should be carefully considered in adopting twin-screw propulsion for transatlantic passenger ships, and that is the question of vibration, which has so much to do with the comfort of passengers. It is a well-known fact that in the largest high-speed passenger vessels, vibration is one of the most serious sources of discomfort. The effect of triple-screw propulsion in respect to vibration is a question which should receive a most thorough investigation. While speaking of vibration, one cannot but call to mind that the steam turbine, because of the absence of reciprocating parts, that is to say, of more or less unbalanced parts, is the ideal motor for passenger service. There is no question that the first transatlantic steamship that is fitted with a successful steam turbine will have a great advantage in this respect over high-powered boats driven by reciprocating engines. Broadly considered, it must be admitted that the success which has attended the installation of turbine units of great horse power in electrical plants foreshadows the day when the steam turbine will be exclusively used in transatlantic travel. We cannot but think that the Cunard Company should give a most exhaustive study of the existing high-powered turbine plants before they decide that there is any inherent quality of the turbine which renders it unsuitable for use in tandem on the shaft of a transatlantic liner. Already turbines of 7,000 horse power are under contract for electric railway plants. If they can be built in 7,000 horse power they can surely be built successfully in 9,000 horse power units, and two such turbines on each of the three shafts of the Cunard boats would give the desired maximum horse power and something over. In an accompanying editorial and in the current SUPPLEMENT will be found most powerful arguments on the score of economy of cost, weight and space, in favor of the steam turbine, and every one of these arguments applies with just as much force to the engine room of a transatlantic liner as it does to the power station of an electric railway company.

THE HEAVENS IN NOVEMBER.

BY HENRY NORRIS RUSSELL, PH.D.

The constellations whose outlines are associated with winter begin to appear again in the eastern sky. At 9 o'clock in the evening, during the middle of the month, Cassiopeia is almost overhead, directly above the Pole star. It can be recognized as a zigzag line of fairly bright stars.

The next group to the eastward, along the Milky Way, is Perseus. The remarkable variable star Algol is the southernmost of its two conspicuous stars, and lies between Cassiopeia and the Pleiades, somewhat nearer the latter group. For most of the time this star is of nearly the second magnitude, but at intervals of about three days—2 days 20 hours 49 minutes, to be more exact—it runs down to the fourth magnitude, remaining at this brightness for about 20 minutes, while the rise and fall in brightness occupy about four hours each. Minima observable in the United States occur on November 2, 8 P. M.; November 20, 1 A. M.; 22, 9 P. M.; and 25, 6 P. M., Eastern standard time.

The variability of this star is believed to be due to the presence of a dark companion, which partially eclipses it at every revolution.

Below Perseus is Auriga, marked by an irregular pentagon of stars, one of which, Capella, is the brightest one at present visible anywhere in the sky. Below this again is Gemini, whose twin stars Castor and Pollux are just rising. To the right of Auriga is Taurus. The group of the Pleiades, with the ruddy Aldebaran lower down, make this an easy constellation to identify. The little V-shaped group of which Aldebaran is one, is called the Hyades. The next star to Aldebaran is an interesting wide double, just separable with the naked eye.

Below Taurus is the incomparable Orion, the most brilliant constellation in all the heavens. With the two bright stars in his shoulder and knee, and the line of his belt between, he is so familiar that he hardly needs description.

To the left of Perseus, and southeast of the zenith, is the little triangle that marks the head of Aries. The faintest of the three stars is a very pretty double, requiring a small telescope to bring it out, which has an added interest from the fact that it was the first double star noticed by astronomers. It was discovered by Hooke in 1664. The large but inconspicuous constellations Eridanus, Cetus and Pisces fill the southeastern sky.

The great square of Pegasus lies to the southwest of the zenith. A line of conspicuous stars extending from it toward Perseus marks the position of Andromeda. The nearest of these to Perseus—Gamma Andromedæ—is a very pretty double star, the larger component being reddish, while the smaller is green.

The conspicuous star low in the southwest is Fomalhaut, in the constellation Pisces Austrinus. Aquarius lies above it, and Capricornus to the right. The fine cross of Cygnus, almost in the center of the Milky Way, is one of the most prominent of the western constellations. The star at the foot of the cross is another fine double which can be divided by a powerful field glass, while its contrasted colors show finely in a small telescope.

