

Mr. Solomon often succeeded in taking as many as 500 per minute. In this process some hundred shells are exposed at a time to the rays. The oysters, spread on trays, are carried under the specially constructed cylinders by means of an electric motor. These great cylinders are cooled by means of suitable water jackets, and can thus be kept working continuously.

The oysters in which there is no sign of pearl formation are put back to their beds. Those in which good-sized pearls are detected are removed and opened, and the pearls promptly utilised. Those showing no pearls of adequate commercial value, but containing promising seed or immature pearls, are carefully placed in hospital. This hospital has rather a novel object; not the cure of the pearl disease (for the much prized gem is but a pathological growth), but, on the contrary, everything is done to keep the mollusc in *stutu quo ante* so that the disease may progress as rapidly as possible to the production of valuable pearls and to the death of the incurable patient.

The question seems to arise, can the normal, or perhaps we should say the abnormal, conditions of the pearl-producing bivalve be well enough imitated in captivity to ensure the continued growth of the pearls? May not the "change of water" (as they must be kept nearer the surface) secure for the sufferers immunity from their diseased process? One might have imagined that a greater amount of sunlight, more oxygen, altered temperature, different nutrition, lessened pressure, and other changed conditions we think not of, would so influence the life of the mollusc that it might depart from its pathological but useful habit of producing these valued round bits of shell material, and the hospital might thus prove a true *Kur-Anstalt* instead of a pearl-breeding depôt. But Mr. Solomon tested these points, and he has satisfied himself that, if he can be certain to transmit in all circumstances the oysters to and from his laboratory without injury to their well-being, all other difficulties have already been overcome. As to the lucrative commercial value of the undertaking, time alone can tell; sufficient has not yet elapsed to make it demonstrable by actual proof that pearls can thus be hatched *en gros*.

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Two Graces will be offered to the Senate at the Congregation on Thursday, February 13; the first gratefully accepts the generous offer of the Drapers' Company to contribute a sum of 200*l.* a year until 1919 towards the stipend of a second professorship in the department of agriculture, and the second establishes in the University a professorship of agricultural botany.

The council of the Senate has reported that it is of opinion that the University should hold a Darwin celebration in the course of the year 1909. The council points out that Charles Darwin was born on February 12, 1809, and that the "Origin of Species" was published on November 24, 1859. The hundredth anniversary of the former event, and the fiftieth anniversary of the latter, will therefore fall in the course of the year 1909. It is suggested that representatives of universities and other learned bodies, together with distinguished individuals, should receive invitations to visit the University on the occasion. Should this report be confirmed by the Senate, the council will appoint a committee to consider the details of the proposed celebration. The week beginning June 20, 1909, appears to the council to be the most suitable time for the celebration.

LONDON.—The degree of D.Sc. has been conferred on Mr. H. B. Fantham for a thesis entitled "*Spirochaeta (Trypanosoma) balbianii* (Certes) and *Spirochaeta anodontae* (Keysselitz); their Movements, Structure, and Affinities," and other researches in zoology.

Dr. Otto Stapf has commenced a university course of ten lectures on "Grasses: their Structure, Biology, Distribution, and Classification," and Dr. Beddard, F.R.S., a course of four lectures on "The Circulatory System of Reptiles." Both courses are being delivered at University College on Mondays, the botany lectures at 4 p.m. and the zoology lectures at 5 p.m., admission to these lectures being free.

A university course of four advanced lectures in zoology on "Tooth Development and Morphology" will be given by Prof. H. W. Marett Tims, at Bedford College for Women, at 5 p.m. on Tuesdays, commencing March 3. Admission will be free.

Arrangements have been made for university courses in geology by Prof. Garwood, on "The Geology and Physiography of Arctic Europe" (in March); by Prof. Seeley, F.R.S., on "The Thames and its Tributaries" (in May); by Dr. Evans, on "Recent Advances in the Determination of Minerals by Optical Methods" (in June); and by Miss Raisin, on "The Geological Structure of the Area of the Vosges" (in October).

In future, a candidate for the D.Sc. degree may be required by the examiners, as an additional test, to submit within a given period a reasoned report on a subject prescribed by them. Candidates for the B.Sc. honours degree in mathematics as internal students are to be allowed, under certain conditions, to submit research work, and such work will be taken into account in estimating their qualifications.

THE Lord Alverstone, G.C.M.G., Lord Chief Justice of England, will present prizes and certificates to students of evening classes and the day college of the South-Western Polytechnic, Chelsea, on March 13.

THE Board of Education has issued a return (325) showing the application by local authorities of funds for higher education in England and Wales during the official year 1905-6. It appears that the total expenditure on account of education other than elementary during the year was 3,355,434*l.* Of this amount, 706,149*l.* was spent on secondary schools and 234,182*l.* on pupil-teacher centres. On behalf of evening schools and institutions for higher and technical education, 1,200,789*l.* was expended, and in day schools of similar scope 258,517*l.* Exhibitions and bursaries at secondary schools, pupil-teacher centres, evening and day technical institutions, accounted for 376,762*l.* The training of teachers cost 71,910*l.*, the salaries of officers other than teachers 120,531*l.*, and 150,660*l.* was paid on account of loans. The part of the total amount which was expended in Wales reached 214,185*l.*, more than half of which was devoted to secondary schools.

#### SOCIETIES AND ACADEMIES.

##### LONDON.

Royal Society, November 21, 1907.—"Note on the Sensibility of the Ear to the Direction of Explosive Sounds." By A. Mallock, F.R.S.

Soon after the introduction of modern rifles, which give their projectiles a velocity much higher than that of sound, the author noticed that when standing in a position in front of the gun, and not far from the line of fire, the sound seemed to come, not from the firing point, but from some point considerably in advance of the gun. The natural explanation seemed to be that the sound thus heard was not that of the explosion itself, but was caused by the wave-surface, which is generated in the air by the projectile moving at a velocity higher than that of sound. In 1898 the author made observations at the ranges at Broudown to see if the apparent directions agreed with this supposition; and in the present year he has again made similar experiments in much more favourable circumstances. It is clear (if the source of the sound is due to the wave caused by the projectile) that the apparent direction of the sound will be the normal to the wave-surface, and that if the direction of this normal is known, the velocity of the projectile, at the time that that particular portion of the wave-surface was generated which ultimately reaches the observer, can be calculated.

These observations are now recorded, not as giving a practical method of ascertaining the velocity of projectiles, but as showing that the ear can distinguish with considerable accuracy the direction of a sound which consists, not of a train of waves, but, at most, of two waves only. The figure gives the plan of the range and the stations at which the observations were made.

The arrows through these points show the direction of the sound as judged by ear. Each arrow is the mean