was in Japan in 1874, in command of the U.S.S. *Tuscarora*, engaged in surveying the proposed route for a Pacific submarine cable. The greatest depth found on the voyage was 3287 fathoms, and H.M.S. *Challenger*, then on her exploring voyage, had not discovered anything in the Pacific of as great a depth. But upon leaving Yokohama the *Tuscarora* made very deep soundings. Only 100 miles from the coast 3427 fathoms were found, and a little further on 4643 fathoms went out without bottom being touched. Still keeping on the great circle track a number of soundings of over 4000 fathoms were made, the deepest being 4655. After re-coaling at Hakodate a fresh departure was made, and the Kuriles were skirted, and here again very deep water was found, except in one place, where there is a ridge of land on which there was only 1777 fathoms, whilst there was 3754 on the western side of it, and 4037 on the eastern side, only eighty miles from land. Admiral Belknap observed that there is, therefore, evidently a deep submarine valley running parallel with the coast of Japan, and some 250 miles in width. Whether the Kuro Siwo, or Japan current, corresponding in a sense to the Gulf Stream, has anything to do with this is a matter for surmise. Since the *Tuscarora* first showed us these great depths others have been discovered. The *Challenger* after leaving Japan found 3750 fathoms 200 miles east of Cape King, and nearly the same depth another 200 miles farther, after which the water shoaled. She also got 4475 fathoms only 150 miles from Guam in the Caroline Islands. The U.S.S. *Albatross* found 3820 fathoms off the coast of the Aleutians, and the U.S. Coast Survey steamer *Blake* got 4561 fathoms 70 miles north of Porto Rico, whilst H.M.S. *Egeria*, surveying in the South Pacific, has succeeded in getting depths of 4428, 4295, and 4530 fathoms. Subsequent researches have proved that the deepest portions of both the Atlantic and Pacific Oceans are close to their western shores. The Admiral then gave some description of the apparatus employed, and after paying tribute to the English and American Navies for their researches, he concluded a most interesting lecture by suggesting that the Japanese Naval Service should take up the work, more particularly on their own coasts and along the course of the Kuro Siwo.

THE additions to the Zoological Society's Gardens during the past week include a Wild Cat (*Felis catus* ♂) from Scotland, presented by Mr. Osgood H. Mackenzie; an African Cat (*Viverra civetta* ♀) from West Africa, presented by Mr. John J. Pitcairn, M.R.C.S., F.Z.S.; two Weka Rails (*Ocydromus australis*) from New Zealand, presented by Mr. Edward T. Dixon; a Common Tequexin (*Tupinambis tequexin*) from Rio de Janeiro, presented by Mr. Edward Sloane; a Himalayan Bear (*Ursus tibetanus*) from Tibet, deposited; a Molucca Deer (*Cervus moluccensis* ♀), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

STARS WITH PECULIAR SPECTRA.—A communication from Prof. E. C. Pickering to *Astronomische Nachrichten*, No. 3008, announces the discovery of the following stars having peculiar spectra, and of some new variables in the constellations Triangulum and Hydra:—

Designation of star.	R.A. 1900.	Decl. 1900.	Mag.	Date of photograph.	Description of spectrum.
	h. m.	° ′			
D.M. + 33°·470	2 31·0	+33 51	9·2	1890 Oct. 13	III. Type. Bright hydrogen lines.
Cord. G.C. 719	5 59·4	− 6 42	5·8	1888 Feb. 15	F line bright.
,, ,, 17717	12 56·3	−70 56	6·6	1890 May 14	F line bright.
,, ,, 18770	13 43·4	−27 44	7·0	,, May 15	III. Type. Bright hydrogen lines.
,, ,, 18947	13 51·6	−55 51	8·0	,, May 25	IV. Type.
,, ,, 20554	15 48	−69 42	6·2	,, May 26	IV. Type.

