

been rendered necessary, much good exploring work appears to have been done. The deep boring for oil at Athabasca Landing has now been continued down to over 1700 feet, with every prospect of early success when work is resumed this season. Students of Graptolites will welcome the announcement that Prof. Lapworth's work on the Canadian forms is now approaching completion.

IN a communication made before the St. Petersburg Society of Naturalists (*Proceedings*, November 1895), Prof. Borodin described some interesting species of plants which he had discovered during his last summer's exploration of the lakes of the Valdai plateau, namely, the *Isoetes echinospora* and the *Isoetes lacustris*, the *Lycopodium inundatum*, *Botrychium virginianum*, and *Luzula angustifolia*, Garcke, var. *albida*, which last seems to have been imported, and now grows in masses along the embankment of the Moscow Railway. He especially mentioned the simultaneous occurrence, in Lake Bologoye, of the two species, *Caulinia fragilis*, W. (*Najas minor*, All.) and *Caulinia flexilis* (*Najas flexilis*, Rostk.), which, Prof. Borodin remarks, never occur together. The former is known from many localities of Southern and, partly, Middle Russia; but the second, which is altogether a rare northern species, has only been found until now in the lakes of Finland and Olonets.

THE presidential address, delivered last December to the Geological Society of Washington, by Dr. G. K. Gilbert, has been published by the Society. It is entitled "The Origin of Hypotheses," and illustrates the methods of scientific investigation by reference to a particular problem—the origin of the peculiar crater-structure in limestone known as Coon Butte (Arizona). Involving as it does a consideration of all possible methods of the formation of a non-volcanic crater, it will be found to have a more special interest for geologists than the title might suggest.

THE Rugby School Natural History Society is one of the best of the scientific societies attached to our public schools. The report for the year 1895 has just come to hand, and we recognise in it a spirit of devotion to science worthy of the fullest encouragement. It is no small matter for a school society to spend £270 upon the purchase of objects, cases for a new museum, and for the rearrangement of the specimens; yet that is what the boys at Rugby have done. A rigid economy of many years enabled the Society to meet the entire expenses of the removal and cleaning of the objects, without appealing for help from outside, but as a consequence its resources are entirely exhausted. Funds are needed to be devoted to new cases for the entomological collection in the museum, but, we understand from the report, unless material assistance beyond the ordinary income is received, it will be a long time before the Society's exchequer will be sufficiently replenished to warrant any expenditure. We cordially commend the position of the Society to philanthropists, believing that any assistance given would work for the increase of scientific investigators. The papers contained in the report are on the flight of birds, by Mr. W. T. Loveday; the contents of the Rugby School Museum, with suggestions for their improvement and enlargement, by Mr. W. E. Collings; the functions of a school natural history museum, by Mr. L. Cumming; and on earth-worms, by the Rev. Hilderic Friend. There are also the usual reports of the various scientific sections of the Society.

THE additions to the Zoological Society's Gardens during the past week include a Red-faced Ouakari (*Brachyurus rubicundus*), from the Upper Amazons, presented by Mr. Ernest E. Austen; a Black-eared Marmoset (*Hapale penicillata*), a Common Marmoset (*Hapale jacchus*) from South-east Brazil, presented by Mr. R. H. Biddle; two Ring-tailed Coatis (*Nasua rufa*) from South America, presented respectively by Captain Hyde and

Mr. James Green; a Lion (*Felis leo*, ♂) from Africa, deposited; an Indian Civet (*Viverricula malaccensis*) from India, a Nankeen Night Heron (*Nycticorax caledonicus*) from Australia, twenty Midwife Toads (*Alytes obstetricans*) European, purchased; a Weka Rail (*Ocydromus australis*) from New Zealand, received in exchange; two Maholi Galagos (*Galago maholi*), four North African Jackals (*Canis anthus*) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

URANUS AND ITS SATELLITES.—As part of his work at Mount Hamilton during 1894 and 1895, Prof. Barnard took up the measurement of the positions of the four moons of the planet Uranus, and his results have just been published (*Astronomical Journal*, No. 370). Even with the 36-inch telescope the two inner satellites were usually difficult objects, while Titania and Oberon were also difficult if there was any wind to disturb the telescope. Ariel seems to be generally about half a magnitude brighter than Umbriel, and is the more easily visible notwithstanding that it is nearer to the planet. The compared brightnesses of Titania and Oberon seemed at first to show a variation of their relative light, amounting to a whole magnitude, but it is by no means certain that a real change occurs in the brightness of either; a consideration of the circumstances under which the comparisons were made has led Prof. Barnard to the curious conclusion that his eye has a tendency to make the lower of two equal lights appear the brighter, and he therefore thinks it probable that the two outer satellites are of constant and nearly equal brightness.

Apparently without being aware of the earlier observations of Schiaparelli and others, Prof. Barnard noticed a very decided ellipticity of the disc of Uranus, and found that the orbits of the satellites deviate some 20 or 30 degrees from the equatorial plane indicated by the major axis of the disc. For the polar and equatorial diameters, the measured values are 3".93 and 4".150 respectively, when reduced to the mean distance of Uranus from the sun equal 19'.8329 astronomical units. The polar compression appears to be greater than that of Saturn, which fact indicates a rapid axial rotation. The mean diameter of the planet derived from the measures is 34,900 miles.

COMET SWIFT.—A telegram received from Kiel on April 17 announces the observation of Swift's comet at 8h., Echo Mountain mean time, on April 13 in R.A. 3h. 39m., Decl. 15° 40' N. The comet is stated to have a tail, and was moving slowly westward. It is a little south of the Pleiades, so that it can only be observed for a short time after sunset.

A later telegram states that the comet was observed at the Lick Observatory at 8h. 26m. mean time on April 16; it was then in R.A. 3h. 38m., Decl. 18° 20' N.

THE ASTRONOMICAL AND PHYSICAL SOCIETY OF TORONTO.—Judging by the sixth annual report, which we have just received, this Society is doing good work in popularising the study of science in Canada. The volume contains reports of the semi-monthly meetings and a series of papers read before the Society. For the most part the papers give popular accounts of various astronomical and physical researches, among which "the spectra of nebulae," "celestial photography," and "electrical radiation" may be specially mentioned. One of the communications, by A. Harvey, describing the behaviour of minerals at very high temperatures, is very suggestive. His experiments were made by means of a Barton electrical furnace, in which the current proceeds through water to the negative pole, so that an arc is formed where the mineral at the negative pole is brought to the surface of the water. The mineral in this way becomes surrounded by an intensely heated gaseous envelope, and its surface is quickly melted, while a brilliant light is produced. When removed from the water, the crust on the surface of the mineral greatly resembles that seen in meteorites. Different minerals give out light of different colours, and usually glowing particles are detached in very much the same way as those which give rise to the trails of shooting-stars. The volume also reports the proceedings of the Committee on the "unification of time." It appears that of the nine nations publishing ephemerides, six have formally given their assent to the proposal that on and after the first day of January 1901, the astronomical day should begin at mean midnight.