of these phenomena during the several hours of the day for the twenty years ending 1884:—

| Hours. | Thunder-storms. | Sheet lightning. | Auroras. | Hours. | Thunder-storms. | Sheet lightning. | Auroras. |
|---|---|---|---|---|---|---|---|
| | Summer—June, July, August. | | Year. | | Summer—June, July, August. | | Year. |
| Midt. to 1 a.m. | 9 | 14 | 10 | Noon to 1 p.m. | 26 | 0 | 0 |
| 1 to 2 a.m. | 5 | 4 | 2 | 1 to 2 p.m. | 24 | 0 | 0 |
| 2 to 3 a.m. | 5 | 1 | 2 | 2 to 3 p.m. | 21 | 2 | 0 |
| 3 to 4 a.m. | 6 | 1 | 1 | 3 to 4 p.m. | 29 | 2 | 0 |
| 4 to 5 a.m. | 4 | 0 | 0 | 4 to 5 p.m. | 17 | 2 | 0 |
| 5 to 6 a.m. | 6 | 0 | 1 | 5 to 6 p.m. | 22 | 4 | 5 |
| 6 to 7 a.m. | 4 | 0 | 1 | 6 to 7 p.m. | 22 | 3 | 10 |
| 7 to 8 a.m. | 7 | 1 | 0 | 7 to 8 p.m. | 5 | 12 | 26 |
| 8 to 9 a.m. | 5 | 0 | 0 | 8 to 9 p.m. | 3 | 22 | 31 |
| 9 to 10 a.m. | 8 | 0 | 0 | 9 to 10 p.m. | 5 | 41 | 27 |
| 10 to 11 a.m. | 7 | 1 | 0 | 10 to 11 p.m. | 5 | 40 | 25 |
| 11 to noon. | 21 | 1 | 0 | 11 to midnight | 5 | 26 | 16 |

Thus the daily maximum for thunderstorms is from about noon to 7 p.m., being the period of the day covered by the afternoon minimum of atmospheric pressure in summer; but the maximum for sheet lightning is from 8 p.m. to midnight, being the period embraced by the afternoon maximum of pressure. The absolute daily maximum for sheet lightning, it will be observed, does not occur till from 9 to 11 p.m., or till some time after dusk, and cannot therefore be accounted for by increased visibility as darkness sets in. The opinion is widespread that sheet lightning is merely the reflection of a distant flash of lightning. The Oxford observations show, however, that only a small percentage of all the cases admit of being explained in this way. In connexion with the well-defined maximum from 9 to 11 p.m. it may be remarked that there is no region of the globe nearer Oxford than America where thunderstorms with the accompanying true lightning have the daily maximum at the same physical time, 9 to 11 p.m. G.M.T., when sheet lightning has its daily maximum at Oxford.

The curve for auroras has its diurnal maximum substantially at the same time as sheet lightning, or during the time of the evening maximum of pressure. The agreement of these two maxima with this portion of the daily curve of pressure is all the closer when it is considered that the evening maximum of pressure is from one to two hours later in summer when the sheet lightning was observed than in the autumn and spring months when the great majority of auroras occur. These results are of the greatest importance with respect to recent theories regarding thunderstorms, and to suggested connexions between the aurora in arctic and sub-arctic regions and the lightnings of low latitudes. The time of occurrence of the maxima of aurora and sheet lightning from 9 to 11 p.m. indicates, perhaps, a more direct connexion between these phenomena and the evening maximum of pressure than has been suspected. This maximum is mainly due to an overflow of upper aërial currents back to eastward from the longitudes to westward, where at the time the afternoon pressure is at the minimum ("Encyc. Britt.," *Meteorology*, p. 122); and hence at these hours there is more aqueous vapour spread through the higher regions of the atmosphere in its gaseous and fluid states, and also in the solid state of minute spicules of ice, even though no cloud in the finest pencilled forms of the cirrus be visible.

## *UNIVERSITY AND EDUCATIONAL INTELLIGENCE.*

CAMBRIDGE.—Drs. Routh and Glaisher, Prof. J. J. Thomson, and Mr. A. R. Forsyth have been appointed Examiners in Part II. of the Mathematical Tripos of 1888.

