

average before it came to the star. The *tropical* or common year would be completed upon the sun's arrival at the intersection of the equinoctial and the ecliptic, 50.1 seconds of arc, or 20m. 19.9s. of time before it could reach the initial star. So that by adding 365d. 5h. 48m. 49.7s. to the date given above, we find when the sun is at the first point of Aries in 1890. In 20m. 19.9s. more it would arrive at the star where the first point of Aries was in March 20th, 1889. It would take 25,868 years for this average difference of 50.1" annually to amount to 360°. The motion is so very slow that lines of declination and of right ascension, which change their position with the equinoctial, will leave these lines on our star maps practically correct for some years into the next century.

2. A *sign* of the zodiac always means a length of 30° on the ecliptic. It therefore follows that every sign is slowly moving westward along the ecliptic; and in one-twelfth of 25,868 years, that is, in 2,156 years, Aries will cover exactly the stars at the beginning of the period covered by Pisces.

3. The *constellations* of the zodiac gave the names to the *signs*. These *constellations* as they have been delimited for us by Argelander, cover the ecliptic, but are irregular in shape and even unequal in length, some being as short as 19°, and others as long as 48°; while theoretically they should be each 30°. It is evident that when the present order of *signs* was established they must have approximately coincided with the *constellations*. When was that time?

4. During the last month the brilliant planet Venus could have been seen passing a little below a pair of stars, one of the second magnitude, the most westerly of the third magnitude. These are, respectively, Alpha and Beta, of the constellation Aries. About 128 B. C., when that great ancient astronomer, Hipparchus, was developing the science, the *vernal equinox* was near Beta Arietis (beside Venus, on the 7th March,) which was nearly on the western boundary of Aries, contiguous to Pisces. The *signs* and *constellations* were then coincident, so far as they could be from the irregular boundary of the constellations. Since then 2017 years have passed away. Shortly before the time of Christ, the vernal equinox, or the first point of the *sign* Aries moved westwardly into the *constellation* Pisces. It is not yet in the constellation Aquarius, nor will it be for at least 300 years to come, as Pisces is one of those constellations which is longer than the average 30°.

5. The prevalence of fish forms in the ornamentation of Christian tombs in the catacombs of Rome are not likely to have any astronomical signification. The Christians of that time were not likely to have

good opportunities or even the leisure to cultivate such tastes. Some of the decorations show figures of the miracles of the loaves and fishes, among other scenes from the history of Christ. The Apostles, too, were fishermen. Fish pictures would, even for these reasons, be expected to appear often in their decorations. But these simple minded men could more easily see a great mystery in the remarkable lettering of the word fish, taken from their Greek testament, than in abstruse astronomical knowledge, so generally unknown even to the comfortable Christian of to-day, who can get it, much of it, even in a free advertising almanac.

The Greek for fish is: *Ichthys*. There were here, in order, the initials of the name above all names—the name of Him for whom they lived, the name of Him for whom they died: *Iesos Christos, Theou Uios Soter*, "Jesus Christ, the Son of God the Saviour." The fish, *Ichthus*, was therefore the emblem, the symbol of the great name, and its attributes, which should not be even lightly spoken.

6. Over 2000 years before the time of Hipparchus, or shortly after the date of the deluge, according to Archbishop Usher's chronology, a little later than 2450 B. C., the vernal equinox would be in the proximity of the Pleiades, near the western boundary of Taurus. Bull worship would account for the honorable titles having been given to the first sign beginning at the vernal equinox.

There is a probability that the constellations of the zodiac may have received substantially their present names at even as early a date as the above. This seems to be indicated by some other curious facts. In the ancient cabala of the Jews the bull is the first zodiacal sign. Among the Persians, who numbered their successive signs by the letters of the alphabet, A stands for Taurus, B for Gemini, and so on. Among the Chinese the commencement of the sun's annual motion is referred to the same constellation. In Thebes the zodiacal signs in a great sepulchral chamber begin with Taurus, and so does the zodiac of the pagoda of Elephanta.

This would seem to indicate that over 2000 B. C. the elements of astronomy had been studied and formulated, and even the same idea of nomenclature, in some points, made common to various peoples. It appears to us most probable that the bull must have been worshipped before he was placed in the sky. His position must have depended on his popular estimation. Once enthroned in the sky, however, the bull's prestige would be in a fair way to be increased.

Another curious coincidence exists in connection with the cluster called the Hyades (the rainers), near Aldebaran, in the bull's eye. When the vernal