

glass. In his "Astronomy with an Opera Glass," G. P. Serviss gives a map of the Pleiads containing seventy-five stars and says, "All these may be seen with the most powerful field glass." Young, in his "General Astronomy," gives a map containing eighty, and says, "A mere opera glass shows nearly one hundred." Newcomb, in his "Popular Astronomy," gives a map containing sixty, and says that is how the cluster is seen "through a small telescope." These statements are rather indefinite and apparently not exactly consistent. The following are more definite: Down to magnitude 9.2 Bessel gives fifty-three stars in the cluster, and Dr. Elkin, of Yale, gives sixty-nine. Flammarion gives a map containing 120 down to magnitude 11. Wolff has mapped 499 down to magnitude 14. Dr. Pritchard, of Oxford, says "more than 625 have been seen." The Henry Brothers, of Paris, have photographed many that have never been seen and that may never be seen.

How many you may see depends chiefly on the size of your object glass. To see Elkin's sixty-nine a very good one-inch glass may suffice, but even a  $1\frac{1}{2}$  may not. For an eleventh magnitude star nothing less than  $2\frac{1}{2}$  inches will do, and some  $3\frac{1}{2}$  inch glasses will do no more. To reach the fourteenth magnitude at least ten inches of aperture is needed.

In the map which accompanies this article only the eleven brightest stars of the cluster are shown—the eleven that Heis sees with his naked eye. The map shows them as we see them when they are on the meridian. The positions of the stars relative to each other and relative to the surrounding stars are always the same; but relative to *up* and *down* and *right* and *left* their positions on the map are strictly true only when they are on the meridian.

The one at the top of the map and the one at the bottom have no names so far as I know. The other nine have. Of the two at the left, the lower and brighter one is Atlas, the upper Pleione. Next to the right and the brightest of the lot is Alcyone. To the right and below this is Merope. These two form a quadrilateral with two others above and to the right. The one diagonally opposite Alcyone is Electra, the one opposite Merope is Maia. Above Electra is Celaeno, above that Taygete. The triangle above Maia and Taygete is completed by Sterope or Sterope.

The six generally seen are Alcyone of the third magnitude, Electra and Atlas of the fourth, and Merope, Maia and Taygete of the fifth. If you can see seven the seventh will be either Pleione or Celaeno, both of magnitude  $5\frac{1}{2}$ . To my eye Pleione is easier than Celaeno. Of the remaining three, Sterope is to me the least easy.

In a small glass the cluster is very beautiful, well worth looking at long and often. One of its prettiest features is the string of small stars running down from Alcyone. It is useful too, containing some good test objects. Sterope is double, and if your glass does not show both stars it is not a very good one. Alcyone has several small companions close on its northwest side. If your glass shows one of these distinctly it is not a bad one; if it shows three it is (if a field or marine glass) a very excellent one.

There are several other things some little notice of which I had hoped to squeeze into this article—the different names given to the cluster and its stars, their meanings, and the probable reasons for their being given; the ancient myths and modern fictions connected with it; the use that was made of it by the ancient farmers and sailors; the evidence it supplies for or against some modern astronomical theories; the drift of its principal stars through space; how the moon behaves towards it, &c.—but the article is already long enough and these matters must stand over.

By the way, if any of you know of any names applied to the cluster or its members other than those used above—and other than the Seven Stars, the Seven Sisters, the Atlantides, Vergiliae, Kimah (?) La Poussiniere, Die Glucke, Ajalkuch (Micmac), Isilimela (Zulu)—I wish you would send them to me along with anything you know as to their meaning and as to where and by whom they are or were used.

C.

#### Dr. Hall on the German Schools.

Dr. Hall, in writing from Berlin to the *Weekly Monitor*, thus sums up his first impressions of the German Schools:

Here one may see the principles of Froebel and Pestalozzi developed on the native soil. I have visited already the kindergarten, germinde school, gymnasium and seminaries. The teacher is a government official, and continues his work until he is rendered unfit either by sickness or old age. He must take a liberal course of study before he enters the profession, and then he ranks with the other learned professions. They appear to be satisfied with their work. There is none of that unrest and friction which is too often noticeable amongst our teachers. The work done in the schools is superior. The Germans have a power in their educational work that America—so far as we can judge—does not possess. Possibly at some future time I shall try to define it.

Some of the points that have impressed me are the following:

1. The general good health of the teacher and pupils.
2. The especial care that is paid to the correct use of language in all school exercises.
3. The cultivation of politeness and good manners is an important feature in school work.
4. Music, drawing, and proper physical exercises has each a new meaning and value.
5. The pupil is developed fully. There is no partial or one-sidedness in education.