ASTRONOMY

Summer in the Sky

Low in the South on July Evenings You Can See Constellation Most Typical of Season, Scorpius

By JAMES STOKLEY

LOW in the southern sky on July evenings we can see the constellation that, perhaps more than any other, suggests summer to those who know their stars. Just as the three stars of Orion's belt, and those nearby, dominate the winter evening, so does the curved tail of Scorpius, the scorpion, shine to the south at this time of year.

Unfortunate it is that the scorpion is always low in the heavens, where the greater amount of air through which the light of its stars must penetrate makes them dimmer than if they were higher. From a point in the southern hemisphere, or in the tropics, the scorpion is much higher, and its beauty can be better appreciated.

On the accompanying maps, we see the arrangement of the summer evening stars, as they are at 10:00 p.m. (standard time) on July 1, or 9:00 p.m. on the 15th. Scorpius is right over the south point of the horizon. Its brightest star is Antares, red in color, from which fact comes its name. This means "rival of Mars," for the planet is also red. We cannot now compare them, because Mars is not in a good position to be seen at all this month.

To the left of Scorpius is Sagittarius, the archer, a group resembling a teapot in outline. The spout is next to the curved tail of the scorpion, and the handle is indicated by four stars in a little quadrilateral to the left. These four stars, by the way, form the bowl of the "milk dipper," perhaps the least familiar of heaven's three dippers.

The most prominent dipper is the great one, part of Ursa Major, the great bear, which we see to the northwest. The lowest stars in the big dipper are the pointers, which show the way to the pole star. This, in turn, is at the end of the handle of the little dipper, part of Ursa Minor, the lesser bear.

By following the curve of the big dipper's handle southward, we come to the bright star Arcturus, in Bootes. And then, continuing the curve farther, we reach Spica, brightest member of Virgo, the virgin.

High in the east is the most brilliant star of the summer evening: Vega, in Lyra, the lyre. Below it is one end of the figure of Cygnus, the swan. The most prominent stars of this figure form the "northern cross," now seen lying on its side, and which has Deneb at the top. To the right of Cygnus may be found Altair, in Aquila, the eagle. This has two fainter stars which attend it directly above and below.

No planets are now visible in the evening, but two can be seen in the morning, before sunrise. Jupiter appears soon after midnight, in the constellation of Aries, the ram. Far brighter than any other star or planet then visible, one can find it readily. Just below it is Saturn, considerably fainter, though equaling a first magnitude star. Venus is gradually coming into the morning sky. By July 15, it will rise about an hour and a half before the sun, and will be even more brilliant than Jupiter.

Where the constellations originated, no one can say for sure. It is believed, however, that they originated in one place. In a recent report to the British Astronomical Association, Mrs. A. S. D. Maunder, recognized as an authority on the history of astronomy, said:

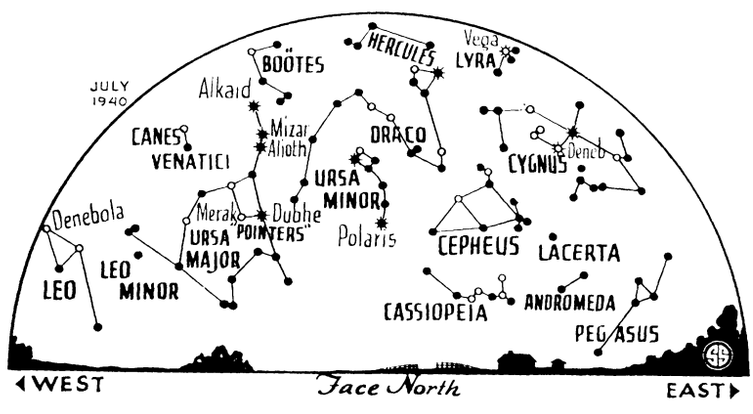
"The whole of the old 47 constellations, as described in the Phenomena of Aratos, were devised as a complete system, at one epoch, by those astronomers who were named by Aratos as of the Elder Race. They were not a gradual aggregation of constellations admitted somewhat haphazardly into the number. At present, we know no more about the Elder Race than that they lived in Europe, in latitude between 37 and 38 degrees north—that is, in the Mediterranean region. The epoch was very close to 2900 B.C., between 3000 and 2800 B.C."

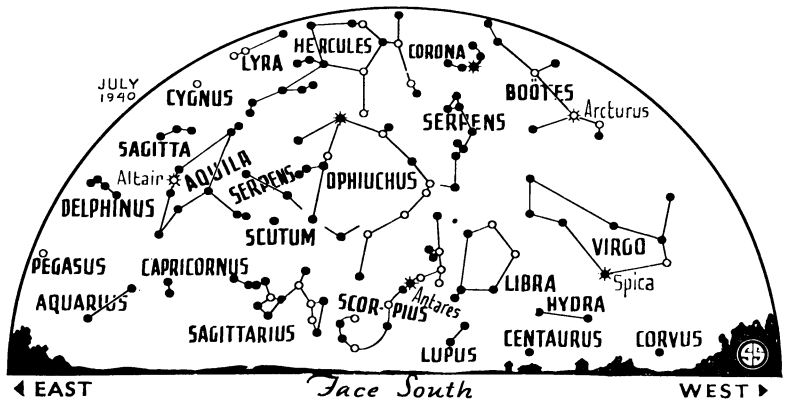
According to Mrs. Maunder, they had considerable knowledge of astronomy, and recognized a calendar based on the sun and moon, which had at least 12 months. Occasionally, as with other early calendars, a thirteenth month was added to keep the reckoning straight, just as we have an extra day every leap year. Thus they must have recognized the part of the sky in which the sun moves through the year, the zodiac, and so divided it into 12 constellations, one for each month. It happened that there were four bright stars near the place where the sun was at the beginning of each season.

