β, 2.3, yellow.

Mirach was described in the *Alfonsine Tables* of 1521 as *super mirat*, from which has been derived its present title, as well as the occasional forms **Mirac, Merach, Mirar, Mirath, Mirax,** etc.; *mirat* probably coming from the 1515 *Almagest's super mizar*, the Arabic mi'zar, a girdle or waist-cloth. Scaliger, the great critical scholar of the 15th century, adopted this **Mizar** as a title, and Riccioli followed him in its use, thus confounding the star with ζ Ursae Majoris. The **Mirae** of Smyth doubtless is a typographical error, although Miraë had appeared in Chilmead's *Treatise*[1] of 1639 for the same word applied to β Ursae Majoris.

Hipparchos seems to refer to it in his ζώνη; and, synonymously, some have termed it **Cingulum**; others, **Ventrale,** from its former position in the figure, although now it is on the left hip. In later Arabian astronomy it marked the right side of Andromeda, and so was known as **Al Janb al Musalsalah,** the Side of the Chained Woman. β appeared in very early drawings as the *lucida* of the northern of the two Fishes, and marked the 26th *manzil* **Al Baṭn al Ḥūt,** the Belly of the Fish, or **Al Ḳalb al Ḥūt,** the Heart of the Fish; and the corresponding *sieu* **Goei,** or **Kwei,** the Man Striding, or the Striding Legs, anciently **Kwet.** In this location it was **Al Rishā,** the Band, Cord, Ribbon, or Thread, as being on the line uniting the Fishes; but this title now belongs to α Piscium.

Brown includes it, with υ, φ, and χ Piscium, in the Coptic lunar station **Kuton,** the Thread; and Renouf, in **Arit,** an asterism indigenous to Egypt. It lies midway between α and γ, about 15° distant from each; and in astrology was a fortunate star, portending renown and good luck in matrimony.

γ, Binary,—and perhaps ternary, 2.3, 5.5, and 6.5, orange, emerald, and blue.

This is **Alamac** in the *Alfonsine Tables* and 1515 *Almagest;* Riccioli's **Alamak;** Flamsteed's **Alamech;** now **Almach, Almak, Almaack,** and **Almaac** or **Almaak;** all from **Al 'Anāḳ al 'Arḍ,** a small predatory animal of Arabia, similar to a badger, and popularly known there as Al Barid. Scaliger's conjecture that it is from Al Mauk, the Buskin, although likely enough for a star marking the left foot of Andromeda, is not accepted; for

[1] This book, a *Learned Treatise on Globes*, was a translation by Master John Chilmead, of Oxford, of two early Latin works by Robert Hues and Io. Isa. Pontanus. It is an interestingly quaint description of the celestial globes of that and the preceding century, with their stellar nomenclature.

Ulug Beg, a century and a half previously, as well as Al Tizini [1] and the Arabic globes before him, gave it the animal's title in full. But the propriety of such a designation here is not obvious in connection with Andromeda, and would indicate that it belonged to very early Arab astronomy.

Bayer said of it, *perperam* **Alhames,** an erroneous form of some of the foregoing. Riccioli [2] also mentioned this name, but only to repudiate it.

Muḥammād al Achsasi [3] al Muwakkit designated γ as **Al Ḥ·āmis al Na'āmāt,** his editor translating this *Quinta Struthionum*, the 5th one of the Ostriches; but I have not elsewhere seen the association of these birds with this constellation.

Hyde gives another Arabian designation for γ as **Al Rijl al Musalsalah,** the Woman's Foot.

In the astronomy of China this star, with others in Andromeda and in Triangulum, was **Tien Ta Tseang,** Heaven's Great General. Astrologically it was honorable and eminent.

Its duplicity was discovered by Johann Tobias Mayer of Göttingen in 1778; and Wilhelm Struve,[4] in October, 1842, found that its companion was closely double, less than 1″ apart at a position angle of 100°, and probably binary. The two larger components are 10″.4 apart with a position

[1] The catalogue of this author, Muḥammād abu Bekr al Tizini al Muwakkit, was published at Damascus in 1533 with 302 stars, and from its long list of purely Arabic star-names was regarded as worthy of translation and republication by Hyde, in 1665, with the original text. The *muwakkit* of his title indicates that he was shaykh of the grand mosque.

