

supplied by him. It may be noted that he, and Hall also, name the satellites from without inward, whereas the natural and usual system of numbering is in the reverse order.

Neptune has but one known satellite, discovered by Lassell in 1846. It is ordinarily not given a name. Flammarion writes of it:²² "The body has not yet received a name. The god Neptune however was not without a son; would not the name Triton, one of the most diligent companions of his father on the ocean, be suitable for it?"

REFERENCES

- ¹ "The Satellites of Mars," p. 6. Reprinted in "Source Book in Astronomy," Shapley and Howarth, p. 323.
- ² *The Observatory*, **15**, 429.
- ³ *The Sidereal Messenger of Galileo Galilei*, translation by E. S. Carlos.
- ⁴ "Histoire de L'Astronomie Moderne," **2**, 92.
- ⁵ "Library of Useful Knowledge," Galileo, p. 26. I have been unable to find the original of this letter, even in the twenty-volume edition of Galileo's works and letters. Henry IV was assassinated May 14, 1610.
- ⁶ Translation by my friend Dr. W. W. Blancké.
- ⁷ *Il Saggiatore* p. 2.
- ⁸ *Archives Néerlandaises des Sciences Exactes et Naturelles*, serie II, **8**, 11, et seq. and **12**, 258, et seq.
- ⁹ *Pop. Astr.*, **1**, 81.
- ¹⁰ *A. J.*, **14**, 97.
- ¹¹ *The Observatory*, **15**, 429.
- ¹² *Ap. J.*, **100**, 57, et seq.
- ¹³ "Oeuvres Complètes," **15**, 213.
- ¹⁴ *Mémoires de L'Académie des Sciences*, **10**, 494.
- ¹⁵ "Saturn and its System," p. 57.
- ¹⁶ "Outlines of Astronomy," p. 460.
- ¹⁷ *Harvard College Observatory, Circular* 43. Reprinted *Pop. Astr.*, **7**, 235.
- ¹⁸ *Annals Harvard College Observatory*, **53**, No. 9. Reprinted *Pop. Astr.*, **14**, 18.
- ¹⁹ *Monthly Notices R.A.S.*, **35**, 16, et seq.
- ²⁰ *Astronomische Nachrichten*, **34**, 326.
- ²¹ "Outlines of Astronomy," p. 461.
- ²² "Popular Astronomy," Flammarion-Gore, p. 470.

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The Astronomical Significance of Easter

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What astronomical significance is there in the various observances connected with the Easter festival? One wonders if arbitrary caprice induced the Council of Nicaea in 325 A.D. to fix Easter day on the first Sunday after the full moon following the vernal equinox, or if the church fathers were compelled to incorporate an ineradicable custom of greater antiquity. Whether or not a divergence of views concerning the placement of Easter prompted Constantine to summon the council is of minor importance. It is an established fact that the Easter festival even then was an ancient, spring, sacred observance. Through ages and localities, the date of the festival varied between March 15 approxi-

mately and the end of April. The English word *Easter* is distinctly derived from the Anglo-Saxon goddess of spring, Ostara; in the Saxon language the month of April had the name of Oestur-monath.

There exists a series of peculiar Easter ceremonies in old European churches and among the country folk. Most interesting is the extinguishing of the so-called eternal light in the principal altar lamp on the Thursday preceding Easter Sunday. The following Saturday evening the lamp is relighted by the ceremonial building of the fire by means of flying sparks from striking quartz. This ritual, including the solemn procession of the Resurrection, of course is interpreted generally as being in commemoration of Christ. We will examine the custom more closely.

Apart from the usual Christian Easter ceremonies, I found in many European villages an Easter children's play of unusual interest. Its general nature consisted in carrying a straw effigy of death, representing Winter, out of the village, to be placed on a pyre amidst great rejoicing. Frequently an old rhyme was chanted: "We carry death out of the village; may new life awaken in our village!" This particular ceremony was spontaneous among country people, set apart from any church supervision or interference. Both the church and folk ceremonies, however, pointed to the same natural phenomenon, namely, the victory of life over death, the coming of springtime. The general use of Easter eggs is a most characteristic rite of Easter. Painted eggs have been profusely used as the symbol of fecundity and the hope of new life.