Lyra lies below Cygnus on the right, and Aquila on the left, each marked by a bright star.

The Great Dipper is close to the northern horizon, and the Little Dipper swings to the left from the Pole star, encircled by the coils of the Dragon.

THE PLANETS.

Mercury is morning star in Virgo, and should be visible in the southeast before sunrise, in the early part of the month. On the 3d he is at his greatest elongation. He is nearer the sun than usual—19 deg.—but in compensation for this he is unusually bright.

Venus is morning star until the 28th, when she passes through superior conjunction, and becomes an evening star once more. It is interesting to note that on this occasion she actually passes behind the sun, being hidden by his disk for nearly 24 hours. The phenomenon is of course unobservable, as the planet is lost in atmospheric glare long before she gets near the sun's limb. All through the month she is too near the sun to be seen without a telescope.

Mars is morning star in Leo, rising about 1 A. M. on the 15th. He is nearly on the line joining Regulus and Spica, about one-third of the way from the former toward the latter, and is fairly bright.

Jupiter is evening star in Capricornus, remaining visible till about 10 o'clock. On the 1st he is in quadrature, and is due south at 6 o'clock.

Saturn is evening star in Sagittarius, and sets between 8 and 9. Uranus is in Ophiuchus, too near the sun to be visible, and Neptune is in Gemini, coming to the meridian at about 3 A. M.

THE MOON.

First quarter occurs at 7 A. M. on the 8th, full moon at noon on the 15th, last quarter at 3 A. M. on the 22d, and new moon at 9 P. M. on the 29th. The moon is nearest on the 16th, and farthest off on the 4th. She is in conjunction with Uranus on the 3d, Saturn on the 6th, Jupiter on the 7th, Neptune on the 18th, Mars on the 23d, Mercury and Venus on the 29th, and Uranus again on the 30th.

The Leonid meteors are due on or about the 13th of November, but there is no reason to anticipate any unusual display this year. The great body of meteors, deflected in its orbit by planetary attraction, has long since passed by the earth without meeting it, and whatever stragglers may appear this year will be so much obscured by the moonlight that only the brightest of them can be seen.

TEST OF A NORWEGIAN LIFE-SAVING BOAT.

On the afternoon of October 22, a hazardous demonstration of the efficiency of a Norwegian life-saving vessel took place in the English Channel. A tug boat, when four miles off Folkestone sighted a strange-looking object in the water. Steaming up, the captain found that the object was a large globe, from a manhole in the top of which a man's head projected. As the tugboat came alongside, two men crept out of the globe, who proved to be Captain Doenvig, the inventor of the device, and his assistant. They told a weird story of their adventures. It seems that their globe was dropped overboard from a steamer off Havre on the 21st, and that since then it had been knocking about in the Channel with its two occupants. In their confined quarters they had been penned for more than twenty-four hours before they had been picked up. Naturally the inventor considered his experience the most satisfactory proof of the efficiency of his device.

The apparatus, or buoy, is round as a globe, only a little flattened at the bottom. It is made from solid sheet iron of the following thicknesses: At the bottom five-sixteenths of an inch, on the sides three-sixteenths of an inch, and at the top one-eighth of an inch. The diameter of the buoy is 8 feet; the height 6½ feet. The buoy has a double bottom and draws 2½ feet of water when loaded. The inside of the buoy is entered through three water-tight trapdoors.

Under the deck, which is located about 1 foot below the water line, are placed 4 galvanized tanks, with capacity for holding about 140 gallons of fresh water. Alongside the wall runs a low bench to sit on, and the space underneath it is to be filled with canned goods. In the center of the inner room is a funnel that can be shoved up, thus letting fresh air into the buoy. In the top are three small windows, partly for the purpose of letting in light, but also for use in sending up rockets. The buoy is provided with a movable keel which can be let down from the inside; also with a rudder which can be applied in the same manner. Assisted by small oars, which are kept inside, the buoy can be propelled to land in fair weather. On the outside of the buoy is a cork belt, on which the men may stand and row. Further, the buoy is supplied with an anchor and 100 feet of steel rope and with sails, the air funnel serving as mast.

