of the 4 solstitial directions. The 4 cardinal directions are north, east, south, and west. The 4 solstitial directions are toward either sunrise or sunset on the dates of either the summer solstice or the winter solstice. The days of the solstices are close to June 21 and December 21 every year. For people in the Southern Hemisphere, summer and winter have to be reversed. Also, in rare cases, the significant direction can be toward the rise of some bright star. Halfway between the solstice dates, the Sun will equally illuminate both hemispheres, and these dates are called the equinoxes, which are close to every March 21 and September In all, archaeoastronomy is looking at the nearly universal commemoration of the 8 cardinal and solstitial directions, rarely including star-rise directions, in the monuments and myths of ancient cultures. This basic astronomical alignment was recognized from antiquity, but it was only in that this alignment started a worldwide obsession with Stonehenge. This book launched storms of protests from archaeologists. It also launched the whole field of archaeoastronomy. But he also proposed a series of other alignments and claimed that Stonehenge is an analog computer to predict eclipses. This led to the view that Stonehenge was a marvelous astronomical observatory that was millennia in advance of the rest of the world in science. With this, astronomers were telling us that Stonehenge was just one big astronomical observatory and computer. The fusion of the 2 themes was that some mystic Druid astronomer-priests ruled their society and built Stonehenge for their own astronomical observatory. In the last century, modern pagans invented a new religion centered at Stonehenge. These neo-Druids dress up in white robes, sometimes with fake beards, and parade around Stonehenge carrying large staffs. On the summer solstices from to , Stonehenge became the venue for a free festival, featuring rock bands and free drug use. These hippies would get into gang fights with motorcycle gangs. The British police finally suppressed this in , but the hippies fought back, in what became known as the Battle of the Beanfield, with arrests of people. All of this rebranding of Stonehenge became absurd in , when a British medical journal ran an article claiming that the monument design was intended to model female genitalia. The authors were a pair of Canadian gynecologists. Through all this, archaeologists were telling us that Stonehenge and all the tombs and burial mounds in the area were just part of a huge Neolithic burial grounds. But the real picture for Stonehenge archaeoastronomy is much more complex, detailed, and confident. In other words, what are the most famous discoveries, the most exciting astrolocations, the most important topics, and the greatest astronomers of antiquity? In old times, for a relatively small number of scholars, ancient astronomy is various lines of theory and observations that we might call science. But these are not the concerns of the vast majority of astronomers or ordinary people throughout ancient times. What were the primary concerns of working ancient astronomers? What do you think were the primary concerns and sky interactions for commonplace people?

Chapter 3 : Remarkable Science Ancient Astronomy / Rapu

This survey course covers ancient sites connected with sky observations from Stonehenge through the pyramids and on to astrolabes and finally ending with Galileo's first modern telescope starting the new age in astronomy.

Louisiana State University In a world without artificial lights, the night sky was ablaze with over a thousand stars, whose patterns illustrated stories people had heard since childhood. Thus, ancient people viewed the sky differently than we do. Skywatching was crucial to daily life, since the motions of the heavens served as timekeeper, calendar, compass, and almanac for planning when to plant and harvest. The perfect regularity of celestial cycles was the only guaranteed aspect of life and inspired a wide range of religious and philosophical views, as different cultures struggled to grasp the unseen forces that govern the cosmos. Richly interdisciplinary, the subject of ancient astronomy encompasses archaeoastronomy, which is the study of how ancient monuments are oriented to the sky, but it also includes cosmology, mythology, mathematics, celestial mapping, astrology, divination, timekeeping, calendars, navigation, and ancient technology, among other fields. It is part science, part history, part archaeology, part cultural anthropology, and part detective story, since progress in the discipline depends on an astute reading of clues to unravel the complex relationship of ancient people with the sky. In these dazzling and provocative 24 half-hour lectures presented by Professor Bradley E. Schaefer , a professional astronomer and multi-award-winning educator at Louisiana State University, you will see the sky like never before. Designed for learners of all ages and backgrounds, these lectures are a visual delight, filled with clear and insightful graphics. For example, familiar Western constellations are contrasted with the very different systems of other cultures, and the star patterns of the Babylonians and Chinese are shown in detail not available elsewhere. Plus, animations demonstrate the celestial alignments of ancient monuments as well as the workings of ingenious devices such as the armillary sphere, astrolabe, and incomparable Antikythera mechanism. Among the astronomical marvels of the ancient world are some celebrated puzzles that have generated many theories: This impressive prehistoric monument in southern England has an obvious alignment with sunrise on the summer solstice, but dozens of other celestial alignments have been suggested. Are they chance or intentional? And was the summer solstice the real focus of rituals at the site? Great Pyramid of Giza: Ancient Egyptians built their largest pyramid oriented to the cardinal pointsâ€”north, south, east, and westâ€”with an accuracy of one-twentieth of a degree. How did they do it? This seeming contradiction is one of several astronomical problems with the passage, which may have found a recent surprising solution. Discovered in aboard an ancient Roman shipwreck, this badly corroded bronze tool eventually proved to be an astonishingly versatile astronomical computer, arguably the most remarkable artifact in all of ancient science. Intriguing clues point to the identity of its designer. Solve Age-Old Mysteries of the Sky Professor Schaefer is a noted astrophysicist involved in cutting-edge research on the fate of the universe. His other passion is understanding how his long-ago predecessors observed and perceived the cosmos. In The Remarkable Science of Ancient Astronomy, he takes you inside a worldview that knew nothing of telescopes, stars, or galaxies, yet was able to chart and predict the movements of the heavens. He puts modern theories about ancient astronomy to the test, separating the reasonable from the improbable; and he paves exciting new ground with his own detailed analyses addressing age-old mysteries. He particularly relishes working from scattered evidence to pinpoint when ancient observations and maps were made, including: The phenomenon called precession of the equinoxes is like a carbon-dating tool for ancient astronomy. Birthplace of Greek astronomy: Focusing on star lore surviving from a lost work by the Greek astronomer Eudoxus, Dr. It turns out that he was almost surely using year-old data from Mesopotamia. Atlas shoulders the celestial globe in this famous Roman copy of a vanished Hellenistic sculpture. Noting the implied positions of stars in the constellations, Professor Schaefer argues that the original must have utilized the long-lost star catalog of the great Greek astronomer Hipparchus. The first sighting of the crescent Moon after new Moon marks the start of the month in the Jewish calendar. See the Heavens the Way the Ancients

