

ASTRONOMY

Names Reveal Changes

Two constellations now seen in July were once one. Their old names have survived. The scorpion, archer and teapot are visible.

By JAMES STOKLEY

► FOR THE characteristic constellations of this time of year, look to the south. Most conspicuous is the figure of Scorpius, the scorpion, with bright red Antares, and the curved row of stars to mark the animal's tail. To the right is the figure of Libra, the scales, made principally of five stars forming a rather irregular pentagon, and with a sixth star hanging from the lower left corner.

The two brightest of these stars have rather peculiar names—"Zubeneschamali" and "Zubenelgenubi." These are Arabic, like so many of the popular star names. The "Zuben" part means "claw." "Eschamali" means "northern" and "elgenubi" means "southern." These apply to their relative positions in the sky, but the claw part of the name seems to have little to do with a pair of scales. Actually, these names go back long ago, when what we call Libra was really part of the scorpion, and they were really northern and southern claws. Though the stars were separated to form a new constellation, the old star names have survived.

All these stars are shown on the accompanying maps, which picture the skies as they appear at 11:00 p.m., your war time, on July 1, and about 10:00 p.m. in the middle of the month.

To the left of the scorpion is the figure of Sagittarius, the archer. It isn't easy to see an archer there, but you can find a teapot. The spout is close to the scorpion's tail, and the handle is farther to the east. During the night, as the sky seems to move on account of the earth's turning from west to east, the teapot tilts, as if it were pouring its hot tea on the scorpion's tail! Incidentally, on Dec. 21, the shortest day of the year, when winter commences, the sun is in the part of the sky directly over the spout of the teapot, which, of course, is then invisible.

There is another bright star in the south, in the constellation of Virgo, the virgin, which is to the right of Libra in the southwest. This is called Spica. Vir-

go, Libra, Scorpius and Sagittarius are all constellations of the zodiac, the figures through which the sun, moon and planets seem to move. No planets are easily visible this month, but you can see the moon go through this part of the sky at the beginning of July, and again at the end of the month.

Above Virgo is Bootes, the bear-driver, and in this figure is Arcturus. Another way of finding Arcturus is to locate the great dipper in the northwest, and to follow the curved lines of the dipper's handle to the south, when it brings you to this bright star.

The most brilliant star on view these evenings, however, is not Arcturus, but Vega, in Lyra, the lyre, which is high in the east. Two fainter but interesting groups are between Bootes and Lyra. Next to Bootes is a semi-circular row of stars, Corona Borealis, the northern crown. Between Corona and Lyra is Hercules, the strong man. Somewhat incongruously, the stars in Hercules are arranged to form a pretty good butterfly!

Two other magnitude stars are shown on the maps. Cygnus, the swan, is just below Lyra, and in it is Deneb. To the right of Cygnus is the bright star Altair, in Aquila, the eagle. This star can be recognized without trouble because there is a fainter star just above and just below it.

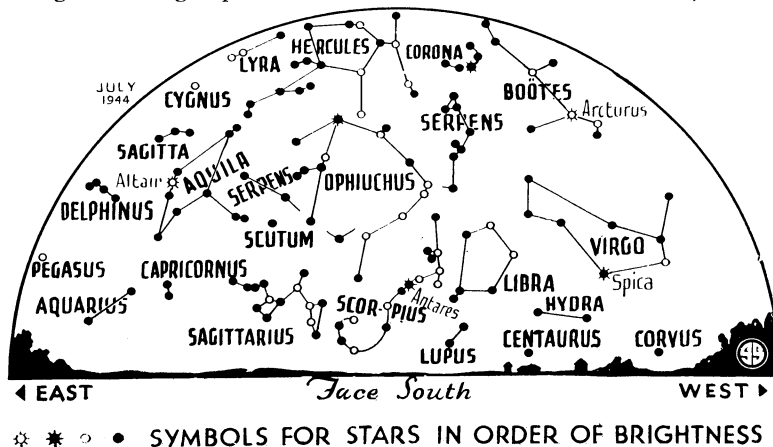
Though the moon always seems to have the same diameter approximately, even though it changes phase, its size

does vary during the month, on account of changing distance. In July for example, it is closest on July 8, at a distance of 226,600 miles. Then two lines to the earth from opposite edges would meet at an angle of about $32\frac{3}{4}$ minutes. (A minute of arc is a sixtieth of a degree, and a degree is a ninetieth of the distance from the horizon to the zenith.) On July 24, on the other hand, the moon will be farthest, 251,900 miles away, so its diameter will then make an angle of about $29\frac{1}{2}$ minutes.

The sun, too, changes its distance from the earth during the year, and on July 3 is farthest, at a distance of 94,450,000 miles, compared with its closest of 91,342,000 miles on Jan. 4. This means that its diameter in the sky changes also, but not as much as the moon does. Now it is about $31\frac{1}{2}$ minutes, while in January it was slightly more than a minute of arc larger.

Comparing the figures given for the sun and the moon, it will be noticed that sometimes the moon is the bigger, and sometimes the sun. The result is that we have two kinds of solar eclipses, which occur when the moon comes in front of the sun. If there is an eclipse when the moon's diameter is bigger, the sun is completely covered, and then the eclipse is total, making possible many scientific observations which can be made when the solar disk is hidden. Such an eclipse occurred last January, and was visible in Brazil.

This month the year's second eclipse of the sun will happen on July 20, but that date is not far from the 24th when the moon's diameter is least. Actually, on the 20th, its angular diameter will be a little over 30 minutes, about a min-



Do You Know?

