

appeared at 5.25 a.m., being brighter than the moon. Unfortunately the sky was overcast at the great majority of places at the time when the maximum occurred, and very few reports have come to hand, but they furnish unquestionable evidence as to a plentiful fall of meteors in the few hours preceding sunrise on the 15th.

Before midnight on the 13th, and during the early morning hours of the 14th, meteors were comparatively rare, and may be said to have been more conspicuous by their absence than by their presence. The shower of Leonids was of an extremely meagre character, and such as might occur in an ordinary year with the parent comet near its aphelion. But, apart from the disappointing meteors, the night of the 13th was one of singular beauty. At Bristol the sky partly cleared at 11.30 p.m., and the atmosphere became remarkably transparent. The moon and stars shone very brightly, and films of white cloud, floating rapidly across the sky, gave it a very picturesque appearance.

From the observations reported it may be well to make a few extracts:—

*Mr. S. H. R. Salmon, South Croydon.*—Sky perfectly clear November 13, 14h. to 16h. About seven meteors seen, including four bright ones as under:

h.	m.	s.	
15	3	45	First mag. from Andromeda.
15	28	0	First mag. Leonid.
15	32	45	First mag. Not a Leonid.
15	53	0	= Sirius. Probably a Leonid. It fell in a curved path slightly south of Jupiter, and was a beautiful object.

*Rev. S. J. Johnson, Bridport.*—Tolerably clear on November 13, between 15h. and 15h. 30m., but not a single meteor was observed.

*Miss Brown, Cirencester.*—The sky was perfectly clear on November 13, 11h. 45m. to 13h. 15m., and the eastern sky was watched from a window facing that quarter, but no meteors were seen.

*Mr. W. H. Milligan, Belfast.*—Cloudy weather prevented observation except on one night, November 13, 11h. to 12h. 30m., when only one sporadic meteor was recorded; no Leonids.

*D. W. Walton, Kingston-on-Thames.*—Sky clear and moon bright on November 13, 10h. 30m. to 11h. 30m., but only one meteor appeared. Partly overcast afterwards, but a few faint meteors were noticed in breaks between the clouds.

*Bristol.*—The writer watched the sky on November 13, between about 11h. 30m. and 13h., but no Leonids were recorded. The sky clouded after 14h., and the following night was overcast throughout. Mr. Corder, at Bridgwater, reports that the nights following November 13 and 14 were too cloudy to permit of observation.

*W. Trueman Tucker, Loughborough.*—On November 14 the clouds cleared away between 16h. and 16h. 30m., but the moon was very bright, and must have extinguished many of the smaller meteors. Between 16h. 30m. and 18h. a considerable number of shooting stars were observed, but no exact count was kept. The lines and approximate paths of ten of the more conspicuous ones were noted, and the brightest of all appeared in Cepheus at 17h. 25m. It was sufficiently luminous to cast distinct shadows in spite of the moonlight. Very brilliant meteors also fell at 17h. 10m., 17h. 15m., 17h. 35m. and 17h. 40m.

*The Dumfries and Galloway Standard* of November 17 reports that the nights of November 12 and 13 were overcast. On November 14, soon after midnight, the clouds began to roll off, and the sky afterwards became very clear. An amateur observer began watching at 12h. 30m., and from that time until 16h. 15m. he noted in all only thirty-three meteors, not more than thirteen or fourteen being Leonids. He then, thinking the outlook not sufficiently promising for any striking develop-

ment of the shower, folded up his note book and star charts and retired. Shortly afterwards, however, the Leonids increased rapidly both in numbers and brilliancy. At about 16h. 50m. "a couple of young bakers going along the Whitesands to their work, were startled by many meteors throwing their fiery lances athwart the sky. They estimate the numbers as not fewer than ten shooting stars to the minute, and state they never saw so many before in all their lives."