The following appointments of Natural Science Examiners have been made:—Physics: Profs. J. J. Thomson and W. G. Adams. Chemistry: Prof. H. E. Armstrong and Mr. H. J. H. Fenton. Mineralogy: Messrs. T. W. Danby and H. A. Myers (British Museum). Botany: Prof. I. B. Balfour and Dr. S. H. Vines. Physiology: Dr. W. H. Gaskell and Prof. G. F. Yeo. Zoology: Messrs. H. Gadow and W. F. R. Weldon. Geology: Prof. C. Lapworth and Mr. A. Harker. Human Anatomy: Prof. J. Cleland and Dr. A. Hill. Pharmaceutical Chemistry: Mr. Pattison Muir.

At a meeting of the Senate in the Arts School recently, general approval was expressed of the scheme for providing a new room for botanical microscopy. The scheme for new anatomical and physiological rooms was not so entirely approved, some persons wishing to retain the ugly old Anatomical Museum and buildings, and also considering that the requirements of the Medical School had not been sufficiently considered.

Mr. W. Bateson, M.A., Fellow of St. John's College, has been elected to the Balfour Studentship.

Group E (Natural Science), in the Higher Local Examination, attracts a diminishing number of candidates, we are sorry to see. Only 36 presented themselves this year as against 73 in 1879; but 10 candidates gained a first class this year, as against 4 in 1879: 35 failed then, only 5 this year. Elementary Biology is reported on fairly this year; but Elementary Chemistry does not seem to have been studied practically, and problems were not satisfactorily dealt with. Only four candidates passed in Physics. The Physiology, Zoology, and Geology papers were well answered; but in Botany the general standard was decidedly low.

## *SOCIETIES AND ACADEMIES.*

### LONDON.

**Entomological Society**, November 2.—Dr. D. Sharp, President, in the chair.—Mr. Stevens exhibited a specimen of *Acidalia immorata*, L., purchased by him some years ago at the sale of the collection of the late Mr. Desvignes. He remarked that specimens of the insect lately captured near Lewes had been described last month by Mr. J. H. A. Jenner as a species new to Britain.—Mr. Adkin exhibited, and made remarks on, a series of male and female specimens of *Arctia mendica* from co. Cork; also, for comparison, two specimens of *A. mendica* from Antrim, and a series of bred specimens from the London district.—Mr. Enoch exhibited a specimen of *Calocoris bipunctatus* containing an internal parasitic larva.—Dr. Sharp exhibited three species of Coleoptera new to the British list, viz. *Octhebius auriculatus*, Rey, found some years ago in the Isle of Sheppey, but described only quite recently by M. Rey from specimens found at Calais and Dieppe; *Limnius rivularis*, Rosenh., found by Dr. J. A. Power at Woking; and *Tropiphorus obtusus*, taken by himself on the banks of the Water of Cairn, Dumfriesshire.—Dr. Sharp also exhibited a *Goliathus* recently described by Dr. O. Nickerl as a new species under the name of *Goliathus atlas*, and remarked that the species existed in several collections, and had been supposed to be possibly a hybrid between *G. regius* and *G. cacicus*.—Mr. Eland Shaw exhibited two species of Orthoptera, which had been unusually abundant this year, viz. *Nemobius sylvestris*, and *Tettix subulatus*.—Mr. E. B. Poulton exhibited the cocoons of three species of Lepidoptera, in which the colour of the silk had been controlled by the use of appropriate colours in the larval environment at the time of spinning up. He said this colour-susceptibility had been previously proved by him in 1886 in the case of *Saturnia carpini*, and the experiments on the subject had been described in the Proc. Royal Society, 1887. It appeared from these experiments that the cocoons were dark brown when the larvæ had been placed in a black bag; white when they had been freely exposed to light with white surfaces in the immediate neighbourhood. Mr. Poulton stated that other species subjected to experiment during the past season afforded confirmatory results. Thus the larvæ of *Eriogaster lanestris* had been exposed to white surroundings by the Rev. W. J. H. Newman, and cream-coloured cocoons were produced in all cases; whilst two or three hundred larvæ from the same company spun the ordinary dark brown cocoons among the leaves of the food-plant. In the latter case the green surroundings appeared to act as a stimulus to the production of a colour which corresponded with that which the leaves would subsequently assume. Mr. Stainton suggested that larvæ should be placed in green boxes, with the view of ascertaining whether the cocoons would be green. It had been suggested that the cocoons formed amongst leaves became brown because the larvæ knew what colour the leaves would ultimately become. The discussion was continued by Mr. Waterhouse, Dr. Sharp, Mr. McLachlan, and others.—Mr. S. Klein read "Notes on *Ephestia kuhniella*," and exhibited a number of living larvæ of the species, which he said