It is remarked that "the stars D.M. + 33°·470 and Cord. G.C. 18770 in the above list have a spectrum in which the lines due to hydrogen are bright, as in that of *o* Ceti and other variables of long period. They were therefore suspected of variability." An examination of the Harvard College Observatory photographic charts and spectra indicates that the former star varies between 7·1 mag. and 9·2 mag., and the latter between 7·0 mag. and 10·4 mag. Three observations of Cord. G.C. 18770 by Stone gave a magnitude 6. It is interesting to note that the Rev. T. E. Espin announced the probable variability of the star D.M. + 33°·470 in *Walsingham Observatory Circular*, No. 27 (NATURE, November 13, p. 45).

A photograph of the spectrum of T Ceti shows that it belongs to the third type. A photograph of the spectrum of the variable of the Algol type, viz. S Antilæ (R.A. 9h. 27·9m., Decl. −28° 12′), discovered by Paul in 1889, shows the hydrogen lines at λ 410 and λ 434 (*h* and G) narrow, while the lines at λ 394 and λ 397 are very broad. This would place it in "an intermediate class between stars of the first and second types."

THE ROTATION OF JUPITER.—A report in the *Revue Générale des Sciences*, of the meeting of the St. Petersburg Academy of Sciences held on November 18, contains an account of a paper by M. Biolopolski, on the rotation of the planet Jupiter. Cassini appears to have been the first to point to the analogy between the rotation of Jupiter and the sun, by demonstrating that the velocity at the equator is greater than on the rest of the surface of these two bodies. It is known that on the sun the angular velocities are functions of the heliographic latitudes. By utilizing observations and drawings made by Cassini, Herschel, Schröter, and many other observers, M. Biolopolski has been able to determine more than a hundred angular velocities at various "Jovigraphic" latitudes. Among these velocities two predominate, one of 9 hours 51 minutes, and another of 9 hours 55·5 minutes (approximately). The first is found almost exclusively in the zone between 0° and 5°, in both hemispheres; the second is obtained from the remainder of the surface, except between 5° and 10°, both N. and S., where the two velocities appear to occur with equal frequency. These conclusions are confirmed by Mr. Keeler's drawings of Jupiter, made at the Lick Observatory during this year.

EDDIE'S COMET (?).—A telegram from Cape Town Observatory to the editor of the *Astronomische Nachrichten*, with regard to the supposed remarkable comet seen by Mr. Eddie on October 27 at Grahamstown, reads: "It has been cloudy here, October 27; has not been seen by anyone else."

NAMES FOR ASTEROIDS.—The following names have been given to recently-discovered asteroids:—

(283) Emma.	(289) Nenetta.
(284) Amelia.	(293) Brasilia.
(285) Regina.	(294) Felicia.

PERIOD OF χ CYGNI.—Mr. Chandler represents the inequalities in the period of the variable χ Cygni by the formula

406·02 E days + 0·0075 E^2 days + 25°·0 sin (5° E + 272°),

where E is the normal epoch of a maximum. This formula, containing quadratic and periodic terms, gives the epochs of maxima much nearer than those derived from Schönfeld's uniform period of 406·5 days.

BIOLOGICAL NOTES.

ILLUSION OF WOODPECKERS AND BEARS.—Mr. J. D. Pasteur, Inspector of the Post and Telegraphic Service at Java, communicated to Dr. F. A. Jentink, in July last, the following very curious and interesting facts about woodpeckers, who, under the illusion that the buzzing sound so apparent on applying the ear to telegraph poles is caused by the vigorous efforts of gnawing or boring insects, make large holes in the timber, on a hopeless chase after such. He incloses a piece of a telegraph pole made of teak-wood, with two woodpeckers (*Picus analis*), from the Kediri Residency, Java. The wood, which is of iron hardness, is perforated with rather large holes near the place where the insulators had been attached. Although Inspector Pasteur passes thousands of telegraph poles under view each year, only in a very few

