being fifty-six days. It was noticed that many days often elapsed between the hatching of the eggs of the same lot—even those kept under similar circumstances. The differences in the actual stage of development of the eggs when first laid may possibly explain the apparent differences in the dates of hatching.

On July 11, 1890, a snake I had in confinement laid eighteen eggs. Some of these were placed at a temperature of 16°–20° C. (61°–68° F.): at the end of October, not being hatched, they were opened, and found to contain fully-formed young ones, but these were all dead. Other eggs from the same lot, which was laid on July 11, were sent into the country and placed in a manure-heap; on September 9, an egg being opened, the embryo snake was nearly formed, but there were no movements visible; on September 24 these eggs began to hatch—that is, after an incubation of seventy-five days.

From the first set of experiments it did not appear that the actual temperature influences to any great degree the period of incubation, or at least not after the first few weeks. (In the cases described it would appear that the eggs had been deposited some seven weeks before they were removed, and then kept artificially from three weeks to a month before they hatched.) Also, that exposure to the atmosphere does not destroy their vitality, provided they are kept fairly moist, some having hatched after several days' full exposure to the air of the room; and that they may be exposed to rather low temperatures, at least for a few hours, and yet finally hatch. As might be expected, some eggs which were placed in small glass pots and hermetically sealed did not hatch.

The process of hatching was very interesting to watch. At first a slit appeared in the uppermost part of the egg, whether the egg was placed on the side or on one end; most usually the slit rapidly became a **V**-shaped one, which in shape and position corresponded to the snout of the young reptile—that is to say, the apex of the **V** corresponding to the tip of the lower jaw. The snakes would often remain for some hours in this position, with just their snouts out, and, when disturbed, would withdraw these into the shells again. In a state of nature I have seen them when completely out of the shell, retreat into it again when disturbed. When first out of the shell, the young snakes were very smooth and velvety to the touch; there was usually some opacity about the cornea, which disappeared after a few hours; the yellow ring on the neck was well marked from the very first. They were about 15 cm. (6 inches) in length, and weighed about 3 grammes (45 grains); the eggs themselves weighed about 6 grammes (80 to 90 grains). One cast its skin within a few days after birth, and died. Occasionally they were hatched with the yolk-sac adherent, and in these instances always died. From the first the snakes were very lively, and within a very few days produced the characteristic hissing noise when provoked.

Many problems in connection with the subject of the incubation of eggs might be mentioned. It would be interesting to ascertain definitely what are the maximum and minimum temperatures at which the vital processes can take place in an incubating egg. There is probably an optimal temperature, or one at which the process proceeds most rapidly or most favourably. So also it might be asked, Is the optimal temperature the same for all kinds of eggs—those, for instance, of various forms of birds and those of snakes and lizards? Is the increase of temperature, both of the incubating bird and of the incubating python, essential to the hatching of the eggs? What is the reason of the differences in the incubation periods between different birds? Why, for instance, do pigeons' eggs hatch in fourteen days, hens' three weeks, turkeys' a month, and swans' six weeks?

We know that if a hen's egg be maintained for some twenty-one days at a temperature of about 40° C. it will hatch; but I am not aware of any experiments to ascertain if they will hatch at a temperature considerably under or much over this, and what is the minimum temperature at which they will hatch at all? In the case of many of the micro-organisms, bacteriologists have found the actual limits of temperature within which the various species grow, and also that most of them have an optimal temperature—that is, one at which these lowest forms of vegetable life grow most luxuriantly.

Literature.—Valenciennes, *Comptes rendus de l'Académie des Sciences*, 1841; Sclater, Proceedings of the Zoological Society, London, 1862; Abbott, Proceedings of the Zoological Society, London, 1862; Lataste Fernand, Paris, 1877; Forbes, Proceedings of the Zoological Society, London, 1880; Fisher, *Der Zoolog. Garten*, Bd. 26, 1886.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

Oxford.—Among the lectures which are being delivered this term, we notice the following:—Electricity, Prof. Clifton; Physical Optics, Mr. Walker; Ureas and Uric Acid, Prof. Odling; Surfaces of the Second Order, Prof. Sylvester; Disturbed Elliptic Motion, Prof. Pritchard.

In the Morphological Department Prof. Ray Lankester is giving a general course on Animal Morphology, and Mr. Minchin, who has been appointed Junior Demonstrator, is lecturing on the Porifera.

The arrangements for the instruction of medical students in physiology have been considerably improved.

The Burdett-Coutts Geological Scholarship has been awarded to Mr. F. W. Howard, of Balliol.

In the Report of the Visitors of the University Observatory it is stated that Prof. Pritchard will shortly publish an enlargement of his lectures on Disturbed Elliptic Motion.

The following examiners have been appointed for next year:—Physics, Mr. Baynes and Mr. H. G. Madan; Chemistry, Prof. Tilden; Animal Morphology, Mr. Poulton and Mr. Bourne; Physiology, Mr. F. Gotch.

The statute respecting the admission of women to examinations in medicine, which has formed the subject of a good deal of controversy, has been rejected in Congregation by 79 votes to 75.

SCIENTIFIC SERIALS.

The *Quarterly Journal of Microscopical Science* for August contains:—On the origin of vertebrates from Arachnids, by W. Patten (plates xxiii. and xxiv.). As a full description of the author's observations could not be published without considerable delay in this article of sixty pages, he gives a short account of the facts bearing directly on the subject, and at the same time presents his theoretical conclusions. Recognizing the "Annelid theory" as sterile, the author thinks that since vertebrate morphology reflects, as an ancestral image only, the dim outlines of a segmented animal, but still not less a vertebrate than any now living, it is clear that the problem must be solved, if at all, by the discovery of some form in which the specialization of the vertebrate *head* is already foreshadowed. While, since of all invertebrates, concentration and specialization of head segments is greatest in the Arachnids, it is in these, on *a priori* grounds, that we should expect to find traces of the characteristic features of the vertebrate head. Finding, from time to time, confirmation of this preconceived idea, as the unexpected complexity of the Arachnid cephalothorax revealed itself, he feels justified in formulating a theory that *Vertebrates are derived from the Arachnids*.—On the origin of vertebrates from a Crustacean-like ancestor, by W. H. Gaskell, F.R.S. (plates xxv. to xxviii.). This paper is but chapter one of a very important memoir, which approaches the subject of the ancestry of the vertebrates from a different standpoint from that of Dr. Patten. In previous papers the author had pointed out that the vertebrate nervous system is composed of nervous material grouped around a central tube which was originally the alimentary canal of the invertebrate from which the vertebrate arose, and that the physiology and anatomy of this system both best fit in with the assumption that the invertebrate ancestor was of the Crustacean, or at least of a proto-Crustacean type. In both these papers the author promised to point out the confirmation of this theory, which is afforded by the study of the lowest vertebrate nervous system, viz. that of the Ammocœtes form of Petromyzon. This promise he redeems in this paper, in which, to bring out as prominently as possible the theory, he discusses the nervous system of the Ammocœtes in terms of the Crustacean. Taking separately the prominent features of the alimentary canal and central nervous system of a Crustacean-like animal, he indicates how each one exists in the nervous system of the Ammocœtes. In a second chapter it will be pointed out how the present alimentary canal arose by the prolongation of a respiratory chamber.—On the development of the atrial chamber of Amphioxus, by E. Ray Lankester, F.R.S., and Arthur Willey (plates xxix. to xxxii.). The period of development was that before Hatschek's well-known work stops short. Series of sections were prepared in order to ascertain the mode in which the atrial chamber takes its origin, and the subsequent history of the gill-slits, viz. as to how the slits on the left side of