A detailed account of the results of observations will be found in the Appendix No. 16 of the report of 1870.

I take this opportunity to mention the kindness of Henry Suter, esq., Her Britannic Majesty's vice-consul at Larissa and Volo, who, when it was contemplated to send a party to Larissa, afforded every facility for the prosecution of inquiries, and was in readiness to assist further if it had been expedient to occupy a station near that city.

"Astronomical."

1874 The Atlantic Almanac, 1874, Boston: James R. Osgood and Company, p. 4.

Fisch, First Supplement.

ASTRONOMICAL.

CHRONOLOGICAL CYCLES.

Dominical Letter,	D	Solar Cycle,	7
Epact,	12	Julian Period,	6587
Golden Number,	13		

ECLIPSES IN 1874.

In the year 1874, there will be four eclipses, two of the Sun and two of the Moon.

I. A total eclipse of the Sun, April 16, invisible in North America. Total in Africa, near the Cape. Partial throughout the South Atlantic Ocean.

II. A partial eclipse of the Moon, May 1. Middle of eclipse at 11h. 23m. A.M., Washington time.

III. An annular eclipse of the Sun, October 10, invisible in America. Visible as a partial eclipse throughout Europe. Annular on a very short line in Siberia.

IV. A total eclipse of the Moon, October 24 and 25, visible in the United States.

//SEE TABLE, PAGE 4, IN XEROXED COPY.//

TRANSIT OF VENUS.

On the 8th of December (and partly on the 9th) the planet Venus will pass over the disk of the sun. This is the most important of all astronomical phenomena, because it affords the best means of ascertaining the distance of the sun and thence of all the other planets, the velocity of light, etc., and because it is an event of extreme rarity. It happens on an average once in 86 1/3 years, but the intervals are exceedingly irregular. After a transit another may happen in eight years, then another in 121½ years, then another in eight years, then another in 105½ years, then another in eight years, another in 121½ years, etc. These are the only times at which transits can occur, but not nearly all these do occur. The first transit of Venus, which was made use of to ascertain the distance of the sun, occurred in 1761, and gave for the distance of the sun 94,500,000 miles. The next transit occurred in 1769, and great expeditions were fitted out by the different governments of Europe

for observing it. The results obtained proved nevertheless to be unsatisfactory, different calculations differing all the way from 88,000,000 to 109,000,000 miles; that which was for a long time considered as the best result, 95,000,000 miles, is now known to be too great, the real distance being 92,000,000 or 93,000,000. There has been no transit since 1769, and consequently the most elaborate preparations are making by all the most civilized nations for the observation of that which occurs in 1874, our own government having appropriated 150,000 dollars for the purpose. It will be visible only in Asia, Australia, Oceanica, and the Antarctic Continent. The next transit, which occurs in 1882, will be visible throughout the United States, the whole of Africa, South America, the Atlantic Ocean, and the greater part of the Pacific Ocean.

There is an excellent popular account of transits of Venus in Mr. Richard A. Proctor's book entitled "The Sun." The general theory of the deduction of the planetary distances from observations of a transit is simply this. Venus is so much nearer to us than the sun, that from different parts of the earth's surface she appears projected on to different parts of the sun's disk; then the ratio between the distance of the different places on the earth and the distances of the different parts of the sun's disk give us the distance of Venus, and thence, since all the proportions of the solar system are well known, all other distances among the planets and the sun. But it is far from being a simple matter so to select the stations for observations and the method of observing as to give results of the extreme accuracy required for the purpose. Mr. Proctor quotes a remark of Sir John Herschel's that "the error which has recently been detected and applied to the previously received value of the solar parallax, or ratio between the diameter of the earth and the distance of the sun, corresponds to the apparent breadth of a human hair at one hundred and twenty-five feet, or of a sovereign eight miles off," and of course the coming transit will have no value unless it considerably increases the accuracy of this result. The two methods which have hitherto been relied upon for the observation of this phenomenon are Halle's and Delisle's. Halle's consists in noting the duration of the transit at different places, Delisle's in noting the instant at which it begins or ends. Of these two Halle's is the most suitable for the transit of 1874, but the American observers will rely principally upon a new method which consists in photographing the sun during the progress of the transit at different places. These photographs will be taken with very long telescopes lying upon the ground, into which the sun is reflected, a method the invention of Professor Winlock, Cambridge.

THE COURSE OF THE PLANETS.

VENUS. Venus is a morning star from the beginning of the year until February 23d, when she comes into superior conjunction with the sun, and she is then an evening star until December 8th,

when she passes across the sun's disk at about 11 P.M. Washington time. For the remainder of the year she is a morning star. She reaches her greatest elongation East on the 23d of September, and her greatest brilliancy on the 2d of November.

MARS. At the beginning of the year Mars will rise at about 7 P.M., and will be situated about midway between Formalhaut and η Pegasi. He will move continually eastward among the stars during the whole year, but in consequence of the sun's moving in the same direction at a more rapid rate, Mars will constantly come to the meridian at an earlier and earlier hour. He will therefore be an evening star until the 5th July, when he comes into conjunction with the sun. After that time he will be a morning star for the remainder of the year, and will not reach opposition during the year. At the end of the year he will be nearly in a line between Spica and α Librae.

JUPITER. Jupiter at the beginning of the year will be situated in Virgo near the star η, and in a line between Spica and Regulus, and will rise at about 11.20 P.M. He will move eastwardly among the stars, and will rise earlier and earlier until the 16th January, when, having gone a little way towards η, he will commence a westward or retrograde course, which he will continue until May 19th, when he again changes his course, having during that time moved about 10^{o} towards Regulus. On the 17th March he will be in opposition with the sun, and of course at his greatest brilliancy. From the 19th May until the end of the year he will move westwardly again, passing his first position on the 14th August, and on the 5th October coming into conjunction with the sun. After that time he will be a morning star, and at the end of the year he will still be in the constellation Virgo about 9^{o} east of Spica.

SATURN. During the whole year Saturn will remain in the constellation of Capricornus. On the 1st January it will be an evening star, passing the meridian about an hour and a half later than the sun. It will always rise earlier and earlier, but from the 1st January until the 24th May it will move eastwardly, and will then have a retrograde motion until October 12th, when it will resume its regular course. It will come into conjunction with the sun on the 24th January, after which it will be a morning star, and will rise earlier and earlier until on the 4th May it will come into quadrature with the sun, passing the meridian at about 6 o'clock in the morning. On the 3d August it will be in opposition with the sun, and about that time will therefore be visible from the time of its rising until the time of its setting. On the 31st October it will again be in quadrature with the sun, passing the meridian about 6 o'clock in the evening, and for the remainder of the year remain as an evening star. The position of the ring will be such as to show moderately open during the whole year.

THE TIDES.

Boston is so situated with reference to the tidal wave that from the tides at this port those at any other can be readily

calculated. The following table shows how to obtain the time of high-water from any other port from that for Boston:--

//SEE TABLE, PAGE 4 IN XEROXED COPY.//

Our predictions for Boston have been obtained from the office of the U.S. Coast Survey. The above table is made from data given in the Coast Survey Report for 1864.

//SEE "SYMBOLS OF THE PLANETS AND ASPECTS."
"NAMES AND CHARACTERS OF THE SIGNS OF THE ZODIAC."
PAGE 4 IN XEROXED COPY.//