

NIGHT SKY—AUGUST AND SEPTEMBER.

BY RICHARD A. PROCTOR.

The Great Bear (*Ursa Major*) is low down, between northwest and north, the Pointers (α and β) directed slantingly upward toward the Pole. A line from the Pole Star, α of the Little Bear (*Ursa Minor*), to the Guardians of the Pole, β and γ , is in the position of the minute hand of a clock twelve minutes before an hour. Between the Great Bear and the Little Bear run the stars of the Dragon (*Draco*), round the Little Bear toward the north, thence toward the northwest, where we see the head of the Dragon high up, its two bright eyes, β and γ , directed toward *Hercules*, which occupies the western midheaven. Above *Hercules* is *Lyra*, the Lyre, with the bright steel-blue star *Vega* high up toward the point overhead. Right overhead is the Swan (*Cygnus*).

Low down in the northwest we see in the chart one star of the Hunting Dogs (*Canes Venatici*). Nearer the west stands the Herdsman, rather slanting forward, however, with the Crown (*Corona Borealis*) on his left, almost due west. The long winding Serpent (*Serpens*) runs from near the Crown, where we see its head due west to farther south than southwest, high up, on the western side of the Serpent Holder (*Serpentarius* or *Ophiuchus*), now standing upright in the southwest. Low down creeps the Scorpion (*Scorpio*), its heart Antares, rival of Mars, in the southwest, the end of its tail between south and southwest. Above and south of the Scorpion's tail we see the Archer (*Sagittarius*).

Due south, and high up, is the Eagle (*Aquila*), its tail at ζ and ϵ , its head at θ , the bright steel-blue Altair marking its body. On the left, or east, of the Eagle lies the neat little Dolphin (*Delphinus*). Midway between the Dolphin and the horizon is the tip of the tail of the Sea Goat (*Capricornus*), whose head lies nearly due south.

On the southern horizon is the head of the Indian (*Indus*); on its left a part of the Crane (*Grus*); and low down in the southeast lies Fomalhaut, the chief brilliant of the Southern Fish (*Piscis Australis*). Above lies the Water Bearer (*Aquarius*), in the southwestern midheaven.

Due east, fairly high, is "the Square of Pegasus," the head of the Winged Horse, Pegasus lying close by the Water Pitcher of Aquarius (marked by the stars ζ , γ , and α).

The Fishes (*Pisces*) are low down in the east, a few stars of the Whale (*Cetus*) being seen on their right, very low down. On the left of Pisces we see the Ram (*Aries*), low down; above it the Triangle; and above that the Chained Lady (*Andromeda*).

Low down in the northeast is the Rescuing Knight (*Perseus*); above whom is *Cassiopeia*; and on her left, higher up, the inconspicuous constellation *Cepheus*.

Lastly, immediately below *Cepheus*, we find the Camelpard, below which, very low down, between north and northeast, is the Charioteer (*Auriga*), the brilliant *Capella* being just above the horizon.

The Earthquake of August 31 and September 1.

As we go to press, the accounts which have reached us of the great earthquake are not reliable enough to justify the full discussion of the great catastrophe. Affecting the continent over an area extending from the extreme southeastern States to the great lakes, and by its shock alone, without any tidal wave, wrecking so many buildings in Charleston, we may hope that it will for many years retain its present pre-eminence as one of the great earthquakes of this country. Disturbances are recorded in no less than twenty-eight States of the Union.

In the city of Charleston, S. C., on August 31, between 9 and 10 P. M., the first and most destructive shock occurred. According to one account, there were three disturbances within half an hour. The clocks in the steeples stopped a little before 10 P. M. Then all was quiet until Sept. 1, from which day disturbances are

recorded extending from 2 A. M. to 11:50 P. M., six in number, followed by two light shocks at 1 A. M. and 5 A. M. on Sept. 2. This gives a total of eleven more or less accurately verified shocks. A few light shocks have since been reported. The damage was done during the first hour. It was very great, but original estimates have been greatly reduced, both as regards the loss of life and of property. The present estimate places the mortuary record at 50 to 60 lives. The property loss is considered to be about \$3,000,000.

Three or four buildings are in complete ruin, a number of other buildings have had their fronts prostrated. Many of the public buildings, *Hibernia Hall*, *St. Michael's* and *St. Philip's Church*, have been so cracked that their repair will involve little short of demolition. Ceilings were thrown down, chimneys overturned, and coping stones and gables suffered. Fire added its horrors to the scene, and some twenty houses were burned. The shock broke the water pipe leading to the high-level stand-pipe, so that water had to be pumped directly into the mains for a while, until that connection was restored. The reservoir suffered no injury whatever.

