

observatory. Six hours observatory, first half. Three hours lecture and six hours observatory, second half."

The University possesses an excellently equipped students' observatory, in addition to the world-famous establishment on Mount Hamilton. Graduates of the University, or indeed of other universities of equal standing, are received at the Lick Observatory to pursue a higher course of instruction in astronomy; every facility consistent with the scientific work of the establishment will be given them, and they will usually be assigned as assistants to some of the astronomers. An illustration of the bond between the greater and lesser establishments is afforded by the recent computation at the students' observatory of the elements of a comet from observations telegraphed by the astronomers at Lick. (*Pub. Ast. Soc. Proc.* vol. xi. No. 70 p. 190.)

From the information which Prof. Holden has collected, we gather that special students of promise have also the privilege of entering into the regular work of the observatories at Harvard College, and the Universities of Yale, Michigan, Virginia, Wisconsin and Pennsylvania.

The special value to the student of this association with the staff of an observatory is admirably stated by Prof. Holden in a report on the Lick Observatory, from which he makes the following quotation: "No institution in the world is better fitted to give such instruction, and there is a special impetus to be gained in an observatory which is regularly pursuing work of discovery and research. The student comes directly into the current, and learns far more by observation of the methods of others than by the study of text-books. He can take part in the regular work of the observatory also." This happy arrangement is not only beneficial to the student. Prof. Holden further remarks: "It is a great advantage to the university as a whole to count among its members a considerable number of active and ambitious young men who are able to work with some independence to advance science, and not merely to acquire what is already known. They set a standard of scholarship to all the undergraduates. Such students can take a useful part in the actual observations of every day as assistants, and after some practice they become valuable aids in our work of computation and observation, and supplement the permanent force of the observatory in an important degree."

No wonder that with advantages like these there is an adequate supply of highly-trained young astronomers capable of fully developing the great resources which the scientific spirit of wealthy Americans has placed at their disposal. It appears to us that it is precisely for want of opportunities for securing the necessary technical training to future observers that the astronomical development of our own country proceeds less rapidly than that of America. While it is possible to obtain a certain amount of tuition in spherical astronomy, and here and there a modicum of practical instruction in the older branches of the subject, facilities for the study of astrophysics are almost completely lacking, and it is a deplorable fact that the universities are especially deficient in this respect.

Under the Science and Art Department a general study of astronomy is encouraged, but the subject is incorporated with a variety of other subjects, under the comprehensive title of Physiography, and no separate certificate for astronomy is granted.

At the universities, astronomical teaching appears to remain in much the same position as the teaching of chemistry and physics before the introduction of practical work in those subjects, the prevailing idea apparently being that if a mathematician can be placed at the head of affairs in an observatory, it matters little who makes the actual observations, or whether observations are made or not. There can be little doubt that means exist for establishing schools of astronomy comparable with those which have arisen for other branches of science, and we sincerely hope that the need for serious attention to practical teaching in astronomy will soon be recognised.

So far as we know, there is only one institution in Great Britain where any attempt is made to give practical instruction in astronomical physics, and even in this case the greater part of the instruction is necessarily of a somewhat elementary character, in consequence of the small amount of time available for the subject.

It is a natural consequence of our inadequate provision for technical education in astronomy—more particularly in the newer branches—that vacancies in our observatories must be filled by observers who have still to make practical acquaintance with the

work expected of them. Much loss of time and apparent inactivity is the result.

It may be urged that benefactors of the science of astronomy are less numerous here than in America, but the generous gifts of Dr. F. McClean to Cambridge University and the Cape Observatory, and of Sir Henry Thompson to the Royal Observatory, Greenwich, remind us that they are not wholly wanting. Besides, there are already numerous observatories scattered throughout the country which might be made more productive by putting them in the hands of observers who have received adequate training. Public interest in astronomy is by no means absent, and British observatories would, perhaps, receive a much increased measure of support if it were not for the possible impression that the best work can only be done in America, and that instruments of the largest size are alone useful.