An analysis of our Easter rituals, which seemingly purport purely Christian significance, will reveal that similar miraculous events occurred in faiths of civilizations which preceded the Christian era by thousands of years. For example, Dupuis writes¹ that Krishna, the crucified Hindu Savior, rose from the dead. Similar stories circulated about Buddha,² the Chinese Lao-Kium,³ and Zoroaster.⁴ Ovid's poem, written at the time of the Roman Emperor Augustus, describes Aesculapius, the Son of God, as being put to death and being resurrected. Likewise, the Savior Adonis or Tammuz, after being put to death, arose from the dead. Julius Firmicius, an eminent early Christian priest and scholar who lived during the reign of Constantine and therefore at the time of the Council of Nicaea (325 A.D.) gives an account of the rites of Adonis. He is struck by the similarity of the heathen mysteries with the Christian sacrament honoring the death and resurrection of Christ Jesus. Alexander Murray quotes the exclamation which the ancient Greeks used during their Easter festival: "Adonis lives and is risen again."⁵ In our Christian Easter services the name of Christ replaces Adonis.

Dupuis says: "The obsequies of Adonis were celebrated at Alexandria with utmost display. His image was carried with great solemnity to a tomb, which served the purpose of rendering him last honors. Be-

fore singing his return to life, mournful rites were celebrated in honor of his suffering and his death. The large wound he had received was shown, just as the wound was shown which was made to Christ by the thrust of the spear. The feast of this resurrection was fixed at the 25th of March."⁶ Bonwick,⁷ Prichard,⁸ and other authoritative writers agree that what Adonis was to the ancient Greeks, Osiris, the Egyptian Savior, was to the Egyptians. Osiris, too, was put to death, whence he arose from the dead. The worship of Osiris was universal in Egypt prior to any similar worship in the Mediteranean region.

Therefore, it is historically clear that Christians annually celebrate the resurrection of the Savior in much the same manner as did the pre-Christians who, in their sacred mysteries, commemorated the resurrection of their Saviors. The progress made is that it is brought out of the mysteries and has become a common heritage of all humanity. It is evident that the celebration of this resurrection is symbolic of the return of spring, conditioned by the position of the sun exactly as it crosses the celestial equator, which is on March 21; 2000 years ago this apparently occurred on March 25. In regard to the 25th of March, Cedrenus, a celebrated Byzantine writer, says, as quoted from Dupuis: "The first day of the first month is the first of the month Nisan; it corresponds to the 25th of March of the Romans, and the Phamenot of the Egyptians. On that day Gabriel saluted Mary in order to make her conceive the Savior. I observe that it is the same month Phamenot, that Osiris gave fecundity to Isis, according to Egyptian theology. On the very same day, our God Savior—Christ, Jesus, after the termination of his career, arose from the dead; that is what our forefathers called Pass-over, or the passage of the Lord."⁹

These similarities and analogies, of which only a few are here introduced, are most striking. St. Augustine observes: "The same thing which is now called Christian Religion, existed among the Ancients. They have begun to call Christian, the true religion which existed before." With the lapse of time, as the fame of Jesus of Nazareth grew and spread, the same fateful trend occurred as in preceding cases. Christ was placed in the rôle of previous idolatrous deities, whether this was or was not in accordance with his beautiful and simple teachings. Originally Easter, determined by the full moon, was the great luni-solar festival of resurrection, because the sun-god was annually reborn at the vernal equinox, a point where the sun crossed the celestial equator, made the transit, and designated the period of passover. It is therefore, a very ancient equinoxial holiday, and the question arises whether or not this Spring equinoxial holiday is older than the Winter solstitial festival, our present Christmas. Different authorities hold various opinions on this, and it cannot be held as definitely solved. J. Norman Lockyer, in his work "Dawn of Astronomy," deals with this problem and does not appear to express a final opinion. He makes a careful in-