The negroes in some cases were greatly excited. The

have smelt of sulphur. The water in the wells is said to have fluctuated in level during the shocks, and to have had its level raised permanently. Jets of water are reported to have been thrown from the fissures.

While the shock in the city of Charleston did so much damage, instances of immunity are to be also recorded. In one large block of stores most of the plate glass escaped, though bricks and parapets were disturbed. The Belgian pavement was not affected. Some of the larger buildings, the Academy of Music, the Waverley and the Victoria Hotels are reported uninjured externally.

The cause of earthquakes, like that of geysers and of volcanoes, is a mystery. The very high specific gravity of the earth makes its interior composition quite uncertain, and assimilates it to that of meteorites. If in a liquid state, the enormous compression it is subjected to by gravity would probably modify its rigidity somewhat. Even if the earth is solid, but hot, as is probably the case, and is continually cooling, then in the shrinking of the crust we could find a force powerful enough to cause the most intense of earthquake disturbances, if it were rightly directed. The present way of treating the subject is to assume a subterranean shock given

at a place which is called the focus. This is supposed to be subterranean, and to vary in its depth below the surface, as a maximum being thirty miles. From this focus two series of waves emanate—one longitudinal, resembling sound waves, and of rapid motion of translation. They are accompanied by the slower lateral waves, resembling the waves of water. It is the longitudinal waves that produce the principal results, the others being of little account. The amplitude of waves that cause damage may be very slight. An oscillation in the earth's surface of $2\frac{1}{2}$ inches amplitude will crack masonry.

These considerations bring the subject within the scope of mathematical treatment, but leave the ultimate cause as great a mystery as ever. If a cause for the initial shock can be formulated, then the theory will be complete.

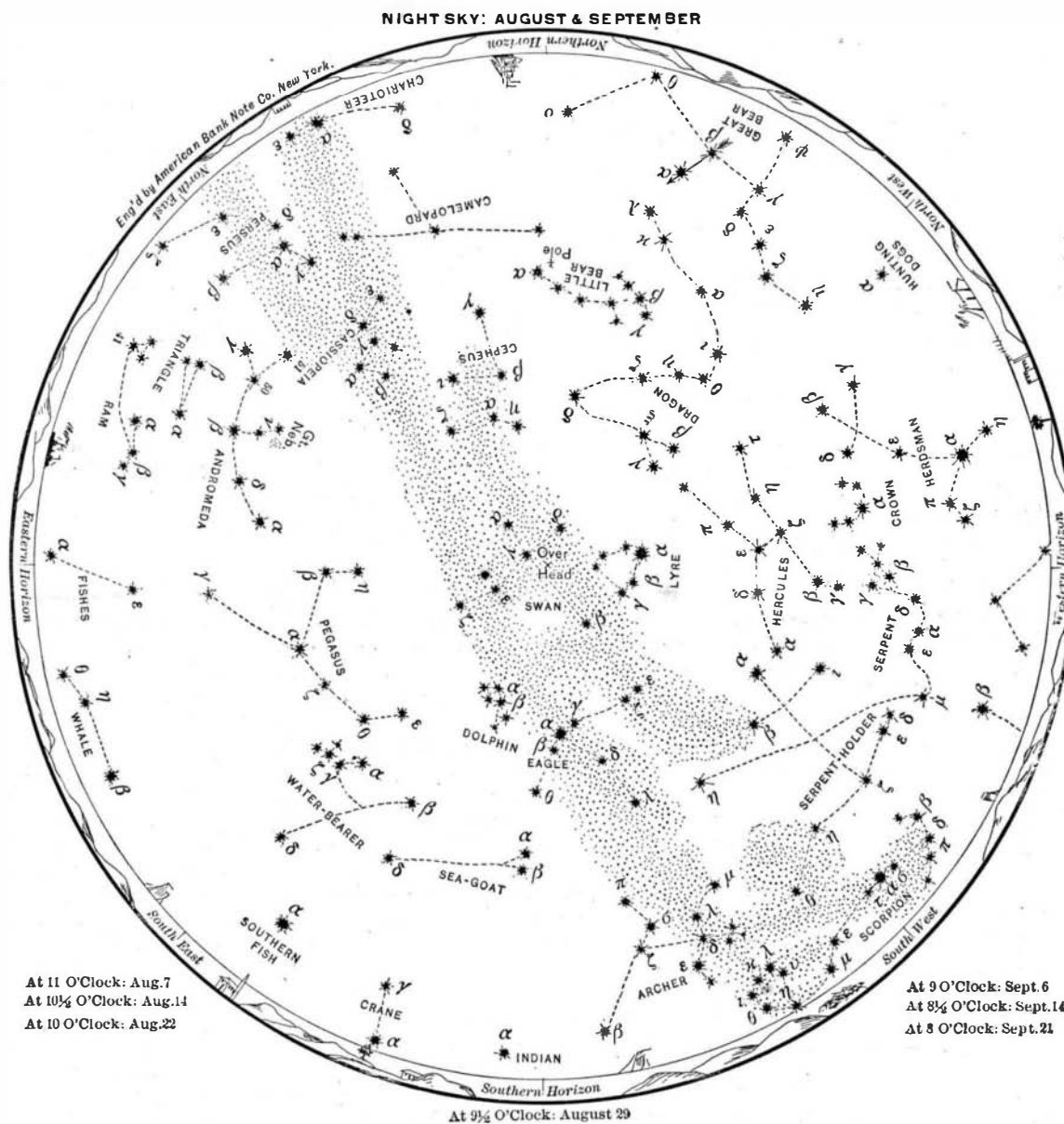
Remembering how slight a settlement will crack masonry, and how very inelastic brickwork is, we have no trouble in finding the cause of the great injury to property. It lies, to a great extent, in the nature of the buildings themselves. The least oscillation will disturb plaster, and will crack brick walls. What we seem forced to do to meet the demands of our modern civilization is to put up structures that are most fragile as regards any earth movement. The earthquake re-

