

Islamic Astronomy's Legacy In The Arabic Origin Of Modern Star Names

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Who Am I?



- Khalid (“ ... ed” not “ ... eeeeeed”)
- Pharmacist by education
- Open Source Software Development and Consulting by experience (32 years)
- One of the developers of Drupal, a Web Content Management System
 - The Economist, Foreign Policy, Harvard, UW
 - NASA, RASC, Cosmos @ Swinburne





Astronomy



- Amateur Astronomy
- Some Astrophotography
 - Rather Electronically Assisted Observation
- Contributor to OnStep Telescope Controller (Open Source firmware)
- History of Astronomy
- Ethno Astronomy (different cultures)





Also ...

abits

- Also, I am:
 - ... an astrobotanist ...
 - ... own a space telescope ...
 - ... imaged blackholes ...





Past Talks



- Medieval Islamic Astronomy And Its Influence On Renaissance Europe
- Forgotten History: Al-Sufi's Book Of Fixed Stars
- Slides from both are on my web site, with audio recording:
 - Baheyeldin.com





Arab Traditions



- Anwaa
 - When certain stars/asterisms are visible before sunrise, after absence from sky
 - Like 'decans' in Ancient Egypt
- Moon Stations
 - Stars/asterisms adjacent to the moon each night as it travels the sky over a month





Not All Are Arabic



- Arcturus
- Polaris
- Bellatrix
- Vindemiatrix
- Capella
- Sirius
- Mira
- Castor
- Pollux
- Antares
- Regulus
- Spica
- Canopus
- Procyon
- Alcyone
- Pleione
- Alkalurops
- Zosma
- ...





Latin from Arabic



- From Greek to Arabic, then Arabic to Latin
- Spica: '*ear of wheat*'
- Asellus Borealis, Australis: '*Donkeys*' around 'manger' (M44) in Cancer
- Propus: '*forward leg*' of Gemini





Non-Arabic Names



- Persian (Farsi)
 - Tarazed (Aquila, from *Tarazu*: ‘Scales’)
 - Sargas (Scorpio, ‘Sar Gaz’ ? ‘Arrow Head’)
- Turkish
 - Yildun (Ursa Min., from Yaldiz = ‘star’)
- Sumerian (?)
 - Nunki





Wrong Information!



- Richard Hinckley Allen, autodidact
- Authored: ***Star Names: Their Lore And Meaning***, 1899, R. H. Allen.
- Did not know Arabic, hence wrong grammar
- Lots of ***wrong information!***
- Criticized by experts (e.g. Prof. Paul Kunitzsch)
- Popular source in the West
- *Even worse*: Most of the bad info crept into Wikipedia, and various other web sites, and became 'truth'





Transliteration Troubles

- Transliteration:
 - *Representing words phonetically from one script/language to another*
- Sounds that don't exist in the target language (e.g. several Semitic sounds used in Arabic)
- Different letters for the same sound (e.g. Kh = Ch or H)
- Same letters for different sounds (e.g. V = W [Vega], V = B [Avicenna, Avempace])





Arabic Star Names



- Beginning with 'Al ...' or 'El ...'
 - With exceptions (e.g. Albireo)
- Examples:
 - Aldebaran, Alkaid, Almach, Eltanin, ...





Fusion



- The current Arabic Star names are really a fusion of:
 - Greek Names (via Ptolemy's Almagest)
 - Native Arab Folklore (Anwaa, asterisms, star names)
 - Translated into Arabic
 - Then translated (and mangled) to Latin)
- See my previous talk on Al-Sufi





Star Names



Native Arab Names





‘The Auspicious’

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‘The Auspicious’



- Total of 10, stars and asterisms
- 4 are ‘Moon Stations’ (**bold** below)
- West to East
 - [Saad al]**Dabih** (*Slaughterer/Butcher*, Cap)
 - *The goat*
 - [Saad]**Albali** (*Swallow*, Aquar)
 - [Saad] Nashira (Capr)
 - **Sa[a]d al suud** (... *of the Auspices*, Aquar)





‘The Auspicious’



