

THE UNIVERSE.

It has been shown that Light will take 5 years to travel from the nearest star to our earth; and that Sirius is probably the nearest and the largest of the whole host. Wellaston calculates that this star is 14 times larger than our sun.

Stars are divided into different magnitudes, from 1 to 7 for the naked eye. Those of the 1st magnitude are 15 or 20; in the 2d, 50 or 60—these are such as the stars in the Great Bear. Proceeding higher, the numbers become enormous. The number visible to the naked eye is about 20,000. Telescopes discover myriads; and divide them into 16 magnitudes. The Milky Way consists of stars of the 10th magnitude. Thus must the power of a telescope be surprizing when showing stars 6 or 7 times smaller than the *Vix Lactæ*.

Some stars are *periodic*, in magnitude and brightness. First appearing as of the second magnitude, and then declining till equal to those of the seventh, and then regaining their original condition. Other stars disappear; and vice versa.

A theory has been offered on this point, which considers the effects to result from spots on the star—as they are found on the orb of our sun—and that when they are opposite to an observer, the star is dimmed or disappears, whilst the bright side, being turned to us, restores the first superior brilliancy. This is not tenable; as the solar spots are always changing so much, that they could not be taken to explain the regular period of the periodic stars.

There have been "temporary stars." In one case, a star rose, and in half an hour shed a brightness rivaling that of Venus. After a few months, it disappeared, and, like many other stars, was lost in the firmament.

"These are mysterious facts, and prove something going on in the Universe, of which man has no knowledge." One theory of those best stars, is, that they are periodic, with an interval of thousands of years.

The last point to be mentioned, is the relative motion between our system and the stars. We appear as if approaching a given point, and the nearing stars seem to separate and enlarge, whilst those we are leaving appear to shrink in size and brightness.—*Dr. Lardner's Lectures.*

British & American Steam Navigation.

In applying the Steam Engine to sea transport, there is a difference to its general employment, which is of importance to be considered

especially when making voyages of considerable length.

The water in such a boiler must be supplied from the sea. This contains common salt and other matters; but the former in the greatest abundance. "This puts the boiler in a different situation to those on rivers or inland transport." Though water is held in solution as steam, salt is not; and, therefore, evaporation is not the only process going on in the marine boiler. Decomposition is also exerted. In proportion to the steam carried off to supply the engine, will it leave the salt with which it was combined. "Thus the water gets saltier and saltier till it gets to the state which chemists call saturation," and, at length, the boiler would become filled with salt. But, before this could take place, other facts would be brought into play. Under ordinary circumstances, the boiler plates are preserved from being burnt and destroyed, by the water on the inner side receiving the heat so readily. But, as the salt and earthly matters first spoken of soon form a crust at the bottom of the boiler which, being a non-conductor, obstructs the passage of the heat, and the iron is speedily burnt into holes. Through these, water and steam freely escape, and the engine is destroyed.

Of course means were adopted from the beginning, for preventing this state of things.—The first plan was that of "blowing out," as it was termed. This was only passing a pipe to the lower part of the boiler, where the heavier salt rests, and pumping a stream of water through it—over the salt, which is dissolved; and out again into the sea. Two objections are raised against this mode; 1st, it depends on the discretion of the engineer; and 2d its robbing the boiler of so much heat.

To obviate these, another plan has been proposed; and tried successfully in the engines of the "Great Western."

It consists of two pumps acting in the boiler, one to give a regular supply of sea water, the other to discharge the briny water, already in the boiler, into the sea; and their action so calculated that whilst both are acting, the water is kept at the same level in the boiler.—The supplying pump is the larger one, having to feed water for the steam, and the remainder as discharged by the smaller one. This is readily determined by measuring the quantity of steam delivered to the piston in a certain number of strokes.

A beautiful provision is made in this invention to economise heat: it is the hot *discharging* pipe, running through the cold *supplying*