The latter description is probably exaggerated, but it seems to convey an expression of fact such as we should expect from persons not acquainted with, but surprised by, an unusual celestial event. Though the rough estimate given as to the number of meteors visible may far exceed the actual figures, there is no doubt from the corroborative testimony afforded by Mr. Tucker at Loughborough, quoted in a previous paragraph, that the Leonid shower displayed quite a special activity on the morning of November 15. That it was apparently observed by few persons is unfortunate, but no other result could be expected in view of the cloud-laden atmosphere which prevailed, generally, at the time. It is to be hoped that more favourable conditions obtained at foreign stations, and that successful observations were secured. The shower seems to have presented itself somewhat later than the time expected, both in 1896 and 1897.

W. F. DENNING.

#### M. FORSTER HEDDLE, M.D.

EARLY on the morning of November 19 there passed away at St. Andrews the foremost mineralogist of Scotland, and one of the most distinguished in the United Kingdom.

Matthew Forster Heddle was the younger son of Robert Heddle, Esq., of Melsetter, in Orkney, and was born in 1828. In 1844 he went to the University of Edinburgh, where he studied medicine and attended the classes of Gregory and Jameson. Even at this time his tastes lay in the direction of science; and on the completion of his medical studies he proceeded to Germany, where he devoted himself to chemistry and mineralogy, at first in Clausthal and afterwards under the illustrious Breithaupt at Freiburg. Returning to Edinburgh, he took his degree as Doctor of Medicine in 1851, his graduation thesis being a treatise "On the Ores of the Metals."

He practised for a short time in Edinburgh, but never found this occupation a congenial one, devoting by degrees all his time to analysis and other scientific work. In 1856 he organised an expedition to the Faroe Islands. Five months of the summer of that year were spent in a mineralogical survey of the group, resulting in large additions to his cabinet, and putting on a firm foundation his knowledge of the mode of occurrence of the zeolites of the tertiary volcanoes.

On Dr. Heddle's return from this expedition he was appointed assistant to Prof. Connell at the University of St. Andrews, and on Connell's death, in 1862, he succeeded him as Professor of Chemistry, occupying this chair for twenty-two years. He threw himself with characteristic energy into his work at the University, spending a very considerable part of his salary in the purchase and fitting up of the apparatus for his experiments.

He found time, however, during these years for much mineralogical work, in the course of which he again and again traversed the whole North of Scotland and the Western Islands, thus acquiring an unrivalled acquaintance with its rocks and minerals. The results of these explorations were embodied in a series of papers read principally before the Royal Society of Edinburgh, of which he was, in 1878, elected a Fellow, and the Mineralogical Society, of which he was one of the

founders, and whose President he afterwards became. In addition to these and other papers of a geological and mineralogical nature, he undertook, in 1858, the revision and practically the editorship of Greg and Lettsom's "Mineralogy of Great Britain and Ireland," to which he made many original contributions. He also wrote the article "Mineralogy" for the last edition of the "Encyclopædia Britannica." In 1878 he received the Keith medal of the Royal Society of Edinburgh. Until a few weeks before his death he was engaged on an exhaustive work upon the mineralogy of Scotland, bringing together the results of all his investigations and analyses. This he left almost complete, and it is to be hoped that it may shortly be published.

In the long course of his mineralogical activity Dr. Heddle gathered very large and valuable collections of minerals, both general and Scottish. The latter of these, the fruit of many journeyings, was three years ago acquired by the Museum of Science and Art, Edinburgh, and is now on exhibition there, arranged and labelled by Dr. Heddle himself.

Although a specialist in mineralogy, Dr. Heddle's sympathies were not by any means confined to this subject, and embraced not only cognate sciences, such as chemistry on the one side and geology on the other, but extended to many other branches of science. As a chemist he was most painstaking and exact, and has published several hundreds of analyses of Scottish minerals, collected and carefully picked by himself. He was always most particular to indicate the possible impurities as a geologist. He published detailed maps of Shetland and Sutherland, and contributed to the unravelling of the problem of the North-west Highlands. He was a very observant student of the influence of geological structure upon the scenery of a country. In some respects he was in advance of his time as a geologist, and has lived to see suggestions, which were ignored when made by him, worked out by others and generally accepted. Many of his papers, which were founded on a wide research, are extremely suggestive and instructive. Perhaps among the best known are those where he expounds his law of pseudomorphous replacement, and where he enunciates the connection between the colloidal and crystalline states of a substance and its specific heat.

