

ASTRONOMY

# Summer Promise

## In Evening Skies of May, Stars Above Point to Warm Days Ahead; Winter's Orion is Already Gone

By JAMES STOKLEY

TO the May evening skies the stars overhead bring the promise of summer. Orion, dominant constellation of winter, is gone; only a few of his neighbors remain low in the west. Low in the southeast the scorpion, Scorpius, is beginning to appear. Antares is visible just above the horizon. This is the star that shines so brightly with its ruddy hue in the southern sky on evenings of July and August.

The appearance of the heavens at 10 p.m. (standard time) at the beginning of May, and an hour earlier in the middle of the month, is indicated on the two semicircular maps. Antares is marked in the one for the southern sky. More conspicuous, however, are the stars higher in the heavens. To the southwest, in Leo, the lion, is the "sickle," a group shaped like a question mark in reverse. Regulus is the bright star at the bottom. To the left of the sickle is a triangle of stars, with Denebola, marking the lion's tail.

Farther left, and about as high as Denebola, is Arcturus, in Boötes, the bear driver. And between Arcturus and Denebola is a cluster of faint stars, Coma Berenices, which honors the beautiful hair of an Egyptian queen. The name means "Berenice's hair." Below Coma is the figure of Virgo, the virgin, with the star called Spica.

### Familiar Star Groups

Turning to the northeast, one sees brilliant Vega of Lyra, the lyre, and, underneath, Deneb, in Cygnus, the swan. In the north the familiar "big dipper" of Ursa Major, the great bear, appears high above the pole star. Continuing around to the northwest there shine the remaining winter stars. These are Castor and Pollux, in Gemini, the twins; Capella, in Auriga, the charioteer and, directly west, Canis Minor, the little dog, with Procyon.

No planets are seen very easily in May in the evening, but Mars, in Aquarius, the water-carrier, rises some three hours before the sun.

Looking overhead on these spring evenings, we see something quite different from what we saw when looking up on an evening in September. Not only are the stars entirely different, but there are

fewer of them. Then, we could see the Milky Way, arching across the celestial vault, and the bright stars, too, were more numerous.

By making accurate counts of stars, astronomers, since the time of Sir William Herschel, a century and a half ago, have been able to form a pretty good idea of the shape of the stellar system of which we are part. The stars are not countless, as they may seem. There are only about 9000 that can be seen with the naked eye, from all parts of the world, at all times, of which not more than 2500 can ever be seen at once. And while the fainter, telescopic stars are more numerous, even they can be counted by picking selected areas, in the same way that a public opinion poll forms an accurate judgment of the views of the nation by interviewing proper samples comprising relatively few individuals.

### Classified by Brightness

Astronomers classify stars by brightness, or magnitude. They get fainter as the magnitude number gets higher. There are 22 stars of the first magnitude, including Vega, Spica, Regulus and Arcturus among those now visible. There are 18 of the second magnitude, making a total of 40 of the second, or brighter. In like manner there are 135 down to the third, 450 down to the fourth and 1500 down to the fifth.

The brightness of an average star of any magnitude is 2.5 times that of the

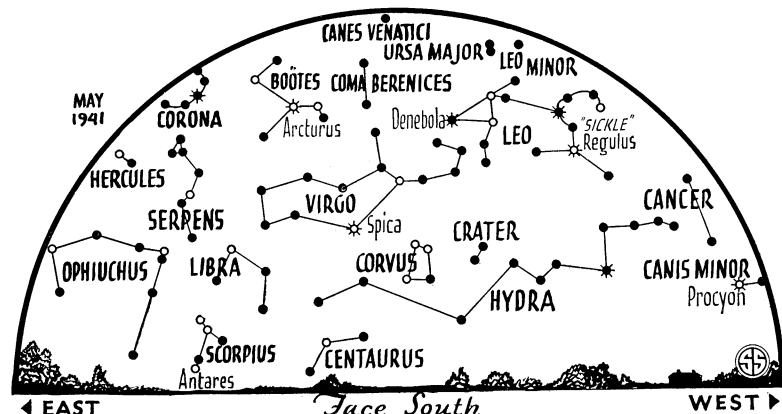
average of the next magnitude fainter. If there are two stars of the same brightness, one at 100 light years distance, the other at 158 light years, the nearer one will be about 2.5 times, or one magnitude, brighter than the farther one. It is true that stars differ in brilliance, but, when you are considering them by the hundreds and thousands, you can take as typical the average. This means, therefore, that as you go to stars of the next fainter magnitude, you go out about 60% farther in distance. When you reach out that much farther, you include a spherical volume of space about four times as big as you had before.

### Not Uniformly Distributed

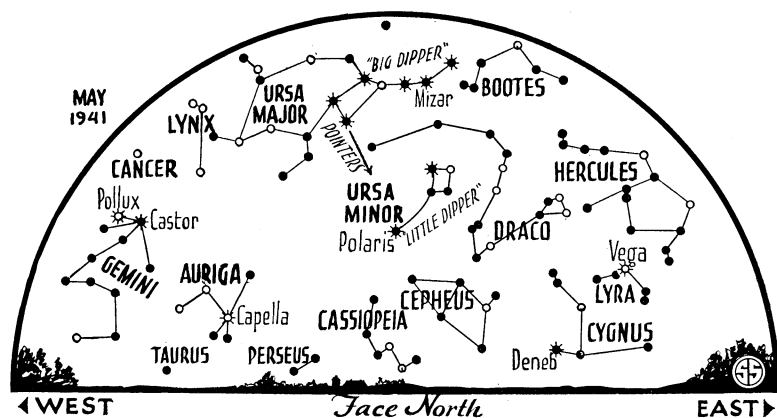
If the stars were uniformly distributed, you would get four times as many stars as you had before with each increase of a magnitude. However, the ratio rapidly falls off. With 135 stars to the third magnitude, and 450 to the fourth, the ratio is 3.3. From 560,000,000 stars down to the 19th magnitude, to the 1,000,000,000 down to the 20th, about the limit of the biggest telescopes, the ratio is only 1.7. At the 30th magnitude, the ratio would be one, in other words, you would have come to the end of the stars.

