south by Hydra, Corvus and Crater; and on the west by Leo, Crater, and Corvus.

While the beautiful Spica is its most noteworthy object to the casual observer, yet the telescope shows here the densest nebular region in the heavens, in the space marked by its β, η, γ, δ, and Denebola of Leo; while other nebulae are scattered all over this region of the sky. Sir William Herschel found here no less than 323, which later search has increased to over 500,— very many more nebulae than naked-eye stars in the constellation. Argelander gives 101 of the latter, and Heis 181.

It is for these four stars in Virgo, forming with ε two sides of a right-angled triangle open towards Denebola, γ at its vertex, that Professor Young uses his mnemonic word **Begde** to recall their order. They extend along the wings through the girdle, and were the **Kennel Corner of the Barking Dogs** of the Arabs, often considered as the **Dogs** themselves.

Von Zach, of Gotha, rediscovered here on the last day of the first year of this century the minor planet Ceres, whose position had been lost some time after its discovery by Piazzi on the previous New Year's Day; Olbers repeating this, and independently, the next evening, the first anniversary of the original discovery. Here, too, Olbers found, on the 28th of March, 1802, another minor planet, Pallas, the second one discovered, and appropriately named, for the thirty-first of the *Orphic Hymns* described this goddess as "inhabiting the stars."

The sun passes through the constellation from the 14th of September to the 29th of October; and during this time

> the Virgin trails
> No more her glittering garments through the blue.

α, Spectroscopic binary, 1.3, brilliant flushed white.

Spica signifies, and marks, the Ear of Wheat shown in the Virgin's left hand—Aratos wrote "in her hands"; Vitruvius and Hyginus, "in her right hand"— when she was thought to be Ceres. All the Romans called it thus, Cicero saying **Spicum,** and their descendants, the modern Italians, **Spigha;** the French have **l'Epi.** In Old England it was the **Virgin's Spike,** and even Flamsteed thus designated it. For at least twenty-five centuries, and among all civilized peoples, the Latin word, or words of similar import, has obtained; although Smyth mentioned an attempt before his day to secure for it the illustrious name of **Newton.**

Στάχυς, perhaps of the same signification although another has been assigned to it, appeared with Aratos, Hipparchos, and Ptolemy, transcribed by the Latins as **Stachys.** Manetho had Σταχυώδης, which we have seen

used for Virgo by another Graeco-Egyptian author, Nonnus. Bayer cited **Arista** for the star as for the constellation; **Aristae Puella** occurs in some Latin doggerel by Caesius; as the brightest of the figure it bore the latter's **Erigone**; while **Vindemitor** and **Vindemiator**, which better belong to ε, have been applied to it.

Other titles—**Sunbala**; **Sunbale**; **Sumbela**; Riccioli's **Sumbalet, Sombalet, Sembalet Eleandri**; and Schickard's **Sunbalon**—are from **Sunbulah** and **Al ʿAdhrā'**, Arabic words synonymous respectively with Spica and Virgo, although Hyde derived them from Σίβυλλα, the Singing Sibyl, of the constellation. Al Bīrūnī said that it was **Al Ḥulbah**, the Bristle, but his explanation of this only served to show the strange confusion in titles that existed in the Arab mind between Spica and Al Ḍafīrah in the Lion's tail. And Al Bīrūnī, again, said that it was the **Calf of the Lion**, with Arcturus as the second Calf; but Kazwini designated it as **Sāḳ al Asad**, the Shin-bone of the Lion, this Lion being the enormous figure already alluded to, of which a part of Virgo formed one of the legs.

A still more widely spread native name in the Desert was **Al Simāk al A'zal**, the Defenceless, or Unarmed, Simāk, *i. e.* unattended by any near-by star; the other Simāk, Arcturus, being armed with a lance, or staff, represented by adjacent stars of Boötes; and it doubtless was this isolated position of Spica that induced the Coptic title **Khoritos**, Solitary. The *Alfonsine Tables* turned Simāk al A'zal into **inermis Asimec**, adding **Acimon, Alaraph, Almucedie** "of the Chaldaeans," and **Alacel**; while the 1515 *Almagest* had **Aschimech inermis.** From all these come Bayer's **Alaazel, Alazel, Azimon, Alzimon** "of the Nubians," **Hazimet Alazel**, the alchemists' **Alhaiseth**, Riccioli's **Eltsamecti** and **Eltsamach**, and the **Azimech** still occasionally seen. Scaliger had **Hazimeth Alhacel**, and Schickard **Huzimethon.** Riccioli cited a "Nubian" title, **Eleazalet**, that some have said came from Al ʿAzalah, the Hip-bone, but it probably belongs among the derivatives from *A'zal*; and his **Eleadari** has been transferred to Spica from the constellation.

This star marked the 12th *manzil*, **Al Simāk**, and in early astrology was, like all of Virgo, a sign of unfruitfulness and a portent of injustice to innocence; but later on, of eminence, renown, and riches.

Chrysococca called it μικρός Κονταράτος, the Little Lance-bearer, Arcturus being Κονταράτος *par excellence.* And Hyde gave the Hebrew **Shibbōleth**, the Syrian **Shebbeltā**, the Persian **Chūshe**, and the Turkish **Salkim**, all signifying the "Ear of Wheat"; other names being the Persian **Çpur**, the **Çparegha** of the *Avesta*, the Sogdian **Shaghar** and Khorasmian **Akhshafarn**, all meaning a "Point"—*i. e.* Spica.