Sawdust is successfully used as a mulching material by gardeners.

America's first *Diesel* streamline railroad train is now 10 years old.

Fine quality *syrups* are now made from starchy cereal grains other than corn, including sorghum grain and rye.

More than 18,000 *dogs* were enlisted in 1943 for war service with the American forces.

Magnesium, it is reported, can be used instead of zinc in any dry battery and increases the voltage considerably.

Female meadow mice have their first young when about *six weeks old*, a record among mammals.

A new type of dental burr with a *chrome finish* will outwear the present steel burrs at least 50%.

New wartime *insecticides* are carefully tested on both insects and plants, as a satisfactory insecticide must be toxic to the insect and harmless to the plant.

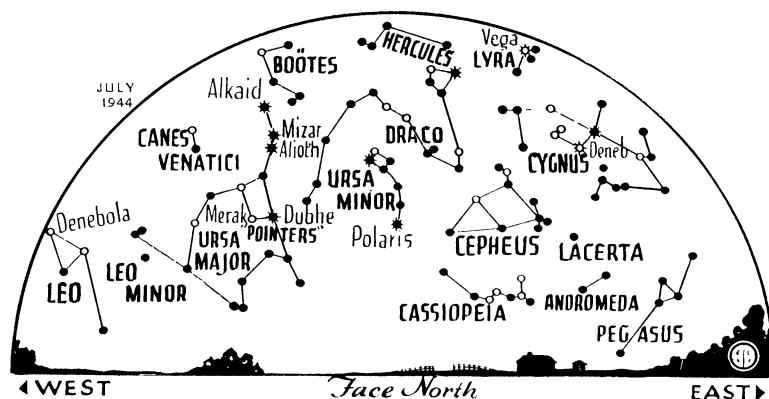
Common *salt* consumption may be used as an index of industrial activities because 97% of the total salt production is used in the industries either as salt or a chemical manufactured from salt.

The importance of *chromium* as a war metal is indicated by the present use of 87% of the available supply of chrome chemicals for military requirements.

Only about 10% of the *castor oil* produced is used medicinally, the remainder being used as a hydraulic fluid, in the manufacture of sulfonated oil, and for many industrial purposes.

The light wood of the *balsa tree* is commercially mature when the tree is from five to seven years old; about 12 years later the wood tends to solidify and becomes too heavy for its unique uses.

Seventy ugly Argentine *toads* have recently been brought by airplane to Florida to destroy insects, larvae and worms preying on the sugar cane; scientifically the toads are *Bufo paracnemis* and *B. arenarum*.



ute and a half smaller than the sun. The moon will go in front of the sun on this date, but will not entirely cover it, even when the two bodies are directly in line with us. Instead, a ring of sunlight appears around the black lunar disk, and this is called an annular eclipse.

The eclipse of July 20 will not be visible in the United States, but large numbers of our fellow citizens will see it, for the path of visibility, along which the ring of the sun will appear surrounding the moon, crosses Africa, the Indian Ocean, India, the Bay of Bengal, Burma, Thailand, the South China Sea, Mindanao and the northern coast of New Guinea. Over a larger area, in-

cluding the southern half of Asia and most of Australia, there will be a partial eclipse, with the moon crossing the sun to one side of its center.

Celestial Time Table for July

July	EWI	
3	2:00 a.m.	Earth farthest from sun, distance 94,450,000 miles.
6	12:27 a.m.	Full moon.
8	6:00 p.m.	Moon nearest, 226,600 miles.
12	4:39 p.m.	Moon in last quarter.
18	4:11 a.m.	Moon passes Saturn.
20	1:42 a.m.	New moon—annular eclipse of sun.
	3:52 p.m.	Moon passes Venus.
22	3:44 p.m.	Moon passes Jupiter.
23	5:35 a.m.	Moon passes Mars.
24	1:00 p.m.	Moon farthest, 251,900 miles.
28	early a.m.	Meteors of delta Aquarid shower.
	5:23 a.m.	Moon in first quarter.

Subtract one hour for CWT, two hours for MWT, and three for PWT.

Science News Letter, June 24, 1944

CHEMISTRY

Sugar Synthesized

➤ SUCROSE, the ordinary cane or beet sugar of our tables, has been produced synthetically for the first time, in the laboratory of the University of California at Berkeley. The work was carried out by a three-man team consisting of Dr. Michael Doudoroff, Dr. H. A. Barker and Dr. W. Z. Hassid.

Raw materials for the synthesis were the chemically simpler sugars, fructose and glucose phosphate. Acted upon by an enzyme extracted from a species of bacterium, *Pseudomonas saccharophila*, these were converted into crystals of pure sucrose indistinguishable from the natural product.

The process has no present or immediate prospective commercial value. Only about two grams of sucrose have been synthesized, and the cost of laboratory production is naturally very high. Principal value is to be found in the

advance in chemical knowledge about the formation of sugar which the research has brought about.

Science News Letter, June 24, 1944

ENGINEERING

New System of Gears For Turbine Locomotives

➤ TURBINE locomotives are brought nearer to realization by a system of gears invented by W. A. Brecht of Wilkesburg, Pa. The high speed of the turbine is reduced to the relatively low speed of the drive wheels through three steps. Side rods link all drivewheels together insuring rotation at the same speed. Rights in the patent, No. 2,351,479, are assigned to Westinghouse Electric & Manufacturing Company.

Science News Letter, June 24, 1944