Abstract: An investigation of ancient astronomy shows that a cubit was used not only as the metric of length (elbow to fingertip) but also as a metric of angle in the sky. That suggested a new interpretation that fits naturally: the brightest celestial object—the sun—moves eastward around the sky, relative to the stars, during the course of a year, by one cubit per day!

Among the intriguing aspects of the Book of Abraham are the three facsimiles and their somewhat esoteric interpretations. In particular, Fig. 1 of facsimile No. 2 is explained as follows: “Kolob, signifying the first creation, nearest to the celestial, or the residence of God. First in government, the last pertaining to the measurement of time. The measurement according to celestial time, which celestial time signifies one day to a cubit. One day in Kolob is equal to a thousand years according to the measurement of this earth, which is called by the Egyptians Jah-oh-eh.”

While this entire passage provokes pondering, the phrase one day to a cubit is especially puzzling, and, as far as this author is aware, no precise interpretation of the phrase has been given. For example, in his thorough treatment of the significance of Abraham’s visit to Egypt, scholar Hugh Nibley ((Hugh Nibley, Abraham in Egypt (Salt Lake City: Deseret Book and FARMS, 1981).)) does not even mention the phrase. It is likewise ignored by H. Donl Peterson ((H. Donl Peterson, The Pearl of Great Price: A History and Commentary (Salt Lake City: Deseret Book, 1987).)) in his useful reference work, The Pearl of Great Price: A History and Commentary and by James R. Harris ((James R. Harris, “The Book of Abraham Facsimiles,” in Studies in Scripture, Vol 2: The Pearl of Great Price, ed. Robert L. Millet and Kent P. Jackson (Salt Lake City: Randall Book Company, 1985.).)) in his detailed study of the Book of Abraham facsimiles. The verse-by-verse commentary by Draper, Brown, and Rhodes reproduces the facsimiles but passes over the phrase with the simple comment: “We do not know how to interpret this.” ((Richard D. Draper, S. Kent Brown, and Michael D. Rhodes, The Pearl of Great Price: A Verse-by-Verse Commentary (Salt Lake City: Deseret Book, 2005), 290.))

In a recent article, Samuel Brown ((Samuel Brown, “The Early Mormon Chain of Belonging,” Dialogue, A Journal of Mormon Thought 44/1 (Spring 2011), 1.)) discusses the use of the “chain of belonging” by Joseph Smith and other early Church leaders. Based on original material from contemporary sources, Brown states that, in their work on the Kirtland Egyptian Project, Joseph Smith and William W. Phelps “wove together a distinctive exegesis of the Hebrew astrogony.” ((Brown, “Early Mormon Chain of Belonging,” 9.)) In doing so, “they employed a cubit as an astronomical metric,” and used “a special cubit—one quarter of the length from the end of the longest finger to the end of the other when the arms are extended—approximately 21 inches” (well within the range of the normal cubit described below). Furthermore, to apply the concepts “a day is equal to 1,000 years” and “one day to a cubit,” Brown suggests that Phelps and Smith used a “symbolic multiplier” ((Brown, “Early Mormon Chain of Belonging,” 9.)) to convert cubits to astronomical distances parallel to the conversion of a day to a millennium.

However, in addition to the rich symbolism within the Book of Abraham, there appears to be a straightforward scientific explanation for the rather curious phrase one day to a cubit. It is quite possible that the phrase describes exactly the movement of the brightest celestial object, the sun, as it moves among the stars during the course of a year, a reflection of the earth’s orbital motion.

What is a Cubit?

An English dictionary defines the word cubit as an ancient (from Old Testament times) unit of length; namely, the distance between a man’s elbow and the tip of his middle finger—some 18 to 22 inches. Since the word is now obsolete, it is of interest only because of its use in the Bible and the Book of Abraham. The English word cubit is derived from the Latin word for “elbow.” Extensive literature on its etymology and history is available from Wikipedia or an etymological dictionary.

Since the length of a cubit naturally differs from person to person, it is not a precise metric. Consequently, a “standard cubit” appeared very early among ancient cultures. Among the earliest attested standard cubits was the Egyptian royal cubit, known from the Old Kingdom pyramids of Egypt: 523 to 529 mm (20.6 to 20.8 inches). Whatever its exact value, a cubit was a common measure of length in ancient times. However, any straightforward relation between a day and a cubit has remained mysterious because a time (a day) and a distance (a cubit) are related by a speed or velocity, and it is very difficult to imagine a speed of any object anywhere as slow as a cubit
to a day. Even snails move faster than that!

A Cubit in the Sky?

A hint toward an interpretation of the odd phrase in the Book of Abraham comes from an extended meaning of the word cubit. Although originally and widely employed as a measure of length (above), the use of the word was extended by ancient scholars to include a measure of angle, especially in the sky.