The Hindus knew it as **Citrā**, Bright, their 12th *nakshatra*, figured as a **Lamp**, or as a **Pearl**, with Tvashtar, the Artificer, or Shaper, as its presiding

divinity; and some have thought it the **Tistar Star** that generally has been identified with Sirius.

In Babylonia, and representing the whole constellation, it personified the **wife of Bēl,** and as **Sa-Sha-Shirū,** the Virgin's Girdle, marked the 20th ecliptic asterism of that name, and the lunar asterism **Dan-nu,** the Hero of the Sky Furrow. It was also **Emuku Tin-tir-Ki,** the Might of the Abode of Life, a common title for Babylon itself.

In Chinese astronomy Spica was a great favorite as **Kió,** the Horn, or Spike, anciently **Keok** or **Guik,** the special star of springtime; and with ζ formed their 12th *sieu* under that title. Naturally it was the determinant.

It is said to have been known at one time in Egypt as the **Lute-Bearer,** and was evidently of importance, for another Egyptian name was **Repā,** the Lord; and Lockyer thinks that the great "Mena may symbolize Spica, with which star we have seen Min-worship associated." According to this same author, one of the temples at Thebes, probably dedicated to this Mena, Menat, Menes, Min, or Khem, was oriented to Spica's setting about 3200 B. C.; and the temple of the Sun at Tell al Amarna was also so oriented about 2000 B. C., or perhaps somewhat later. A similar character attached to it in Greece, for two temples have been found at Rhamnus, "almost touching one another, both following (and with accordant dates) the shifting places of Spica," at their erection 1092 and 747 B. C.; "and still another pair at Tegea." Temples of Herē were also so oriented at Olympia 1445 B. C., at Argos and Girgenti; and those of Nikē Apteros at Athens, 1130 B. C., and of "the Great Diana of the Ephesians," 715 B. C.

It was to the observations of this star and of Regulus about 300 B. C., recorded by the Alexandrian Timochares, that, after comparison with his own 150 years later, Hipparchos was indebted for the great discovery attributed to him of the precession of the equinoxes; although Babylonian records, and the temple orientation of Egypt and Greece, may indicate a far earlier practical knowledge of this.

According to Ptolemy, Timochares observed an occultation by the planet Venus of an unidentified star "on the tip of Virgo's wing,"—perhaps ψ or *q*,—on the 12th of October, 271 B. C.[1]

[1] A still earlier record of the planet, dating from 686 B. C., is on a tablet from Chaldaea now in the British Museum; while earlier still are Homer's Ἕσπερος, the Latin Hesperus,—

> the brightest star that shines in Heav'n;

and Isaiah's

> . . . day star, son of the morning,

that our *Authorized Version* rendered "Lucifer," the equivalent of the Greek alternative titles Ἑωσφόρος and Φωσφόρος, the Latin Phosphorus. The identity of this Morning Star with the Evening Star Hesperus was discovered by Pythagoras, or by Parmenides, in the 5th century before Christ.

The planet also was known as Ἀφροδίτη, as Juno's Star, and as Isis.

Spectroscopic observations by Vogel in 1890 show that Spica is in revolution with a speed of at least fifty-six miles a second in an orbit of three millions of miles' radius, around the common centre of gravity of itself and an obscure companion in a period of about four days. It is, however, never eclipsed by the latter, as is the case with the star Algol. Its spectrum is Sirian; and the system is approaching us at the rate of 9.2 miles a second. Gould thinks that it shows fluctuations in brilliancy.

It is one of the lunar stars much utilized in navigation, and lies but 2° south of the ecliptic, and 10° south of the celestial equator, coming to the meridian on the 28th of May.

With Denebola, Arcturus, and Cor Caroli it forms the **Diamond of Virgo,** 50° in extent north and south.

β, 3.9, pale yellow.

Zavijava, a universal name in modern catalogues, is first found with Piazzi, but is **Zarijan** in the *Standard Dictionary*. It is from **Al Zāwiah,** the Angle, or Corner, *i. e.* Kennel, of the Arab Dogs,—although γ exactly marks this Corner and should bear the title.

The stars β, η, γ, δ, ε, outlining this Kennel, formed the 11th *manzil*, **Al 'Awwā',** the Barker, which was considered of good omen; while Firuzabadi included it with the preceding moon station Al Ṣarfah,—β Leonis,—in the group **Al Nahrān,** the Two Rivers, as their rising was in the season of heavy rains. Other indigenous titles were **Al Bard,** the Cold, which it was said to produce; and **Warak al Asad,** the Lion's Haunches.

β marked the 18th ecliptic constellation of Babylonia, **Shēpu-arkū sha-A,** the Hind Leg of the Lion, for this country also seems to have had one of these creatures here. With η, it perhaps was **Ninsar,** the Lady of Heaven, probably a reference to Istar; and **Urra-gal,** the God of the Great City; and one of the seven pairs of stars famous in that astronomy. As a Euphratean lunar asterism it bore the same title **Ninsar,** but this included all the components of the Arabs' Kennel Corner.

These also were the Persian **Mashaha,** the Sogdian **Fastashat,** the Khorasmian **Afsasat,** and the Coptic **Abukia,** all of the Arabic signification.

In China it was **Yew Chi Fa,** the Right-hand Maintainer of Law.

β is 13° south of Denebola in Leo, culminating with it on the 3d of May.

γ, Binary and slightly variable, 3 and 3.2, white.

The Latins called this **Porrima,** or **Antevorta,** sometimes **Postvorta,** names of two ancient goddesses of prophecy, sisters and assistants of Car-