

GEOGRAPHY.

HOW FAR AWAY ARE THE STARS?—Of the hundred million or more stars which are visible with astronomical instruments, the distances from the earth of only a very few have been measured with even an approximation to accuracy. Most of the stars appear to be so far away that the change in their apparent place caused by viewing them from opposite sides of the earth's orbit—and that orbit is about one hundred and eighty-six million miles across—is so slight that it escapes certain detection. Only about fifty stars have thus far yielded definite results in the attempt to measure their distances, and even those results are too often exceedingly conflicting and uncertain. The nearest star thus far discovered is one of the first magnitude, not visible from the United States or Europe. It is the star called Alpha in the constellation of the Centaur in the southern hemisphere of the heavens.

The distance of this star appears to be something like twenty trillions of miles, or about two hundred and fifteen thousand times as great as the distance of the sun from the earth. The next nearest star, as far as known, is a little sixth-magnitude twinkler, barely visible to the naked eye, in the constellation of Cygnus, popularly called the Northern Cross. The distance of this star, which is known to astronomers as 61 Cygni, is variously estimated at from forty to sixty trillion miles, or two or three times that of the brightest star in the Centaur. The brightness of the stars, as we see them, is, then, no measure of their comparative distance. A very bright star may be much more distant than a very faint one, the difference being due to the greater magnitude of the more distant star. Sirius, or the dog-star, for instance,

which scintillates so splendidly in the winter sky, is more distant than than the little star 61 Cygni, the latter being in fact a very much smaller sun than ours, while Sirius is a far larger one. It thus appears that while the efforts to measure the distances of the stars have not been very successful, yet they have resulted in giving us a wonderful insight into the arrangement of the universe of suns in the midst of which we dwell. They have proved that large stars and small stars are scattered through space at various distances from one another and from us; that the dimensions of the blazing bodies which we call stars or suns, vary to an enormous extent, and that our own sun, great, glorious and overpowering as it seems to us, really belongs to a quite inferior rank.

But it is possible that before many years our knowledge of the distances of the stars may be greatly extended. Spectroscopic investigation in the case of binary stars, as those are called which circle in pairs around their common centre of gravity, is beginning to help us a little in this direction. Recently, for instance, Mr. G. W. Colles, Jr., has calculated, from the results of such investigation, the mean distance of ninety-five stars situated in the northern hemisphere of the heavens, and he finds it equal to the distance which light would travel in about one hundred and fifty years. That distance is not less than eight hundred and seventy trillion miles, or more than forty-three times as great as the distance of the nearest known star, Alpha Centauri. Yet enormous as such a distance is, it is nearly certain that the average distance of all the stars composing the visible universe is still greater. And here and there the starry heavens, even in their richest regions, present black