observed, for some time, right ascensions and declinations, quitted equatorial armils for the astrolabe, which immediately refers the stars to the ecliptic. He probably did this because, after the discovery of precession, he found the latitudes of the stars constant, and wanted to ascertain their motion in longitude.

To the above instruments, may be added the *dioptra*, and the *parallactic instrument* of Hipparchus and Ptolemy. In the latter, the distance of a star from the zenith was observed by looking through two sights fixed in a rule, this being annexed to another rule, which was kept in a vertical position by a plumb-line; and the angle between the two rules was measured.

The following example of an observation, taken from Ptolemy, may serve to show the form in which the results of the instruments, just described, were usually stated.[16]

"In the 2d year of Antoninus, the 9th day of Pharmouthi, the sun being near setting, the last division of Taurus being on the meridian (that is, $5\frac{1}{2}$ equinoctial hours after noon), the moon was in 3 degrees of Pisces, by her distance from the sun (which was 92 degrees, 8 minutes); and half an hour after, the sun being set, and the quarter of Gemini on the meridian, Regulus appeared, by the other circle of the astrolabe, $57\frac{1}{2}$ degrees more forwards than the moon in longitude." From these data the longitude of Regulus is calculated.

From what has been said respecting the observations of the Alexandrian astronomers, it will have been seen that their instrumental observations could not be depended on for any close accuracy. This defect, after the general reception of the Hipparchian theory, operated very unfavorably on the progress of the science. If they could have traced the moon's place distinctly from day to day, they must soon have discovered all the inequalities which were known to Tycho Brahe; and if they could have measured her parallax or her diameter with any considerable accuracy, they must have obtained a confutation of the epicycloidal form of her orbit. By the badness of their observations, and the imperfect agreement of these with calculation, they not only were prevented making such steps, but were led to receive the theory with a servile assent and an indistinct apprehension, instead of that rational conviction and intuitive clearness which would have given a progressive impulse to their knowledge.

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[16] Del. *A. A.* ii. 248.