[2] This last author, to whom I shall make frequent reference, was Joanne Baptista Riccioli, of the Society of Jesus, whose *Almagestum Novum* of 1651 and *Astronomia Reformata* of 1665 were famous in their day, and are interesting in ours, as preserving to us much of the queer mediaeval stellar nomenclature, as well as of the general astronomical knowledge of the times. In the 2d volume of this last work is a long list of titles, curiosities in philology, with this heading: *Nomina Stellarum Peregrinum & Plerumque Arabica;* while the comment thereon, *ne mirere Lector, si eidem Stellae diversa nomina videbis adscripta, pro diversitate Dialectorum aut codicum fortasse corruptorum*, might well have served as a motto for this book. He is noted, too, as having drawn for his *Almagest* the 2d map of the moon,—Hevelius preceding him in this by four years,—and as having given the various names to its various features, more than two hundred of these being still in use, while all but six of those given by his justly more celebrated contemporary have been discarded. His lunar titles naturally were Jesuitical; nor was he overmodest, for his own name appears first in the list, and that of his colleague Grimaldi immediately succeeding.

[3] The Arabic manuscript of this author, with its star-list of about the year 1650, has been reviewed by Mr. E. B. Knobel in the *Monthly Notices* of the Royal Astronomical Society for June, 1895. It contains 112 stars, perhaps taken from Al Tizini's catalogue of the preceding century. The Achsasi of his title was from the village of similar name in the Fayūm, doubtless his birthplace; and, like Tizini, he was shaykh of the grand mosque in Cairo, where his work was written.

[4] Struve was the first director of the Russian National Observatory at Poulkowa, where he was succeeded by his son Otto; and two of the grandsons bear names already celebrated in astronomy.

angle of 63°.3. The contrast in their colors is extraordinarily fine. Sir William Herschel wrote of it in 1804:

> This double Star is one of the most beautiful Objects in the Heavens. The striking difference in the colour of the two Stars suggests the idea of a Sun and its Planet, to which the contrast of their unequal size contributes not a little; but Webb thought them stationary.

It is readily resolved by a 2¼-inch glass with a power of forty diameters, and it seems singular that its double character was not sooner discovered.

From its vicinity radiate the **Andromedes II,** the **Bielid meteors** of November, so wonderfully displayed on the 27th of that month in 1872 and 1885, and on the 23d in 1892, and identified by Secchi and others with the celebrated comet discovered by Biela in 1826, which, on its return in 1832, almost created a panic in France. The stream completes three revolutions in about twenty years, although subject to great perturbations from Jupiter, and doubtless was that noticed on the 7th of December, 1798, and in 1838. These objects move in the same direction as the earth, and so with apparent slowness,— about ten miles a second,— leaving small trains of reddish-yellow sparks. The radiant, lying northeast from γ, is remarkable for its extent, being from 7 to 10 degrees in diameter. The Mazapil iron meteorite which fell in northern Mexico on the 27th of November, 1886, has been claimed "as being really a piece of Biela's comet itself."

δ, Double, 3 and 12.5, orange and dusky.

Burritt added to the letter for this the title **Delta,** perhaps from its forming a triangle with ε and a small adjacent star.

It marks the radiant point of the **Andromedes I** of the 21st of July.

The components are 27″.9 apart, at a position angle of 299°.3.

θ, a 4.7-magnitude star, with ρ and σ, was the Chinese **Tien Ke,**[1] the Heavenly Stable.

ξ, 4.9,

is **Adhil,** first appearing in the *Almagest* of 1515, and again in the *Alfonsine Tables* of 1521, from **Al Dhail,** the Train of a Garment, the Arabic equivalent of Ptolemy's σύρμα; but Baily thought the title better applied to the slightly fainter A, which is more nearly in that part of the lady's dress; and

[1] The star-names of China that appear in this work are few in comparison with the total in the great number of that country's constellations. I occasionally cite them merely to indicate the general character of Chinese stellar nomenclature.