Some years ago the inventor, Captain Doenvig, was in a shipwreck on the coast of Virginia, which bereft him of his family, and ever since he has been deeply interested in the construction of a lifeboat which may be serviceable under all circumstances.

SCIENCE NOTES.

It will be remembered that some time ago Dr. Garnault attempted to disprove Dr. Koch's theory of the transmission of tuberculosis to human beings by animals by inoculating himself with bacilli from a consumptive cow. Dr. Garnault himself is perfectly well, but guinea pigs inoculated with skin taken from his arm have developed symptoms of tuberculosis.

Prof. Edmond S. Meany, of the Smithsonian Institution, is the first scientist to visit the mummy caves of the Aleuts of Alaska. Many mummies, to be sure, have been sent from Alaska from time to time, but no man of learning has ever examined the caves themselves. The report which the professor will doubtless prepare will be looked for with some interest.

At Grove City, near Chillicothe, a perfect skeleton of the Mastodon Americanus was found. The tusks measure from 10 to 12 feet in length. Their size and the condition of the teeth, which are well worn, show that the animal was full grown when it died. Other well-preserved specimens have been found in marshy beds in Ohio; but this is said to have been found in clay, a rather unusual circumstance.

The Scotch mineral known as Lanarkshire blackband, which was discovered in 1801, has been practically exhausted, as there are now no pits in the Lanarkshire coalfield where it is worked as a principal product, though a small quantity of a thin blackband is raised with the gas coal at one or two pits. Some blackband of excellent quality is, however, still raised in Fife and Midlothian for smelting in the Lanarkshire furnaces, while the somewhat leaner blackbands of Ayrshire are still fairly plentiful.

The report which Booker T. Washington sends to us of the Tuskegee Normal and Industrial Institute shows a state of affairs that is encouraging. Up to the present time there have grown out of the Tuskegee Institute at least seventy-two schools of considerable size. Perhaps the most important work that Tuskegee Institute, in connection with schools of similar character, has accomplished has been to find the most effective way to elevate the negro and at the same time to make him most useful to the community in which he is to live. In the history of the institution nothing is more striking than the change which has taken place among the negroes so far as their feeling toward industrial education is concerned. Formerly industrial training was by no means looked upon with favor. Now that feeling has completely disappeared. At present students are trained at Tuskegee in thirty-four industries.

In 1851 Foucault originally demonstrated the rotary movement of the earth by means of the pendulum which bears his name. The experiments were interrupted after the *coup d'état* of December 2, 1951. Another demonstration was carried out on October 22 last. Foucault's pendulum, composed of piano wire, about 220 feet long, was attached to the summit of the dome of the Pantheon and from it was suspended a ball weighing 56 pounds. The steel stylus was fixed to the bob thus constituted, and beneath it on the floor was placed a round table upon which the points of the compass were marked. A little heap of sand was run around the table. Flammarion, the well-known astronomer, and Senator Chaumie, Minister of Public Instruction, delivered appropriate speeches in the presence of a large assembly, which included numerous scientists. Then the minister, with a taper, burned a silk cord attaching the pendulum to the side of the table, and the pendulum swung across the table, cutting a trench through the sand, each swing widening the trench slightly until the table appeared to be revolving.

A curious fact has been ascertained during the recent survey of India—namely, that the northerly deflection of the plumb-line, ascribed to attraction by the great mass of the Himalaya and the Tibetan upland, is reversed along a comparatively narrow belt between 22 deg. and 24 deg. north latitude, crossing India from east to west for one thousand miles. Here the deflection is southerly, while the northerly deflection reasserts itself farther south, and is continued so far as 18 deg. north latitude. The zone, so strangely exempted from what has been supposed to be a general law, runs across Central India from the delta of the Ganges to that of the Indus, but well to the south of the great Gangetic plain. These facts are discussed by Major Burrow in a paper read before the Royal Astronomical Society. Major Burrow's theory is that the phenomenon follows the axis of what he calls a subterranean chain of mountains, causing the greater density of the earth's crust in this particular tract. The hypothetical range would, we are at liberty to conjecture, either have foundered bodily in some great catastrophe or subsided gradually and been submerged under alluvium and silt. The fact opens up an interesting subject for the discussion of geologists.