vestigation of the solstitial and equinoxial temples, indicating: "We have either Temples of Osiris pointing to the sunset at the equinox, or Temples of Isis pointing to the sunrise at the equinox, but in either case built in relation to the Pyramids." But he refers to M. Biot's investigation of Ramesseum, concerning which Biot stated that Ramesseum's inscriptions are not the records of the summer solstice, as in the case of Denderah, but of a spring equinox, and he assigns the date of Ramesseum as 3285 B.C., which would show the existence of the spring festival now known as Easter. Biot further suggested that in all probability one of the mythological figures might be a representation of the intersection of the ecliptic and celestial equator in the constellation Taurus at the date above mentioned. Biot's researches justified an early stated opinion by Dupuis, who suggests that the perpetual reference to the Bull—Taurus—found in ancient Egyptian records and mythologies arose from the fact that this constellation on account of the precession of equinoxes occupied an important position at a critical time in the year, which would indicate a very considerable lapse of time, that is, a date preceding 3000 B.C. "We find in the table at the Ramesseum distinct references to the Bull, the Lion and Scorpion, and it is also clearly indicated that at that time the star Sirius rose heliacally at the beginning of the Nile-rise."¹⁰

The theory that Easter as the Spring equinoxial festival is a holiday even older than the Winter solstitial holiday may be supported by the fact that to primitive man the passing of winter gloom, the opening of spring leaves and the vivifying power of new life pouring forth on this earth was a most impressive and fascinating experience after long nights in his uninviting, obscure, and humid den, to which he was confined ages ago. In that stage of primitive man's life, he did not take as distinct notice of the Winter Solstice as he did of the actual arrival of springtime, which, in his struggle for life, meant the promise of food after winter's desolation and shortage. In his childlike imagination, he wove a charming and supernatural story around the great and miraculous event. Thus, the very ancient Easter spring festival emerged, ages before the Christian era, and being indestructibly rooted, it was adopted and garbed into a Christian allegory.

While for rational man today the Spring Equinox is a simple, celestial phenomenon, without any particular, mysterious background, ancient man fancied in the vernal, reborn nature a celestial rendezvous of the sun and the moon, and as the ancient Egyptians believed, from this divine parentage Horus or Is-su, the child of Atum was born, and Khunsu, the Prince of Peace. According to the ancients and their mystic interpretation, it is the Mother Moon, goddess of night—the woman arrayed with the sun and with the moon under her feet—that still brings forth her child at Easter. March 25 still remains a holiday in the Roman Catholic calendar, known as Annunciation Day, indicating

its unusual correlation with pre-Christian civilizations. Furthermore, in medieval crucifixions, Christ is constantly accompanied by one or another reproduction of the sun and the crescent moon. It is the same luni-solar conjunction that produced the youthful Khunsu in Egyptian mythology.

Therefore, our calendar rules for the date of the Easter festival continue essentially the same as, for example, in ancient Egypt, and the same full moon which contains Khunsu holding forth the Pig of Easter in the famous Zodiac on the ceiling of the Temple of Denderah in Egypt still determines our Eastertide.

REFERENCES

- ¹ Dupuis: "Origin of Religious Belief," p. 240.
- ² *Prog. Religious Ideas*, Vol. 1, p. 86.
- ³ *Ibid.*, p. 214.
- ⁴ *Ibid.*, p. 258.
- ⁵ A. Murray: "Manual of Mythology," p. 86.
- ⁶ Dupuis: "Origin of Religious Belief," p. 161.
- ⁷ Bonwick: "Egyptian Belief," p. 166.
- ⁸ Prichard: "Egyptian Mythology."
- ⁹ Quoted in Dupuis: "Origin of Religious Belief," p. 244.
- ¹⁰ Lockyer: "Dawn of Astronomy," p. 143.