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Did One of the rewards of studying the ancient world is witnessing how it has a direct bearing on our own time, for example in our inheritance of Greek philosophical ideas, Middle Eastern religions, and Roman political institutions. This is no less true in astronomy. As you will learn in The Remarkable Science of Ancient Astronomy, observations made centuries ago, even without the aid of our advanced instruments, can be exceptionally valuable. The English astronomer Edmund Halley used old data on comet sightings to discover that one particular comet, later named in his honor, returns to the inner Solar System at roughly year intervals. And the complex physics of catastrophically exploding stars, called supernovae, is clarified by knowing exactly when the remnant cloud observed today originally detonatedâ€”information best supplied in centuries-old astronomical records. Moreover, the experiences of the ancient skywatchers are open to everybody. You can travel to some of the many archaeoastronomy sites worldwide and see for yourself how their alignments work. You can watch an eclipse, or see a meteor shower, or track a planet moving against the stars, or invent your own set of constellations, or sight the thin crescent Moon low in the west. After learning all that a pair of eyes and patience can do no equipment required!

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Chapter 4 : The Remarkable Science of Ancient Astronomy Â» downTURK - Download Fresh Hidden Obje

The Remarkable Science of Ancient Astronomy. Discover the ancient sky with an award-winning teacher and noted astronomer.

Visit Website The first, known as the Calendar Round, was based on two overlapping annual cycles: Under this system, each day was assigned four pieces of identifying information: Every 52 years counted as a single interval, or Calendar Round. After each interval the calendar would reset itself like a clock. Because the Calendar Round measured time in an endless loop, it was a poor way to fix events in an absolute chronology or in relationship to one another over a long period. For this job, a priest working in about BC devised another system: The Long Count system identified each day by counting forward from a fixed date in the distant past. It grouped days into sets, or cycles, as follows: One Grand Cycle was equal to 13 baktuns, or about 5, solar years. At sunset on these two days, the pyramid casts a shadow on itself that aligns with a carving of the head of the Mayan serpent god. Mayan Technology Remarkably, the ancient Maya managed to build elaborate temples and great cities without what we would consider to be essential tools: For example, they built complicated looms for weaving cloth and devised a rainbow of glittery paints made from mica, a mineral that still has technological uses today. Until recently, people believed that vulcanizationâ€”combining rubber with other materials to make it more durableâ€”was discovered by the American from Connecticut Charles Goodyear in the 19th century. However, historians now think that the Maya were producing rubber products about 3, years before Goodyear received his patent in How did they do it? Researchers believe that the Maya discovered this process accidentally, during a religious ritual in which they combined the rubber tree and the morning-glory plant. Once they realized how strong and versatile this new material was, the Maya began to use it in a variety of ways: The cause and scope of the decline is a matter of some debate today. Some believe that the Maya were wiped out by war, while others attribute their demise to the disruption of their trade routes. While much of what was left of the ancient Maya culture was subsumed by the Spanish conquistadors in the 16th century, the legacy of Mayan scientific achievement lives on in the discoveries that archeologists continue to make about this amazing ancient culture.

Chapter 5 : The Remarkable Science of Ancient Astronomy | The Great Courses | Safe Videos for Kids

The Remarkable Science of Ancient Astronomy The Great Courses Taught by Professor Bradley Schaefer of Louisiana State University, this course shows how ancient Egyptians, Greeks, Indians, Chinese, and other cultures saw the sky.

Chapter 6 : Mayan Scientific Achievements - HISTORY

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Chapter 7 : Great achievements in science and technology in ancient Africa

Thus, ancient people viewed the sky differently than we do. Skywatching was crucial to daily life, since the motions of the heavens served as timekeeper, calendar, compass, and almanac for.

Chapter 8 : The Remarkable Science of Ancient Astronomy | The Great Courses Plus

Why were the motions of the Sun, Moon, and stars so important to ancient people? Investigate key astronomical

directions noticed by all cultures.