For example, in recounting his famous travels, Marco Polo (1254–1324) mentioned his surprise when, on reaching the island of Sumatra, he discovered the (North) Pole Star was not visible there. ((Ronald Latham, trans. *The Travels of Marco Polo* (Harmondsworth: Penguin Books, 1958), 253. )) Sailing northwest thereafter to a part of India called Comorin, Marco Polo caught a “glimpse of the Pole Star rising out of the water to about one cubit.” ((Latham, trans. *Travels of Marco Polo*, 288.))? Sailing further to Malabar, he noted the Pole Star seemed to “rise about two cubits above the water,” ((Latham, trans. *Travels of Marco Polo*, 290.))? and at Gujarat, “the Pole Star is more clearly visible, with an apparent altitude of six cubits.” ((Latham, trans. *Travels of Marco Polo*, 291.))? Here Marco Polo and his translators use the word *cubit* exactly as we would currently use the word *degree* to measure a very small angle.

A much more ancient text from Mesopotamia also used the word *cubit* to describe angular measures of celestial objects. An astronomical record from 331 BC has this passage: “the moon was [nn cubi]ts below β Geminorum, the moon being 2/3 cubit back to the west.” A later passage states: “the moon was six cubits below ε Leonis, the moon having passed ½ cubit behind α Leonis.” ((Francesca Rochberg, “Natural Knowledge in Ancient Mesopotamia,” in *Wrestling with Nature*, ed. Peter Harrison, Ronald L. Numbers, and Michael Shank (Chicago: University of Chicago Press, 2011), 18.))? Among astronomers, stars are commonly referred to (now and anciently) by a Greek letter plus the genitive form of the constellation name where the star belongs, starting with the brightest star or the star nearest the head of the figure represented by the constellation as “α”, that is, alpha. In the citation above, therefore, β Geminorum, ε Leonis, and α Leonis are well known bright stars in the constellations Gemini, Leo, and Leo, respectively.

Since the word *cubit* was used anciently as a measure of angle as well as a measure of length, the phrase *one day to a cubit* in the Book of Abraham seems to refer to angular velocity rather than linear velocity. With this changed perspective, we can readily interpret the otherwise opaque passage *one day to a cubit* as an excellent description of the motion of the sun as it passes among the stars and constellations during the course of a year. The passage then becomes a statement of scientific fact.

It is not known exactly what instruments were employed by ancient observers to measure angles in the heavens. However, in very ancient times they may have employed a simple method still used today. With one’s arm fully extended, the width of the pointer finger seen against the sky covers approximately one degree (technically it “subtends” one degree of arc), and this is a convenient means to measure small distances (small angles) between celestial objects near one another. For example, the sun and moon in the sky each subtend roughly half a degree in diameter. Readers may try this method on the moon. (This and other rough measurements made with the hand are described in many elementary astronomy books.)

The understanding that a circle has 360 degrees is common knowledge and its use dates back to ancient Mesopotamia. ((Michael Hoskin, “Astronomy in Antiquity,” in Hoskin ed., *The Cambridge Concise History of Astronomy* (Cambridge: Cambridge University Press, 1999), 18–47.)) Since the Earth orbits the sun in a year of approximately 365 days, the sun, as seen from Earth, traces a complete circle through the constellations of the zodiac during that period. (This motion is not the apparent daily westward motion of the sun across the sky due to Earth’s rotation, but the slow eastward movement of the sun among the stars as seen from Earth during the course of a year.) The near coincidence of the number of degrees in a circle (360) and the number of days in a year (365) means that, as seen from Earth, each day the sun moves approximately one degree eastward relative to the background stars. Anciendy, one would have stated: each day the sun moves through one cubit relative to the background stars.
Conclusion

The phrase *one day to a cubit* in the explanation of Facsimile no. 2 in the Book of Abraham plays no significant role in the Abraham narrative, and it has generally been ignored or left unexplained by Mormon scholars. However, it has nevertheless remained an intriguing passage.

Some enlightenment is gained when we understand that the word *cubit*, traditionally understood to refer to the length of a man’s forearm, was extended in meaning by ancient observers to include angular measurements as well as linear measurements, especially in the sky. An observer, even with crude instruments, or even with the hand itself, can make simple measurements to yield angular information about objects close together in the sky—measurements in which the pointer finger at arm’s length subtends an angle of about a degree, called a “cubit” by the ancients.

With the extended perspective that a *cubit* is an angle of a degree, the curious phrase *one day to a cubit* from the Book of Abraham describes precisely the movement of the brightest celestial object—the sun. *As seen from earth, each day the sun travels one degree eastward with respect to the background stars and constellations.* Ancient scholars would have stated that each day the sun travels one cubit. *One day to a cubit!*

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Bibliography