cases has he found any damage done to them by woodpeckers, and, until now, the damage done has always been on the living kapok trees (*Eriodendron anfractuosum*), which are used in Java for this purpose. The piece of telegraph pole now sent is the only instance known to him of damage being done to the sound and very hard poles of the teak (*Tectona grandis*). Besides the above-mentioned woodpecker, from time to time the rare little *Picus moluccensis* was seen also among the others at work. Mr. Pasteur remarks on the great rarity of such a phenomenon: in the Paris Electrical Exhibition of 1881 there was exhibited, as a great curiosity, a telegraph pole sent from Norway, which was perforated by a hole of 7 centimetres in diameter. The Norwegian Administration was for a long time uncertain to what cause to ascribe this damage done to poles, which were otherwise quite sound, till a mere chance at last revealed woodpeckers at work. In Norway, too, another equally remarkable case of damage had been noted as done to telegraph poles by the large stones, which are heaped round their base to insure their stability in the ground, being removed and scattered, apparently without any reason. This, which was for a length of time inexplicable, was at last found to be the work of bears, who apparently mistook the sound in the timber for the buzzing of a swarm of bees. It is too much to expect of either bears or woodpeckers that they should be versed in the ways of modern science. (*Notes from the Leyden Museum*, October 1890, p. 209.)

ALGÆ LIVING IN THE SHELLS OF MOLLUSKS.—For a long time back zoologists have, in a more or less desultory and unsatisfactory manner, made known to us the occurrence, in the hard parts of both living and extinct animals, of sundry ramifying canals, which have been described as the work of vegetable parasitic forms. These forms have been found in shells, corals, sponges, in fish-scales, and, indeed, the literature of the subject is quite a large one. Until the other day, however, there was but little progress made in our knowledge of the life-history of these parasitic plants, but the researches of Reinsch (*Bot. Zeit.*, 1879), and especially of Lagerheim (*Oefver. af K. Vet. Akad. Forhand.*, 1885), marked a new era in their investigation. A memoir, recently published in the Report of the Botanical Congress held in Paris last year, from the pens of MM. Ed. Bornet and Ch. Flahault, reduces the whole subject to order, describes the method of investigation, and a number of new genera and species. As most of these minute plants grow within the calcareous shells of Mollusca, it is not possible to study their morphology, unless by decalcifying these structures; this is effected by placing them in a sufficient quantity of Perenyi's fluid, consisting of four volumes of a 10 per cent. solution of nitric acid, three of alcohol, and three of a 5 per cent. solution of chromic acid, which fluid, while it dissolves the carbonate of lime, fixes the protoplasm, and leaves it and the other cell-contents (after a good washing) in a fit state for the use of reagents or staining. The same general features seem to attend the gradual perforating of the shell-structure by these parasites. At first they penetrate just under the outer epidermis of the shell, then speedily they make further advances, until in time the greater quantity of the hard structures disappear. This will account for the gradual extinction of dead shells in tranquil bays, where they are not subject to being ground into powder by the force of the waves. In addition to marine shells, instances of the occurrence of these forms in fresh-water shells are given, and they would also seem occasionally to lead an independent existence on calcareous rocks. Of the Chlorosporeæ, the most important is *Gomontia polyrhiza*, briefly described by Bornet and Flahault in Morot's *Journal of Botany* for May 1888, but here fully described and illustrated. This plant has a minute thallus, consisting of ramifying filaments, certain cells of which become altered into sporanges, and become detached; from these issue biciliated zoospores and immobile spores (the aplanospores of Wille). The germination of these spores seems to differ; the aplanospores increase in volume, emit one or more rhizoids, and soon present an appearance resembling that of a sporangium, but smaller. Whether the zoospores conjugate or not has not yet been observed—the difficulties in the way of observation are great—but they soon give origin to filamentous growth of a bright green colour. The other species described are *Siphonocladus voluticola*, *Zygomitus reticulatus*, and *Ostreobium queketti*. Among the Phycochromaceæ are enumerated *Mastigocoleus testarum* (Lagerheim), *Plectonema terebrans*, *Phormidium incrustatum*, and *Hyella cæspitosa*—this last a very interesting species; its thallus has a great resemblance to that of the Sirosiphoniaceæ, but in reality it belongs to the Chamæsiphoniaceæ, and it has two modes of propagation—one by the ordinary dissociation of vegetative cells, and the other by the formation of spore-like bodies resulting from the division of the contents of certain cells into a great number of minute cellular spheroids, after the manner in Dermocarpa, these cells being either terminal or intercalary. Two fungoid forms are described and figured: *Ostracoblabe implexa*, for the form regarded as *Achlya ferax* by Duncan, and *Lithopythium gangliforme*. This memoir seems to open a new field for research. Without doubt many new facts, as well as new species, await the patient labours of our botanists among these shell-frequenting species, and the way is made plain for them in this memoir. (*Bull. Soc. Bot. de France*, tome xxxvi., 1890.)

