Saturn, Ringed Planet, Now Conspicuous

Astronomy

By James Stokley

Saturn, the ringed planet, and the summer stars form the chief attractions on the celestial stage in August. For the last few months Saturn has been visible at some time during the evening, but now it is better placed than before. It is directly south about 7.09 P. M. local time (not daylight saving) and so throughout the evening it can well be seen.

To identify Saturn is not difficult. It is indicated on the map, and is of the .5 magnitude, brighter than any of the stars in that part of the sky, though not as bright as Vega, now almost directly overhead in the evening. Saturn shines steadily with a yellowish, steady, leaden light, very different from the sparkling bluish-white light of Vega.

Through a small telescope, one magnifying perhaps 30 or 40 times, Saturn is a most attractive sight. With such an instrument the rings become visible. These are flat, and in the same plane as the planet's equator. The ball of the planet is 74,100 miles in diameter at its equator, and the outside edge of the ring system is 171,000 miles in diameter. The system in 41,500 miles wide, and so there is a space of about 7,000 miles between the equator of Saturn and the innermost of the rings.

Thus the earth, with its 7,900-mile diameter, could almost squeeze through between Saturn and the innermost ring. The moon, 2,000 miles in diameter, could do it with plenty of room to spare. So could Mercury, 3,000 miles in diameter, and Mars, with its 4,200 miles.

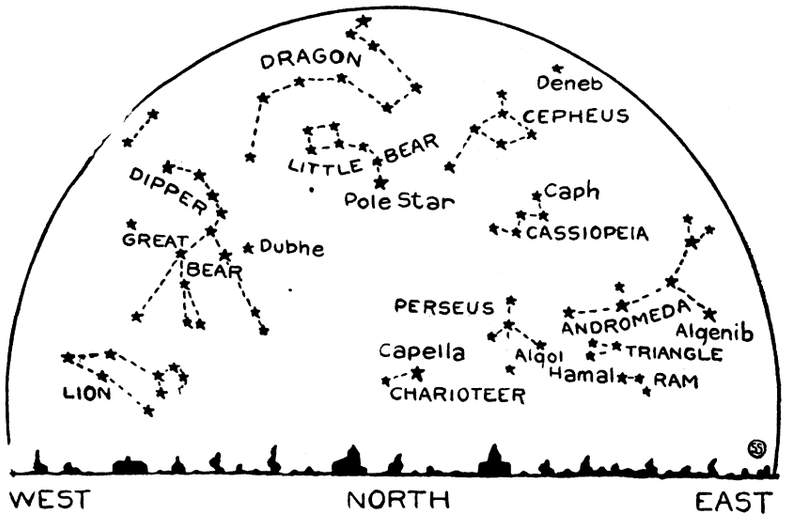
But after all, large though the rings of Saturn are, they are really of the most unsubstantial sort of stuff. Their thickness is not definitely known, but it is probably something like ten miles. If you wanted to make a model of them to scale, and chose 10,000 to the inch, the outer ring would be 17 inches in diameter. But the thinnest tissue paper would be too thick to represent them accurately.

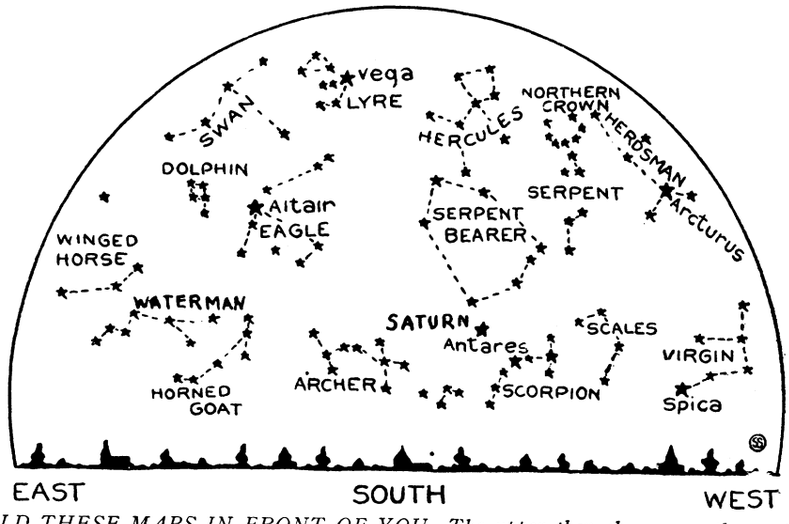
Well, one asks, what are the rings made of, if they are so large, and yet so thin, and why don't they break up? Such a question was asked for many years by astronomers, and only about thirty years ago was their nature conclusively demonstrated.

The objection to their being solid rings is this: With a revolving wheel, the rim travels faster than a point near the axle, but with heavenly bodies that revolve around a central body, like the planets around the sun, or the moons around a planet, the farther they are from the central body, the more slowly they move. Thus, Mercury, nearest of the planets to the sun, revolves around it once in about 88 days, while the farthermost planet, Neptune, takes 165 years to complete a trip around its orbit. If the members of the solar system moved as if fixed to a huge wheel, all would make a revolution in the same period.

