

ASTRONOMY AND ITS USES.



WITH the brilliant astronomical discoveries of the 17th century are associated names, which will be forgotten only when the stellar fires have died out, or the last son of Adam has passed away. But were Galileo, Kepler, and the other mighty geniuses, who pointed out and proved the real motions in the solar system, to visit our planet to-day, they would find that the science for which they did so much, has progressed beyond all they ever dreamed of. They would not have far to go to reach one of the four hundred princely observatories, provided in our age for the reception and appropriate use of astronomical instruments, and the accommodation of the men of science employed in making and reducing observations of the heavenly bodies. Here they would certainly look, in admiration and astonishment, at the glorious artillery of science which nightly assaults the sky; at the telescope, become, so to speak, a wonderful cyclopean eye imbued with superhuman power, by which the observer extends the reach of his vision to the farthest heavens, and surveys galaxies and universes, compared with which the solar system is but an atom floating in the air. They would learn that so thoroughly are the motions of the planets now understood, that the failure of Uranus to move precisely in the path predicted for it, furnished computers all the data they required to determine the exact position, and thus bring about the immediate discovery of a new planet—Neptune. Perhaps no tongue could tell, no pen paint their amazement, when they would hear that in the contrivance and execution of the instruments before them—such has been the stretch of inventive skill and mechanical ingenuity,—that the nature and physical constitution of heavenly bodies, are determined with the certainty and precision which mark the investigations of the chemist into the ultimate constitution of matter before him.

Without having either the ability or the inclination to examine these results, which

would prove to its fathers the phenomenal development of astronomy in our age, the most indifferent reader can scarcely fail to remark the vast amount of energy and money expended upon that science. Without notes or researches, the writer recalls, among other instances that, within the past five years, the Harvard Observatory alone has received bequests, which amount to well nigh half a million dollars, that through the generosity of James Lick, the Californian millionaire, there has been opened upon the summit of Mt. Hamilton, Cal., high above the clouds, an observatory, which, with its magnificent equatorial telescope—aperture 36 inches, the largest refractor on earth—and equipments to match, promises great surprises: that Pope Leo himself has had erected within the Vatican garden, a splendid observatory. During the period mentioned the famed American scientists—Langley, Young, Newcomb and Holden, have each published a work on astronomy—not mere text-books, nor records, but volumes of 500 or 600 pages, composed in great part, of the accounts of investigations made for the first time, or verified, at a single observatory. It takes a volume of several hundred pages to contain the records of the observations annually made at the Harvard observatory, or by expeditions sent out for it. All will remember something of the munificence of the government support and private benefaction, which went to assure the success of observations made at the transit of Venus nine years ago. Total eclipses of the sun come about every other year, and are always awaited, in whatever quarter of the globe they occur, by numerous observing parties, whose expenses are paid by private donation, or by allowances from the public coffers.

Is it true that in our day, the development of any science is in direct ratio to its usefulness or to the material advantages expected from it? If so, the uses of astronomy must be important and its promises great. It has been argued, that the rapid advancement of astronomy is due to man's natural bent for knowledge for its own sake. This view may be correct: all will admit, certainly, that astronomy,