In this way, it has been learned that our star system is limited in extent. It proves to be the shape of a vast grindstone, in which we are located about a third of the way from the center. When we look to the edge of the grindstone, we see a concentration of stars—this is the Milky Way.

Outside this system, or Galaxy, there are millions of other galaxies similar to



☼ \* ○ ● SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



it, though many of them seem considerably smaller than ours. But this may simply be on account of the fact that we cannot see them well enough. Recent studies of the one in Andromeda, which is among the closest, indicate that it is much bigger than we used to think, nearly as big as our own. So perhaps the others too, are bigger than we now believe, and are true "island universes," each made up, like our galaxy, of hundreds of thousands of millions of stars.

#### Celestial Time Table for May

Saturday, May 3, 2:59 a.m., Algol at minimum. Sunday, May 4, 7:49 a.m.,

Moon in first quarter. Eta Aquarid meteor shower. Monday, May 5, 11:48 p.m., Algol at minimum; 12:00 p.m., Mercury in line with sun. Thursday, May 8, 8:00 p.m., Saturn in line with sun; 8:37 p.m., Algol at minimum. Saturday, May 10, 2:00 p.m., Moon nearest, distance 222,000 miles. Sunday, May 11, 12:15 a.m., Full Moon; 5:26 p.m., Algol at minimum. Saturday, May 17, 8:17 p.m., Moon in last quarter. Sunday, May 18, 8:51 a.m., Moon passes Mars. Monday, May 19, 3:00 p.m., Jupiter in line with sun. Friday, May 23, 1:00 p.m., Moon farthest, distance 252,400 miles. Monday, May 26, 12:18 a.m., New Moon.

Eastern standard time throughout.

Science News Letter, April 26, 1941

#### CHEMISTRY

## \$2,500,000,000 Declared Yearly Cash Cost of Smoke

Worst Effect, However, Believed To Be on Health;  
Pneumonia Incidence Highest Where Smoke Is Thick

**A**CTUAL cost each year to people in the United States on account of smoke is \$2,500,000,000. In addition there is incalculable cost to health, W. L. Jones and Dr. F. E. Vandever told members of the American Chemical Society meeting in St. Louis. Dr. Vandever is connected with the American Gas Association Testing Laboratories at Cleveland, while Mr. Jones is with the St. Louis County Gas Company.

The wastage of coal, gas and oil fuels, due to the incomplete combustion which causes smoke amounts to \$200,000,000, they said. In addition, the extra cleaning of buildings, and laundering or dry cleaning of wearing apparel and house furnishings and their shortened life, account for the remainder of the staggering total.

"Probably the worst aspect of smoke is its effect on health," they declared, "While this relationship is difficult to evaluate, correlation of smoke and high incidence of pneumonia seems to have been clearly established. Much evidence exists that death rates from pneumonia and other respiratory ailments are greater in smoky industrial centers than in small urban communities. The effect of smoke in depriving people of sunlight is another broad aspect of the smoke problem, and one which probably has an important bearing on health."

They advocated wider use of gas as a fuel to overcome smoke troubles, because it can be burned more efficiently and completely than some other fuels.

Science News Letter, April 26, 1941

## Should Synthesize Hormone

**C**OMMERCIAL preparation and clinical use of certain highly important chemicals produced in the adrenal cortex need improvement as a national defense measure, Dr. E. C. Kendall, of the Mayo Clinic, indicated.

One of these chemicals, known as compound E, has a "remarkable influence on the resistance to shock and toxic substances," Dr. Kendall pointed out. It also has an effect on the capacity of muscle for work.

Any use it might have in treating shock due to war wounds, however, or for other medical purposes is limited by the fact that the total annual supply of this and another important adrenal gland chemical in the United States, derived from animal glands, could not be greater than about one pound.

The other chemical is called compound F for short. These two should not be confused with vitamins bearing the same letters for names. Both these adrenal gland chemicals have "a striking effect upon the enzymes involved in the conversion of proteins of glucose."

The effects achieved by compounds E and F are not achieved by another chemical from adrenal gland cortex, desoxycorticosterone acetate, which has been used in recent years to keep alive patients suffering from Addison's disease, the once-fatal ailment characterized by a strange bronze discoloration of the skin. To make these other compounds available for the many uses they may have in war and peace time medicine, chemists must produce them synthetically. Dr. Kendall said synthetic production is the only possible solution to the problem of the shortage of compound E.

Science News Letter, April 26, 1941

## Poison Gas Hazard Increases

**I**NDUSTRIAL workers may be increasingly exposed to the poison gas, hydrogen selenide, because of the increasing use of selenium in industry. Guinea pig tests showing the marked effect of exposure to this gas in varying concentrations were reported by H. C. Dudley and John W. Miller, of the National Institute of Health, U. S. Public Health Service.

Protective measures to reduce the hazard of hydrogen selenide poisoning to a minimum should be taken, the scientists suggested, when the odor of the gas can be detected.

The gas tires the sense of smell quickly so that after several minutes exposure