The same thing is true of the satellites, or moons, of the planets. As the innermost part of the ring system of Saturn is more than 40,000 miles closer to the planet than the outer edge, the inner part would tend to move much more rapidly than the outer. The result would be tremendous strains, which would soon break the entire system into pieces, which then might fall on the planet.

So the rings cannot be solid. It has also been proven that they could not be liquid, and in 1895 an American astronomer, James E. Keeler, proved that they really consisted of a vast swarm of myriads of tiny moons, all revolving around Saturn together, and so close that they appear continuous. They are so small that no terrestrial telescope can magnify them sufficiently to reveal them. Keeler's proof was with the aid of the spectroscope. This is the instrument that (*Turn to next page*)





HOLD THESE MAPS IN FRONT OF YOU. The upper then shows you the northern and the lower the southern sky as it appears on August evenings

Saturn Now Conspicuous—*Continued*

analyzes light from the stars or planets, and it is capable of telling whether the object from which the light comes is moving towards or away from us, and, if so, how fast. With solid rings, the actual speed of the outer part of the rings would be greater than the inner. But with rings made of smaller pieces, the outer part would move more slowly. The spectroscope proved very definitely that the outer parts did travel more slowly, and so the age-old puzzle was answered.

So much for Saturn. That is the only planet well seen this month. Venus, which has been absent from the evening sky for many months, is now coming back, and sets about an hour after the sun. But so close is it to the sun that it can scarcely be seen. During the coming months it will separate more and more from the sun, and will rise higher and higher in the western evening sky. By November it will be conspicuous by its brilliance. In the morning sky, before sunrise, can be seen Jupiter and Mars, as morning stars.

During August we have with us two of the closest stars in the heavens. One is in the constellation of Lyra, the lyre, almost directly overhead. It is Vega, or alpha Lyræ, as the astronomer terms it, which indicates that it is the brightest star in the constellation of Lyra.

Vega, and the constellation of Lyra, are of particular interest to us dwellers in the solar system because that is where we're going. The sun itself is travelling through space at a speed that takes it twelve miles every second. That is, twelve miles a second with respect to the average position of the surrounding stars. The motion is towards a point in the constellation of Lyra, near Vega. As the earth is moving around the sun, at the same time that the sun moves through space, our planet is really travelling in a spiral. This fact has long been known to astronomers, but it is so obvious that it is not often mentioned.

Vega is 26 light years (or 26 times six trillion miles) away from the sun, so that even though we are going to it with a speed of 12 miles a second, we won't get there for 475,000 years. And by that time Vega itself will have moved, so we will still be far away from it.

The other star is Altair, in Aquila, the eagle. It is only 16 light years from us, and so is one of the closest of our neighbors. The nearest star to us is four and a third light years away, but it is in the southern hemisphere, and not visible from the United States. Sirius, the dog star, brilliant orb of the winter sky, at 9 light years, is the nearest of those we can see. Altair is also extremely bright. It is number five in order of brilliance of all the stars in our northern skies.

The maps show the other bright stars of the August evenings. Arcturus, in Bootes, low in the west; the red Antares, in Scorpio, the scorpion, in the southwest, and Deneb, in Cygnus, the swan, east of Lyra; complete the first magnitude stars now with us. The moon will be visible all night at the beginning and end of the month, for it is full on both the first and thirtieth. It is new on the fifteenth, so a few days after that it will appear as a thin crescent in the western twilight, gradually waxing until it reaches the full phase.

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Porto Rican fishermen believe that when the brown pelican grows too old to forage for food, it commits suicide by hanging itself by the head from a forked tree.

Ingrowing Personalities

Psychology

JOHN B. WATSON, in *The Ways of Behaviorism* (Harper's):

Can an adult change his personality? This is the question most often asked the behaviorist. The answer is *yes* if he works hard enough. There is no scientific reason why personality cannot be changed. But the practical limits of change are usually narrow indeed. Think of the millions of habits and conditionings set up from infancy to the thirty-year age. Then remember that personality is a cross section of all this organization. Can you change all this in a few short days or weeks? "I am shy. How can I change?" "I am an exhibitionist. Can I overcome it?" "I am afraid of women; I am attracted to them, but when I get around them I am terrified." "I can't lecture. I become afraid every time I get up to speak." "I am quarrelsome and noisy and boastful. What should I do about it?" These are some of the questions. The populace wants to be told some simple trick that will change personality without work. I used to feel quite hopeful of reconditioning even adult personalities. I grow more skeptical, as I grow older, of fundamentally changing adults by the psychological and psychoanalytical methods now in vogue. My skepticism arises not so much from a conviction that it can't be done as from my knowledge of the laziness and carelessness of people. Few of us have the guts to stick to the long, arduous routine we should have to follow. Theoretically you can change a personality as long as the individual can learn. But as a rule we do not have sufficient control over the life of the individual, even if he were to put himself in our hands, to set up reconditioning processes. Possibly, if we had absolute control over food, sex, shelter, if we had some great reconditioning laboratory where the individual could be brought for a year for rigorous study and experimentation, we might be able to undo for him in a year what home nurture had done for him in thirty years..

But with humans as lazy as they are about themselves and lacking this experimental set-up, the zebra can as easily change his stripes as the adult his personality.

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