Dr. Heddle had an acute and exact eye, a clear intellect, and a wonderful memory. He was a good draughtsman, and his crystal drawings were most admirable. He grudged no trouble in smoothing the path of the tyro in his favourite science, and was most generous in his recognition of any work done by others. His kindly and genial disposition endeared him to a wide circle of friends.

J. C.

#### NOTES.

M. MOUREAUX has just completed the installation of the new magnetic department of the Parc St. Maur Observatory; and it will be set in operation on December 1. The work at the old magnetic rooms will be continued until January 1, in order to supply M. Moureaux with a sufficient number of observations for a reduction of the valuable records obtained continuously during a number of years.

PROF. JAMES B. HATCHER, curator of the department of vertebrate palæontology of Princeton University, sailed from New York a few days ago for Rio Janeiro, *en route* for Southern Patagonia. He expects to land finally at Punta Arenas, and thence work northward along the eastern base of the Andes as far as the Argentine territory of Chubut, studying the palæontology and geology of the country. The expedition will be gone three years, and aims to bring home a

complete collection of birds and mammals from the Tertiary deposits of Patagonia.

IN the course of next month, the American Philosophical Society will award the Magellanic gold medal to the author of what is adjudged to be the best discovery, or most useful invention, relating to navigation, astronomy, or natural philosophy (mere natural history—the words are the Society's own—only excepted). The prize was founded in 1786 by John H. de Magellan, of London, and consists of a medal "of solid standard gold of the value of ten guineas."

SIR WILLIAM CROOKES will be the guest of the evening at the Club House Dinner of the Camera Club on December 7.

AT the meeting of the Entomological Society of London last week, the Chairman referred with regret to the death, while serving on the Indian Frontier Expedition, of Captain E. Y. Watson, Fellow of the Society, and well known for his writings on Oriental Rhopalocera.

THE Paris Academy of Medicine has been authorised to accept the legacy of forty thousand francs bequeathed to it by Dr. Eugène Dupierris. The legacy is to be used to found a biennial prize for the best work on anæsthesia, or on diseases of the urinary canals.

A NEW medical society has been formed in St. Petersburg; it will be known as the St. Petersburg Ophthalmological Society, and its first president is Prof. Dobrovolski.

THE *Athenæum* states that the first meeting of the present session of the German Chemical Society at Berlin was devoted to a *Gedächtnisfeier* in honour of the late Prof. Victor Meyer.

JUBILEE medals have been conferred upon Dr. Günther, President of the Linnean Society, Prof. Dewar, president of the Chemical Society; and Prof. R. Meldola, late president of the Entomological Society.

PROF. A. BAUER has been obliged, on account of ill-health, to decline the office of president of the third International Congress for Applied Chemistry, which is to be held next year at Vienna, and Dr. H. R. von Perger has been elected in his stead. There will be twelve sections in connection with the Congress. Among the subjects to be discussed is the introduction of uniform methods of analysis of chemical products.

THE Paris correspondent of the *Lancet* notes the return of M. Raoul from Malaita, where he has for some time been engaged for the Government in making researches as to the existence of indigenous plants that might be turned to account scientifically or commercially. Several members of M. Raoul's party were bitten by snakes of different kinds, and were injected with Dr. Calmette's serum with very great success.

DR. A. LUSTIG, writing in the *Atti dei Lincei*, describes some important observations made in India on vaccination as a preventive of bubonic plague, and also on sero-therapeutic methods of treatment. At the time when the plague was raging in Bombay last June, Dr. Lustig made a number of experiments both on human subjects and on monkeys. Thirty persons suffering from the disease were inoculated with serum, and of these only four died during the treatment. In conjunction with Dr. G. Galeotti, the same writer made experiments on rats with a view of ascertaining whether there existed any hereditary transmission of the immunity conferred by vaccination. It was found that in no case did vaccination of either or both parent animals at any stage prevent the progeny from taking the disease.

IN the Budget of the French Minister of the Interior, the grant of 106,000 francs for the therapeutic serum service of the