feet above sea-level. The second is at La Joya, in the desert, altitude 4140 feet. The third is at the Observatory itself, altitude 8060 feet. The fourth is upon the side of the Misti, at an altitude of about 16,000 feet, and the fifth is upon the summit of the Misti, altitude 19,200 feet. The discoveries made at the Observatory are enumerated by Prof. Pickering. They include double stars, the "lakes" on Mars and the rapid changes in some of the canals and dark markings on the planet at the time of the melting of the southern snow-cap, the observations of changes of shape of Jupiter's satellites, which led to the conclusion that the outer satellites are not solid bodies, but dense swarms of meteorites, and pointed to a modification of Laplace's nebular hypothesis, to explain some of the difficulties inherent in it. Peculiar lunar formations have also been observed, and an explanation has been given of the bright streaks seen at the time of full moon. A new class of lunar rills has been found, winding and tapering like a terrestrial river-bed, and various facts have been determined with regard to what are called "variable spots" on the moon, which darken as the sun rises upon them, and fade out as it sets. Finally, the remarkable photograph of the spectrum of Nova Normæ, showing the star's constitution to be the same as that of Nova Aurigæ, was obtained at Arequipa. But only a small portion of the work of the Observatory is devoted to original research, the greater part of the time being taken up by routine work. Few observatories, however, can show a better record than that made at Arequipa during the three years of the Observatory's existence.

THE DIAMETERS OF SOME MINOR PLANETS.—Various attempts have been made to measure micrometrically the diameters of some of the larger asteroids, and also to determine them by photometric means, but the values obtained have never been very trustworthy. Prof. E. E. Barnard has now taken up the work, using the 36-inch of the Lick Observatory, and has already obtained some new results (*Astronomy and Astro-Physics*, May). So far, he has succeeded in directly measuring Ceres, Pallas, and Vesta, to which he assigns the following diameters:—

| | | |
|---|---|---|
| Ceres | ... | 599 ± 29 miles. |
| Pallas | ... | 273 ± 12 ,, |
| Vesta | ... | 237 ± 15 ,, |

It will be seen from this that, contrary to the general belief, Ceres is the largest of the minor planets, and not Vesta. The values obtained by Argelander from a consideration of the relative light of the three foregoing asteroids and Juno, and those determined by Mr. E. J. Stone in 1867 from measures made by Herschel and Lamont, are as follows:—

| | | Argelander. | | Stone. |
|---|---|---|---|---|
| Ceres | ... | 230 miles | ... | 196 miles. |
| Pallas | ... | 162 ,, | .. | 171 ,, |
| Juno | ... | 108 ,, | ... | 124 ,, |
| Vesta | ... | 275 ,, | ... | 214 ,, |

Juno will soon be in a favourable position for observation, and Prof. Barnard will then apply the filar micrometer to its disc.

RETURN OF TEMPEL'S COMET.—A telegram from the Cape Town Observatory to Prof. Krueger (*Astr. Nach.* 3228) announces that Tempel's periodical comet (1873 II), the return of which was expected this year, was observed by Mr. Finlay on May 8. Its position was then R.A. $=356^\circ\ 20'\ 16''\cdot5$. P.D. $=94^\circ\ 51'\ 11''$. The object was circular, with a diameter of about one minute of arc and some central condensation, but no tail. Its brightness was about the eleventh magnitude, or fainter.