- Continued ...
 - Sa[a]d al melik (... *of the King*, Aquar)
 - **Sad[al]achbia** (... *of the Tents*, Aquar)
 - Saad Al Baham (Pegasus)
 - [Saad Al] Homam (Pegasus)
 - Sa[a]d al Bari (*Clever*, Pegasus)
 - [Saad] Matar (... *rain*, Pegasus)

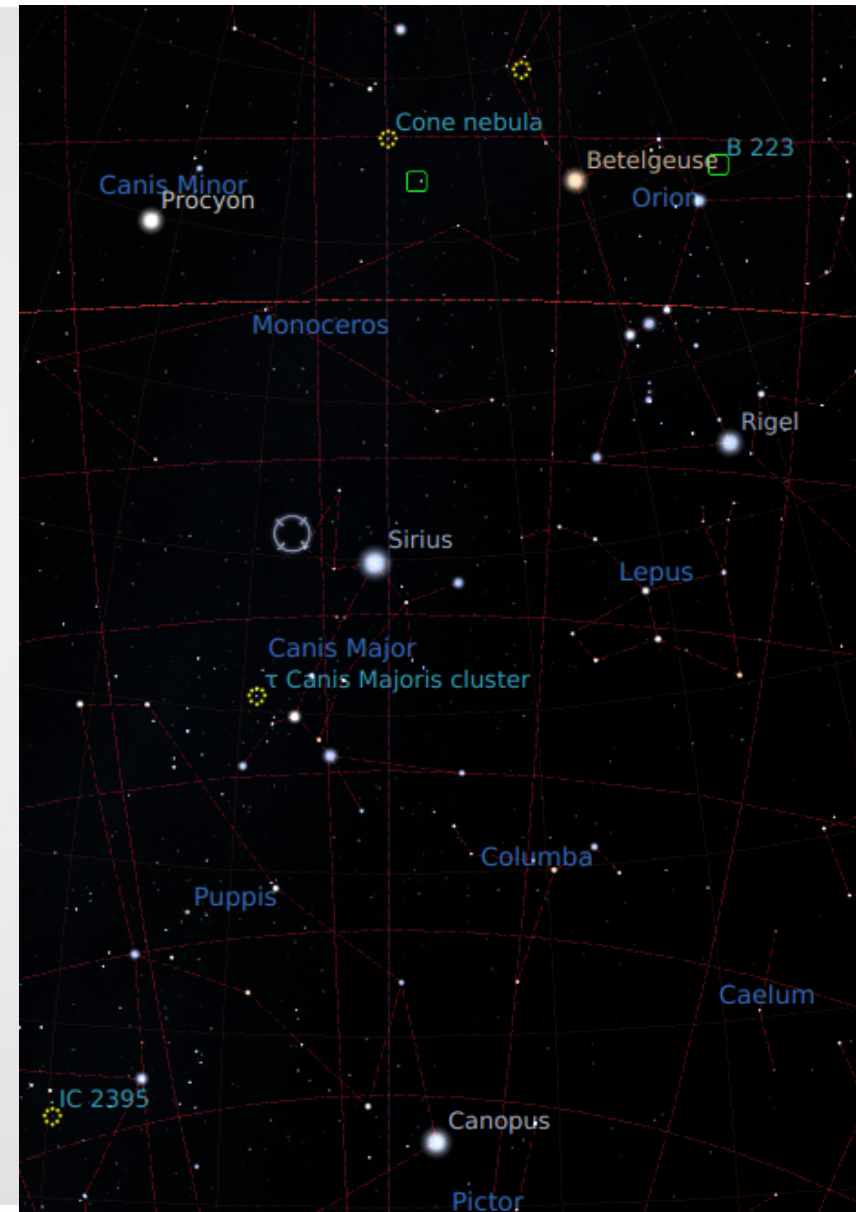




Suhail and Jawzaa



- Suhail (**Canopus**)
- Al-Jawzaa (**Orion**)
- Al-Shi`ra Al-`Aboor (**Sirius**)
- Al-Shi`ra Al-Ghomaysaa' (Gomeisa, **Mirzam**)





