

# Übung zur Vorlesung Terra-Astronomie SoSe 2017

## Übungszettel 7 (18. Mai 2017)

Abgabe bis Mo 29.5.

Besprechung in der Übung am Do 1.6.

Übung: Do 16-18h (MSc Daniel Wagner)

Ort der Übung: Seminarraum, Sternwarte, Schillergäßchen 2

### 1. Historische Aurorae:

Kriterien für Aurorabeobachtungen in historischen Berichten sind wie folgt:

- (1) Nord, Ost oder West, nicht jedoch Süd.
- (2) Farbe wie rot (Blut), blau, gelb oder grün.
- (3) Bewegung.
- (4) Nachts oder bei Dämmerung, nicht jedoch tagsüber.
- (5) Wiederholung innerhalb von etwa 5 Nächten.

Stellen Sie fest, welche Kriterien durch welche Worte bei den folgenden Berichten erfüllt sind, bzw. aufgrund welcher Worte die Deutung als Aurora ausgeschlossen ist. In vielen Berichten sind die Kriterien nur durch indirekte Erwähnung von obigen Kriterien oder Ähnlichem erfüllt. Um zwischen Halo und Aurora zu unterscheiden, kann es manchmal sinnvoll sein, die Mondphase zu beachten (wenn Datum gegeben).

Die Mondphase finden Sie z.B. auf

[www.gautschy.ch/~rita/archast/mond/Babylonerste.txt](http://www.gautschy.ch/~rita/archast/mond/Babylonerste.txt)

(Rita Gautschy 2014, On the Babylonian Sighting-Criterion for the Lunar Crescent and its Implications for Egyptian Lunar Data, *Journal for the History of Astronomy* 45, 79)

In dieser Tabelle finden Sie in den beiden rechten Spalten das Datum des Neumonds (Konjunktion Mond mit Sonne) und die genaue Uhrzeit (Weltzeit Greenwich). Die Datums- und Zeitangaben in den linken Spalten geben die Zeitpunkte der frühesten Sichtbarkeit der Neumondsichel in Babylon an. Die dritte Spalte von links ( $\Delta T$ ) gibt an, um wieviele Sekunden sich die Neumondphase durch leichte Variation der Erdrotation geändert hat (im Vergleich zu einer nicht-gestörten Phase).

(a) AD 826 Jan 21 or 22, Shanxi (China): *Pao-li reign-period, 1st year, 12th month, day chi-yu [Jan 21]: At night, in the NW there was a mist. After the mist had gone there was a red vapour either in dark or light colours. After a long while, then it was dispersed* (Hsin-t'ang-shu)

(b) AD 827 Sep 8, Shanxi (China): *Ta-ho reign-period, 1st year, 8th month, day kuei-mao [Sep 8]: In the capital, there was seen a red vapour filling the whole sky* (Hsin-t'ang-shu)

(c) AD 827, summer or fall, northern Spain: *Just before this catastrophe, there appeared in the night sky terrible battle lines [cladem terribilis nocturno sub tempore acies] reddened with human blood flashing with the color of fire* (Anonymous Vita of Emperor Louis)

(d) AD 836 Feb, northern Germany/Netherlands: *In the month of February wonderous rays of light appeared [mirandae acies] from east to west in the early part of the night* (Annals of Xanten)

(e) AD 839 Aug 10, Kyoto (Japan): *Showa reign-period, 6th year, 6th month, day ting-ch'ou [Aug 10]: Tonight, there was a red vapour of (area) 40 chang square. It began in the SW direction and reached above the Shishinden (palace). It was more than 20 chang above the ground with a light like a torch. A moment later it vanished* (Shyokunihon-koki)

(f) AD 840, after Easter, Fulda (Germany): *exceptional reddening of the sky appeared from the south-east for several nights; another appeared from the north-west until they met in a cone and gave the appearance of a clot of blood in the heavens directly overhead* (Annals of Fulda)

(g) AD 840 May 5/6, Bergamonte (Italy): *May 5 ... in the very next night, almost morning, there was a light like in the day* (Annales Bergomatis)