## THE NEW ENGINEERING LABORATORY AT CAMBRIDGE.

THE new Engineering Laboratory was opened on Tuesday by Lord Kelvin, in the presence of a brilliant assemblage of University dignitaries. The building occupies the site of the old Perse Grammar School, and has been erected from the designs of Messrs. Marshall, Vicars, and Co. The exterior is of plain but not unattractive red brick, in the French *château* style. The main building is of three stories. The three chief rooms, one above the other, are on the left of the handsome entrance doorway, and overlook the grounds of Corpus Christi College. To the right of the doorway are offices, small class-rooms, and rooms for special researches. The electrical laboratory is on the ground-floor; above it is the drawing school, excellently lighted by large western windows; and at the top is the mechanical museum, lighted by dormer windows and a cupola. Behind, the fine old schoolroom has been altered by raising its floor, but the beautiful oaken-roof of sixteenth-century work has been preserved, and the room gains rather than loses by the slight change in its proportions. Here is the chief mechanical laboratory, and it is furnished with all needful apparatus for work on the strength of materials, mechanism, and applied mechanics. Beyond, in the old schoolyard an admirable steam and dynamo laboratory has been erected from Prof. Ewing's designs. Here are several types of experimental steam-engines, dynamos, and motors, and in another compartment the boilers and other heavy appliances. The laboratories are on one side contiguous to the Chemical Laboratory, and when some day the necessary extension of the Cavendish Laboratory takes place, they will also abut on the Physical department. The cost of the whole has been some £6000, of which about £5000 was contributed by friends of the University who desired to see engineering science properly established and equipped in Cambridge.

The Vice-Chancellor presided at the ceremony, and in a happy speech alluded to the doubts at first entertained by many worthy Cambridge men as to the wisdom of admitting purely professional studies among those fostered by the University. In medicine, however, in law, and lately in agriculture, the claims of applied and practical knowledge had been recognised, and the recognition had been amply vindicated. It was due to the enterprise and ability of Prof. Ewing that engineering had now overcome all opposition to its admission to rank as a scientific profession, the preliminary training for which might fitly be carried on within the academic precincts. Lord Kelvin, in declaring the Laboratory open, spoke of the direct evolutional connection between the theoretical mechanics and pure mathematics of his day at Cambridge, and the establishment of a department in which their principles found application and verification. The Laboratory was excellently furnished so far as it went, but £20,000 might well be spent, in the interest of the University as well as of engineering science, in extending and completing it. Prof. Kennedy spoke of the place of such laboratories in the training of the engineer. Engineering was taking its due rank as a liberal profession, and from Cambridge, the centre of mathematical and physical inquiry, future engineers would go out fitted for acquiring with sureness and rapidity the practical details of their work. Sir Frederick Bramwell told stories of his early experiences. Prof. Jebb, M.P., and Prof. Ewing, who was very warmly received, gave thanks to all who had wrought with the Engineering Laboratory Syndicate to bring about the result they were celebrating. The donors, past and future, the architect, builders, demonstrators and workmen received their meed of acknowledgment. After the ceremony a reception was held by Prof. and Mrs. Ewing, and nearly 800 of the members of the University and ladies inspected the rooms. The students acted as guides and demonstrators, and at the close it was on all hands acknowledged that the occasion had been one of the most successful of University functions in recent years.

## SCIENCE IN THE MAGAZINES.

THOUGH articles on scientific subjects are sprinkled through this month's magazines, they contain little that is new or suggestive. In the *Quarterly Review* (No. 356) two interesting articles appear, one on "Shakespeare's Birds and Insects," and another on "Ocean Meadows." Much has been written concerning Shakespeare's natural history, but the conclusion to which an examination of the poet's writings inevitably leads is that he was not an observant student of animal and plant life. The *Quarterly* reviewer criticises Shakespeare's knowledge of these matters, pointing out that Chaucer wrote of what he saw and heard in the animal life about him with a sense of personal delight that convinces the reader of his familiarity with animate nature. So too with Spenser, and with Ben Jonson. But, says the reviewer, Shakespeare resembles neither of these. "He borrows from Gower and Chaucer and Spenser; from Drayton and Du Bartas and Lyle and William Browne; from Pliny, Ovid, Virgil, and the Bible; borrows, in fact, everywhere he can, but with a symmetry that makes his natural history harmonious as a whole, and a judgment that keeps it always moderate and passable." This indictment is supported by