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 ... 

- 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
- 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
Native Arab Names
‘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 (*Swallower, Aquar*)
  - [Saad] Nashira (Capr)
  - Sa[a]d al suud (... of the Auspices, Aquar)
‘The Auspicious’

- 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, Shedin (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’)
- Zubeneschamali (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-l 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

- **Denebola**[ith]
- **Rasalas**[ad]
- **Menk**[ab dhu ]alinan
- **Men**[kab ]**Kent**[aurus])
- **Alc**[h]o[wa]r
Mangled Names (cont’d)

- 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 ~ بـ

- **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 (Gama 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
‘... the three bright ones in a row on [Orion’s] waist ... are known as Mintaqa [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

- Cygnus (‘The Chicken’)
- Minqar Al-Dajajah
  - Beak = Albireo
- Al-Fawares
  - ‘The riders, side by side’
- Al-Ridf
  - ‘The follower’
- Ursa Minor
- Na’sh (‘coffin’)
- Al-Farqadan (‘The Two Calves’. Only Pharkad made it)
- Al-Judai (Polaris)
- 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

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

- 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
• 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? Comments?