presents generally a comparatively insignificant movement of the earth's surface, but the unyielding nature of the building material causes it to break on all sides. Furthermore, it is to be observed that the last intelligence reports the more substantial buildings as standing intact and uninjured, showing how much the fragile character of the erections had to do with their demolition.

The city is now reported as showing signs of great activity, and the inhabitants seem to have met the disaster in a manner worthy of their established reputation for courage under disaster, proved so severely by the tidal wave of last year and on other occasions.

In Peru, earthquakes are very frequent, while rain is of the rarest occurrence. Her houses are strong enough to resist a whole series of moderate earthquakes, but are far from water-tight. A few years ago a rain storm occurred, to the greatest consternation of the native populace. They were fully as frightened as we would be by what, to us, is the more unfamiliar terrestrial visitor. When all was over and the rain ceased, it was found that the damage to furniture and property by leakage of the roofs was very great. The rain storm had done more harm than had many years of earthquakes.

A WHITE swallow was shot recently near North Haven, Conn. It was a perfect albino, pink eyes, and all,



At 11 O'Clock: Aug. 7
At 10½ O'Clock: Aug. 14
At 10 O'Clock: Aug. 22

At 9 O'Clock: Sept. 6
At 8½ O'Clock: Sept. 14
At 8 O'Clock: Sept. 21

In the map, stars of the first magnitude are eight-pointed; second magnitude, six-pointed; third magnitude, five-pointed; fourth magnitude (a few), four-pointed; fifth magnitude (very few), three-pointed, counting the points only as shown in the solid outline, without the intermediate lines signifying star rays.

main portion of the populace seem however, to have acted well. They generally adopted the plan of camping out on vacant lots, or in the yards of their dwellings. By noon of September 2, the people seemed to recover themselves and began to take possession of their houses. The papers suspended publication. In the Western Union Telegraph office, instruments and batteries were destroyed by the falling debris, so that telegraphic communication was interrupted. The railroads stopped running, the first train from Charleston reaching Savannah on the afternoon of Sept. 2. Reports of the shock have been received from other cities over an immense area, extending from New Haven to Detroit and Chicago, and thence over the area to and including the Southern coast States.

Many peculiar phenomena are reported. A railroad train was thrown into violent oscillation, and ran through the period of the shock before the cars could be stopped. On some of the roads, rails are reported as bent.

In various places in the neighborhood of Charleston fissures were produced and symptoms of geyser action were manifested. Eruptions of different colored muds and sands mixed with water occurred in many localities. The accounts as received remind us of the Western mud geysers. Some of the matter thus thrown to the surface is naturally reported to be of kind unseen before. The erupted water and the air in places are said to