Suhail and Jawzaa



- Suhail (**Canopus**) was to marry Al-Jawzaa (**Orion**), but something happened, and Jawzaa died
- Suhail's sisters feared revenge:
 - one crossed the river (**Milky Way**), called Al-Shi`ra Al-`Aboor (the one who crossed: **Sirius**)
 - other stayed behind and cried a lot that she became bleary eyed, **Gomeisa**





Star Names



Other Ways of Naming





Object Names



- Saiph (Sword)
- Alphard ('Solitary one')
- Alhena ('Brand', as in on a camel's neck)
- Altair ('The Flying [Eagle]')
- Vega (more later)
- Mizar/Izar ('Kilt')
- Kaus ('Bow', Australis, Borealis, Media)





Animals



- Diphda (Frog)
- Sulaphat (Tortoise)
- Alpheratz (Mare, Horse)
- Dubhe (Bear)
- Algol (The Ghoul/Monster)
- Eltanin (The Dragon)
- Algorab (The Crow)





Body Parts



- Rigel (leg, Orion)
- Caph (palm, Cassiopeia)
- Minkar (beak, not Minkhar: nostril, as in Wikipedia)
- Deneb (tail, Cygnus, and others)
- Gienah (wing, Cygnus, and others)
- Enif (nose, Pegasus)
- Ain (eye, Taurus)
- Lesath (sting, Scorpio)
- Maasym/Mahasim (wrist, Hercules)





Body Parts (cont'd)



- Sadr, Schedar, Shedir (chest/breast)
- Dschubba, Algieba (forehead)
- Zuben, Acubens (Claw)
- Phecda (thigh), also Phad (corrupted)
- Mebsuta (opened [palm])
- Mekbuda (closed [palm, as in a fist])
- Merak (Meraq = Lower Abdomen/Loins)
- Menkar (Minkhar = Nostril [of Cetus])
- Yed (posterior, prior, 'hand')





Generic Words



- Straight translation of common words
 - Nair, Alnair = [The] Bright [One]
 - Kochab = Kawkab = 'star'





Position



- Algenib (Pegasus, '[on the] flank')
- Alula, Tania, Talitha (Ursa Major: feminine for: *the first [hop], second [hop], third [hop]*)
- Tarf (Beta Cancri, '[on the] edge')
- Megrez (Ursa Major: 'point of attachment [of tail]')
- Achernar (more later)
- Pherkad (Ursa Minor: [two] calv[es])
- Zubenelgenubi (Libra 'Southern Claw')
- Zubeneshamali (Libra 'Northern Claw')





Compound Names



- Rasalhague (head of the [snake] charmer)
- Rasalgethi (head of the kneeler)
- Fomalhaut (mouth of the fish)
- Rigel Kentaurus (Foot of Centaur)
- Achernar (Akher el Nahr = End of the River)
- Kabdhilinan (Ka'b dhi-I inan = Rein Holder Heel)
- Unukalhai (Neck of the Serpent)
- Betelgeuse (more later)





Constellation as Star



- Dubhe = 'Bear'
- Alpheratz = 'The Mare'
- Acrab = 'Scorpion'
- Hamal = 'Lamb'
- Ankaa = 'Phoenix'
- Sulaphat = 'Tortoise', name of Lyra
- Alphecca = Arabic name for Corona
- Mothalla[t]h = Triangle
- Algorab = The Crow





Mangled Names



- Shortening:
 - **Denebola**[ith]
 - **Rasalas**[ad]
 - **Menk**[ab dhu]**alanan**
 - **Men**[kab]**Kent**[aurus])
 - **Alc**[h]**o**[wa]**r**





Mangled Names (cont'd) **2bits**

- Missed Letters
 - **Mothalla[t]h**
 - **Alnat[i]h**
- Letter substitution:
 - **Vega** = Waqe` (= Falling)
 - **Almach** = Al-`Anak (= Lynx)
 - **Alnilam** = Al-nathm





Mangled Names (cont'd)

- Transposition:
 - **Sham** = Sahm = 'arrow'
- Misreading:
 - **Betelgeuse** = Yad Al Jawza, Y يد ~ B بد
- Other:
 - Alioth (Al-`Ayuq = Capella ?)
 - Zavijava (say what?)