(h) AD 845 Nov 20, Lausanne (Switzerland): *In the same year on Nov 20, a light appeared at night* (Annales Lausannenses)

(i) AD 861 Dec 11, Amiens (France): *... the bloody ranks of the sky / that I, frightened, saw at night on the third idus of December. / They greatly sizzled with an extraordinary sound. / They fought a duel just in the center of the sky, / and according to the severe custom of duellists with inflamed arrows / they came together from the four regions of the world ...* (Carmina Fredegarii)

(j) AD 868 fall: *During the September fast days [starting Sep 17] ... At that time in Saxony fire [Lat.: ignis in aere] was seen flying through the air with the speed of an arrow, as thick as pitchfork and shooting off sparks like an iron block in a furnace. And suddenly it appeared to go up in oily black smoke before the eyes of many people* (Annals of Xanten)

(k) AD 858 Jul 16, Kitamo (Japan): *Tonight ... it appeared as if there were two cocks fighting each other in the sky north of Kitamo, above the Inari shrine. Their color looked scarlet and while they were fighting their feather scattered and fell. Although far away, they appeared as if before one's eyes. After a long while they stopped* (Montoku jitsuroku)

(l) AD 734, Constantinople (Turkey): *On the sky there appeared a fiery shining sign* (Theophanes)

(m) AD 735, Ireland: *A huge dragon was seen, with great thunder after it, at the end of autumn* (Ulster Chronicle)

(n) AD 745 Ireland: *A horrible and wonderful sign was seen in the stars at night* (Ulster Chronicle)

(o) AD 762, Ireland: *A bright night in autumn* (Ulster Chronicle)

(p) AD 770 Jun 20, Xian, Shaanxi, China: *Ta-li reign-period, 5th year, 5th month, day chia-shen (21). In the NW, a white vapour extended across the sky.* (Chiu-t'ang-shu)

(q) AD 772, Amida (now Diyarbakır, Turkey): *Another sign appeared in the northern side, and its appearance gave testimony about the threat and menace of God against us. It was seen at harvest time, while occupying the entire northern side, from the east end to the west end. Its likeness was as follows: a red sceptre, a green one, a black one, and a yellow one. It was moving up from the ground, while one sceptre was vanishing and another appearing. When someone looked at it, it would change into 70 shapes. For the intelligent person the sign indicated menace. Many people said many things about it; some said it announced bloodshed, and others said other things. But who knows the deeds of the Lord? – I will give signs in the heaven, and wonders on the earth.* [from Bible Acts 2, 19] (Chronicle of Zuqin)

(r) AD 772 (around Sep 29), Ireland: *The assembly of the hand-clapping at which occurred lightning and thunder like the day of judgment. The hand-clapping on St Michael's Day 29 Sep which called fire from heaven.* (Ulster Chronicle)

(s) AD 793 (before Jun 8), Northumbria, England: *In this year terrible portents appeared over Northumbria, and miserably frightened the inhabitants: these were exceptional high winds and flashes of lightning, and fiery dragons were seen flying in the air. A great famine soon followed these signs; and a little after that in the same year on 8 Jan, the harrying of the heathen miserably destroyed God's church in Lindisfarne by rapine and slaughter.* (Anglo-Saxon Chronicle)

(t) AD 807, Aachen, Germany: *(The emperor celebrated christmas at Aachen.) Again on the 4th calends March [AD 807 Feb 26] was an eclipse of the moon, and flames appeared that night of an amazing brightness [Lat.: acies eadem nocte mirae magnitudinis] (and in the same night enormous battle lines appeared in the sky), and the Sun stood in the 11th degree of Pisces and the moon in the 11th degree of Virgo. And, still more, the star Mercury on the 16th calends April [AD 807 March 17] was seen in the Sun like a small black spot [Lat.: in sole quasi parva macula, nigra tamen], a little above the center of that very body, and it was seen by us for 8 days, but when it first entered, and when it left, clouds kept us from observing (we could not observe it well because of clouds)* (Royal Frankish Chronicle)

(jewels 0.5 Pkt, ins. 10 Punkte)