#### THE FLIGHTLESS RAIL OF NEW ZEALAND.

THE most important ornithological event in New Zealand, in recent years, was the capture of a fourth specimen of the Takake (*Notornis hochstetteri*), on the west side of Lake Te Anau, in August 1898. Prof. W. B. Benham sent us an interesting description of the bird at the time of its capture (*vol. lviii. p. 547*), and a more detailed account by him is referred to in a paper, by Sir Walter L. Buller, in *vol. xxxi* of

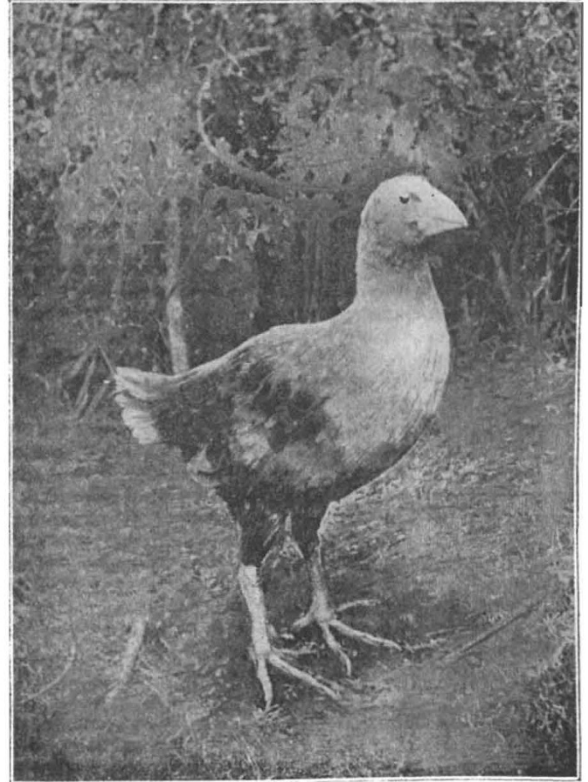


FIG. 1.—The rare *Notornis* of New Zealand.

the *Transactions* of the New Zealand Institute (1898), which has just reached this country. The following particulars, with the accompanying illustration, have been derived from this source:—

In size the bird is like a goose, but in colouration it resembles the Pukeko; its breast is a beautiful rich dark blue, becoming duller on the neck, head, abdomen and legs. These last are clothed with feathers for a greater distance than in the native turkey, but they are relatively shorter and much thicker than in the latter bird. One of the most noticeable characteristics of the bird is its beak—a large equilateral triangle of hard pink



horn, with one angle directed forwards. At the upper side of the base of the beak is a bright red band of soft tissue, like an attempt at a "comb," such as is possessed by an ordinary rooster, only transversely placed. The whole is a handsome bird of heavy gait, absolutely unable to use its wings for their natural purpose of flying. Indeed, one of the interests of the bird zoologically is that, like several native birds of New Zealand, it is flightless, though its congeners in other countries are able to fly. The Takahe is closely allied to the Pukeko, and not far removed from the Brown Woodhen; all these belong to the family of Rails, which usually frequent more or less marshy ground, and in countries other than New Zealand are able to fly as well as other birds. On the other hand, the Takahe can run very actively, and its powerful beak must be a formidable weapon, which it could use with effect on enemies when at close quarters.

The specimen captured in 1898 is a young female, of practically the same size as the bird examined by Sir W. Buller twenty years earlier. The first specimen of the bird ever captured was taken in 1849, and its skin is now in the British Museum (Natural History). The second was caught in 1851, and is also in the British Museum collection. The third was captured in 1879—nearly thirty years after the second had been taken—and its remains were purchased by the Dresden Museum for one hundred guineas. The specimen caught in 1898 appears to be much the best yet obtained, and as much as 300*l.* was offered for it. The rarity of the *Notornis* and other members of the New Zealand fauna makes it essential, as Sir W. Buller points out in his paper, for naturalists to do everything in their power to possess, if not a few living representatives, at any rate a full life-history of the expiring forms.

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

A COURSE of six free public lectures on "Prehistoric Chronology" will be delivered by Prof. Montelius at University College, London, on Tuesdays and Fridays at 4 p.m., beginning on Friday, May 4.

MR. J. F. HUDSON has been appointed mathematical lecturer at University College, Bristol, in succession to Mr. J. F. McKean, who has been appointed a mathematical lecturer at the Royal Naval Engineering College, Devonport. Mr. Hudson has for the past three years been assistant lecturer in Jesus College, Oxford, and assistant demonstrator of physics in the Oxford University Laboratory.

MR. W. TUCKER, C.B., a principal assistant secretary to the Board of Education, has retired from the service on reaching the age of sixty-five. The following promotions have been made in the office of the Board of Education:—Mr. J. White (assistant secretary) to be a principal assistant secretary; Mr. F. R. Fowke (assistant director for science), Mr. H. W. Hoare, Mr. W. I. Ritchie, and Mr. H. M. Lindsell to be assistant secretaries.

THE following appointments have been made by the Irish Department of Agriculture and Technical Instruction:—To be superintendent of statistics and intelligence branch, Mr. W. P. Coyne, professor of political economy and jurisprudence, University College, Dublin. To be inspector in agriculture, Mr. J. S. Gordon, Department of Agriculture, Edinburgh University, principal of the Cheshire County Council Agricultural and Horticultural School.