Duplicate Names



- Alnair (*Bright [star]*, Alpha Grus, Zeta Cent.)
- Ruchbah = Rukbat (*knee*, Delta Cass., Alpha Sagitt.)
- Sadr = Schedar/Shedir (*chest/breast*, Gamma Cyg., Alpha Cass.)
- Mirfak, Marfik/Marsik (Alpha Pers., Lambda Ophi.)
- Mahasim, Maaysam (Hercules, Auriga)
- Alnitak = Mintaka (more later)





Duplicate Names (cont'd)

- Zubana = Claw
 - Acubens (Cancer)
 - Zuben al-Akrab (Scorpio)
 - Zubenschamali (Libra)
 - Zubenelgenubi (Libra)
- Wing
 - Gienah (Epsilon Cygni)
 - Gienah (Gamma Corvi)





Duplicate Names (cont'd)

- Tail
 - Deneb (in Cyg)
 - Deneb Algedi (Delta Capr.)
 - Deneb Kaitos (tail of Cetus)
 - Denebola[ith]





Asterisms

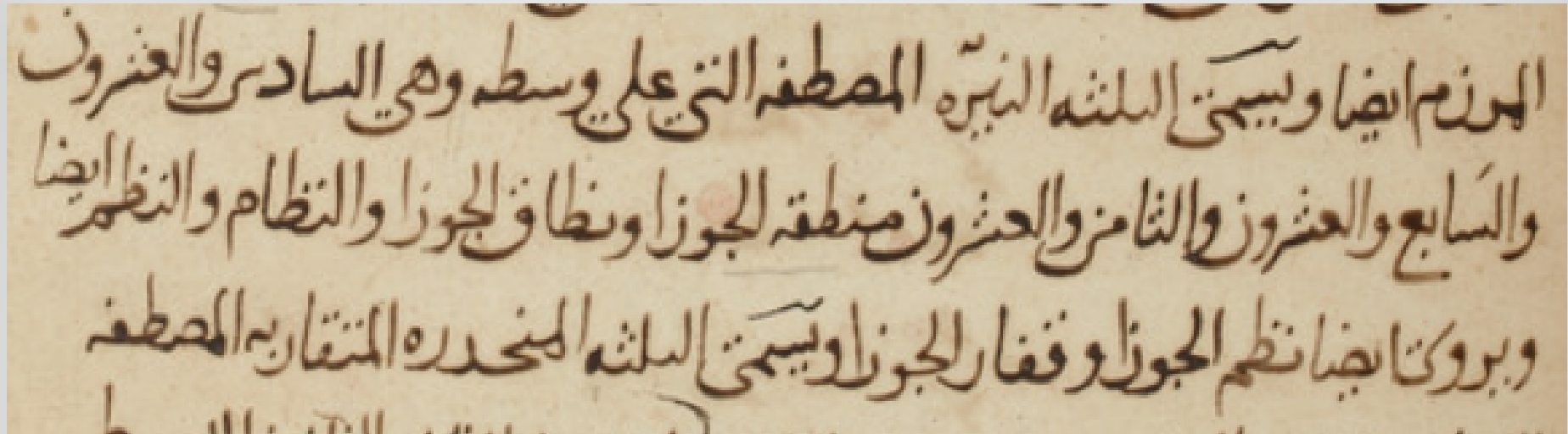


- In many cases, groups of stars were named together
- Examples:
 - Some of the Saads are groups, not single stars
 - ‘The riders ‘in Cygnus
 - Two coffins in Ursa Maj/Min.
- Others





Group vs. Individual



- ‘... the three bright ones in a row on [Orion’s] waist ... are known as *Mintaka* [belt], *Nitaq* [belt], *Al-Nitham* [necklace], *Al-Nathm* [necklace], also *Nathm Al-Jawzaa*’, so synonyms
- Became individual star names, with corruption: *Mintaka* (Delta), *Alnilam* (Epsilon), *Alnitak* (Zeta)
- Why two with Al-, and one without?