These four, on this account, have since been known as the "royal stars," and they are: Regulus, Antares, Fomalhaut and Aldebaran. Only the second is visible these July evenings. Antares marked the sun's position at the beginning of autumn.

To the right of the scorpion is a group which they called "the claws of the scorpion," regarding it, however, as a separate constellation. Thus, even then, there were twelve constellations in the zodiac, the same that we have at the present day.

There is a very slow wabbling of the earth's axis, by which the constellations seem to slip once around the zodiac every 26,000 years. One result of this, incidentally, is that in the year 15000, the scorpion will appear high in the winter evening sky, and Orion low in the summer. This change meant that, around 700 B. C., the sun was not in the scorpion at the beginning of autumn, but in the neighboring "claws of the scorpion."





☼ ✱ ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

It was then, suggests Mrs. Maunder, that this constellation was given its present name, Libra, the scales. The reason is rather obvious, because at this time of year day and night are equal in length. But they still kept on calling the two principal stars in the figure "the northern claw" and "the southern claw." These names survive in those which the stars bear today. They are Arabic, "Zuben Eschamali" and "Zuben Elgenubi." The first part, "zuben," means claw, while "eschamali" and "elgenubi" mean northern and southern, respectively.

Thus, in the stars we see overhead in the evening, we have the world's oldest picture book, where men have preserved the old stories, and also have recorded the knowledge of ages now past and forgotten.

Celestial Time Table for July

Thursday, July 4, 5:00 a.m., Earth farthest from sun, distance 94,239,000 miles; 8:11 a.m., Moon passes Venus. **Friday, July 5,** 6:28 a.m., New moon. **Saturday, July 6,** 5:20 p.m., Moon passes Mars; 9:02 p.m., Moon passes Mercury. **Tuesday, July 9,** 2:00 p.m., Moon nearest, distance 228,800 miles. **Friday, July 12,** 1:35 a.m., Moon at first quarter. **Friday, July 19,** 4:55 a.m., Full moon; 8:00 a.m., Venus nearest sun. **Sunday, July 21,** 12:00 p.m., Mercury between earth and sun. **Wednesday, July 24,** 12:00 p.m., Moon farthest, distance 251,400 miles. **Saturday, July 27,** 6:29 a.m., Moon in last quarter; 11:50 p.m., Moon passes Jupiter. **Sunday, July 28,** 1:47 a.m., Moon passes Saturn. **Wednesday July 31,** 4:22 p.m., Moon passes Venus. (From western U. S. and Canada, Venus will be hidden by the moon between 2:00 p.m. and 3:00 p.m., Pacific Standard Time.)

Eastern Standard Time throughout.

Science News Letter, June 29, 1940

PHYSICS

Cosmic Ray Particles Mostly Die on Trip to Earth

Mesotrons Are So Short Lived That Although They Travel 180,000 Miles a Second Many Die in 12,000 Feet

THE minute particles known as mesotrons, which are formed high in the air when the atmospheric atoms are struck by cosmic rays from outer space, die for the most part before they reach the ground. New evidence of this rapid decay has been obtained by Dr. R. A. Millikan of the California Institute of Technology, in collaboration with Dr. H. V. Neher and Dr. H. G. Stever, Dr. Neher told members of the American Physical Society meeting with the American Association for the Advancement of Science in Seattle.

Mesotrons are similar to electrons, but about 150 times heavier. They start with a speed of some 180,000 miles per second, nearly as great as that of light. Yet, so short-lived are they, that in traveling 12,000 feet, about 15% of them disintegrate spontaneously. From this it is calculated that they live, on the average, about 66 millionths of a second. In accordance with one of the consequences of the theory of relativity, an object moving at such a high speed shows a longer life than if it were at rest. The life of the mesotron at rest is calculated to be only approximately 2.5 millionths of a second.

The scientists measured the intensity of the cosmic ray effects in two mountain lakes, one about 12,000 feet higher than the other, yet geographically close. In the upper lake, the apparatus was immersed about 12 feet deeper, so as to compensate for the fact that there was less air above this one. Thus, the total combined air and water absorption for each was the same.

Despite this, the readings in the lower lake were 15% lower than in the upper one. Dr. Millikan has concluded, therefore, that this is due to the fact that, in the extra time required for the mesotrons to reach the lower level, more have died. A life, at rest, of 2.5 millionths of a second, the same as that obtained theoretically, would give this difference.

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ENGINEERING

Cold Walls Get Dirty Faster Than Warm Ones

IF YOU want to keep the walls of your house clean, keep them warm. This advice is suggested from researches carried out by R. A. Nielsen, research engineer of the Westinghouse Electric and Manufacturing Company, described before the meeting of the American Society of Heating and Ventilating Engineers.

He investigated dirt distribution in suburban Pittsburgh homes during the winter, measuring wall temperatures with electric thermometers. "Thermal precipitation" is the name given to the effect, which often results in walls showing a pattern of the laths and framing behind them.

The molecules of oxygen and nitrogen in the air are in constant motion, the faster the higher the temperature. When the wall is warm there is a layer of warm air next to it, and these molecules move faster than those nearer the center of the room. Thus, they keep the dirt particles away. But when the room is hotter than the wall, Dr. Nielsen finds, the molecules near the cool wall are moving more slowly, and the dirt particles are driven against it.

Since the laths hold heat better than the plaster, the wall over the laths is somewhat warmer than the spaces between. Thus, the majority of the dirt particles are driven against the cooler regions, and a pattern of the laths is formed.

Science News Letter, June 29, 1940

Oiticica oil from a nut of a Brazilian tree is a rival of tung oil in the paint and varnish industry.