IN commemoration of the fiftieth anniversary of the foundation of the North London Collegiate School for Girls, and in honour of the late Miss Francis Mary Buss, a jubilee number of the school magazine was published on April 4. Mrs. Sophie Bryant, D.Sc., describes the foundation and growth of the school, and shows that it has been a very important factor in the development of secondary education for women. During the past twenty years 59 old students have passed Part I. of the Tripos examinations of the University of Cambridge, and 7 have passed Part II., while 10 have qualified for the ordinary degree. It is noteworthy that 33 of the 59 who passed Part I. took mathematics and natural science as their subjects, and 5 of those who went on to Part II. At Oxford University 9 old students have

passed the Honours Moderations (8 taking mathematics), and 8 have passed Final Honours. The College has 116 old students who are graduates of London University, 22 being Bachelors of Science, 4 Bachelors of Medicine, 2 Doctors of Science, and 1 Doctor of Medicine. Since the opening of the degrees of London University to women, 1220 women have graduated, and the North London Collegiate School claims 10 per cent. of this number as old students.

#### SCIENTIFIC SERIALS.

*Bulletin of the American Mathematical Society*, March.—Prof. Pierpont, in an article on mathematical instruction in France, gives an account of the way in which France is educating students who wish to become mathematicians, and indicates rapidly what positions a talented young man may hope to reach, how he attains them, and what his duties are in the various stages of his progress. He subsequently calls attention to the advantages which Americans can enjoy in studying mathematics in France, particularly in Paris. The article should be useful.—Prof. Ernest W. Brown reviews M. Poincaré's "Cinématique et Mécanismes, Potentiel et Mécanique des Fluides," the *Annuaire* of the Bureau des Longitudes for 1900, and the "Elements of Precise Surveying and Geodesy," by Mansfield Merriman.—Prof. F. Morley gives a sketch of E. Duporcq's "Premiers principes de Géométrie Moderne," a work to give students, who have some acquaintance with analytic geometry, a liking for the purely geometric point of view.—Prof. F. Cajori briefly notices "Opinions et curiosités touchant la Mathématique d'après les ouvrages Français des xvi<sup>e</sup>, xvii<sup>e</sup>, et xviii<sup>e</sup> siècles," by G. Maupin (a work, apparently, which merits a place in a modern "Budget of Paradoxes"), and "La Mathématique: Philosophie, Enseignement," by C. A. Laisant.—The number closes with the usual items of "Notes" and "Publications."

THE March issue of the *Bulletin de la Société Astronomique de France* contains an interesting article on solar and lunar halos, with particulars and illustrations furnished by several contributors. Reproductions are given of two excellent photographs obtained by M. Basile de Balasny, at Poltava in Russia, one showing distinctly the halo, the other a definite column of light appearing as a prolongation of the sun above the horizon, the time being just after sunset. The same journal contains four photographs of the eclipse of the moon, December 16, 1899, by M. l'Abbé Moreux; M. Flammarion also continues his illustrated series of naked eye drawings of the moon.

#### SOCIETIES AND ACADEMIES.

##### LONDON.

Royal Society, March 29.—"Certain Laws of Variation." By H. M. Vernon, M.A., M.D., Fellow of Magdalen College, Oxford. Communicated by Prof. Lankester, F.R.S.

In a former paper (*Phil. Trans.*, B, 1895, p. 577) it was shown that the ova of the Echinoid *Strongylocentrotus lividus* were extraordinarily sensitive to their environmental conditions at the time of impregnation. For instance, by keeping the mixed ova and sperm in water at about 26° or 8° C. for an hour, the plutei obtained after eight days' development were some 5 per cent. smaller than those from ova kept at about 20° at the time of impregnation.

By splitting up into groups the 20,600 measurements which have been made from time to time on *Strongylocentrotus* larvæ, according to the amount of effect which had been produced in their size by varying degrees of favourable and unfavourable environment, and by determining the average variability of the larvæ in each group, it was sought to prove the existence of a law of variability. This may be worded as follows:—"An organism varies least when it is best adapted to its surroundings, so that the less it is adapted the more variable does it become."

Entomological Society, March 21.—Mr. C. O. Waterhouse, Vice-President, in the chair.—Mr. R. McLachlan exhibited an extraordinary aberration of *Enallagma cyathigerum*, Charp. The remarkable feature consisted in the predominance of black over blue in the coloration of the abdomen.—Mr.