Plurals vs. Singular



- Adhara
 - Currently name for a single star
 - In Arabic it was a group, plural for: ‘maidens’, ‘virgins’





Misunderstanding?



- Unintended Consequences
 - Zaniah, mistranslation of 'zawyah' = *angle, corner*
 - Means: adultress
 - In Virgo (Virgin)!





New Constellation!



- **Canis Venatici**, was part of Bootes (herdsman)
- Translated by *Hunayn Ibn Ishaq* from Greek to Arabic (~ 850s C.E.) as 'staff with hook': *Al 'Asa Dhat Al Kullab*
- *Kullab* was translated by *Gerard of Cremona* from Arabic to Latin (1150s C.E) as *Kilab* (plural of *Kalb* = dog)
- Petrus Apianus 1533 C.E: drawing of the dogs!





Not Everything Made It **abits**

- Cygnus ('The Chicken')
- Minqar Al-Dajajah
 - Beak = Albireo
- Al-Fawares
 - 'The riders, side by side'
- Al-Ridf
 - 'The follower'





Not Everything Made It **abits**

- Ursa Minor
- Na'sh ('coffin')
- Al-Farqadan ('The Two Calves'. Only Pharkad made it)
- Al-Judai (Polaris)





Not Everything Made It **abits**

- Ursa Major
- Another Na'sh ('coffin')
- Al-Banat ('The Girls [mourning the deceased in the coffin])
- Another 'Anak' (Lynx)
- Alcor = Al-Suha
- Three 'hops': **Al-Qafza** Al-Ula, **Al-Qafza** Al-Thania, **Al-Qafza** Al-Thalitha





Not Everything Made It **abits**

- Bootes
- Awlad Al Diba` (Pups of the Hyenas)
- Al-Rumh (The Spear, two stars)





Not Everything Made It **abits**

- Hercules
- Al-Nasaq Al Shami (The Northern Line)
- Kalb Al-Rai (Dog of the Herdsmen)





Huge *Leo*



- Lion's Liver
 - Cor Caroli in Canes Venatici
- Two legs:
 - Arcturus in Bootes
 - Spica in Virgo





Huge *Pleiades*



- Al-Thuraya: modern *Soraya* female name in Turkey/Iran/Others
- Imagined with two hands:
 - One row north through Persus to Caph in Cassiopeia (**Al-Kaf Al-Khadeeb**, the *Henna Painted Hand*)
 - Another row south to Cetus' Head, **Al-Kaf Al-Jathmaa**, the *Short Hand*)





Antelopes



- Antelopes
 - With their calves
 - Fleeing from the Lion
 - Around Talitha (*third [hop]*) in Ursa Major





Two Thrones



- Eridanus and Orion' Leg
 - Throne of Orion
- Lepus
 - Four stars forming the rabbit's body
 - Other Throne of Orion





More ...



- Ostriches
 - Those who finished drinking
 - Those who are going to drink
 - Eggs of the ostriches
- River
- Wolf
- ...





Much More ...



Still more out there ...





Takeaways



- Islamic/Arab Astronomy is very much still with us, in the legacy of star names
- It is a fusion of native Arab and Greek traditions
- IAU committee continues to confirm old star names (mangled or not)





Further Reading



- Medieval Islamic Astronomy And Its Influence On Renaissance Europe
 - Audio and slides at baheyeldin.com
- Forgotten History: Al-Sufi's *Book Of Fixed Stars*
 - Audio and slides at baheyeldin.com





Further Reading



- Arizona University: *One Sky, Two Deserts*
 - onesky.arizona.edu
- Paul Kunitzsch, Munich University
 - Scientific Contacts and Influences Between The Islamic World and Europe: The case of Astronomy, 2007
 - Various works on Islamic Astronomy, transmission to the West, and Star Names





Further Reading



- UNESCO and IAU
 - Astronomy and World Heritage: Thematic Study
 - AstronomicalHeritage.net
- MuslimHeritage.com
 - Well researched articles on astronomy, observatories, clocks, and other Islamic Sciences





Questions?

abits

Questions? Comments?