THE AUSTRALIAN ABORIGINES.

IN the latest number of the Journal and Proceedings of the Royal Society of New South Wales (vol. xxiii. part 2) there are two remarkably interesting articles on the Australian aborigines. One of them is by the Rev. John Mathew, Coburg, Victoria; the other by Mr. Edward Stephens, Bangor, Tasmania. It may be worth while to give a general idea of the contents of both papers.

Of the two, that by Mr. Mathew is by far the more elaborate. It represents the results of observation and study which have evidently been carried on for many years. A considerable part of it is devoted to the question, Who are the Australian aborigines? and about this he has much to say that must command the attention of ethnologists. He holds that the continent was first occupied by a homogeneous people, a branch of the Papuan family, and closely related to the Negroes. These settlers came from the north, but whether from New Guinea or any other island of the Eastern Archipelago we have no means of knowing, because at the time of their arrival the islands to the north were probably all inhabited by people of the same blood. Mr. Mathew thinks that these first-comers, the veritable Australian aborigines, occupied all the continent; and, having spread right across to the southern shores, crossed what is now Bass's Strait, which may at that distant date have been dry land, their migration terminating in Tasmania. According to this view, the now extinct Tasmanians were a survival of the primitive Australian race; and Mr. Mathew is at great pains to mass the evidence in favour of this theory.

One of the strongest arguments against the hypothesis is that the Tasmanians differed in appearance from their neighbours across the Strait. By a careful comparison of various accounts of both races, one of which is well known to him, he has convinced himself that the physiological differences narrow down to these: that, as compared with the natives of the continent, the islanders were on the average of shorter stature, of much darker complexion, and had hair of very different quality. These differences, he thinks, are to be explained by the fact that the Australian aborigines were greatly modified by fresh settlers, whereas the Tasmanians, being separated from other races, retained their primitive characteristics. There are now various physical types in Australia, but the Papuan type has not been effaced. Mr. Mathew cites various authorities to show that there is a decided Papuan fringe on the south-eastern and western coasts, with a departure from it landwards and in the north. The hooked nose is a feature common to Papuans, Australians, and Tasmanians.

Having discussed the argument from mythology and tradition, Mr. Mathew goes on to consider the argument from implements. The Tasmanians, as warriors, were much less skilfully equipped than most Australian tribes. They possessed, for example, neither the shield nor the boomerang, nor were their weapons ornamented. But in Australia there is a people at an equally low stage; and, with regard to those who are more advanced, Mr. Mathew suggests that the arts they possess may have reached Australia after the departure of the tribes who peopled Tasmania. His conclusion, after a survey of all accessible facts, is that the arms of the Tasmanians were of the same kind as those of the lowest of the Australians; and it is, he maintains, anything but illogical to infer that the "autochthonous" Australians once used exactly the same weapons and implements as those of the islanders. By circumstances which affected only the continent, the arms and implements there were almost universally improved. The author further strengthens