particles following in the comet's wake must have been something like 550 million miles long. This need not, however, occasion great surprise, for observations have proved that in the case of the great Leonid stream of November the débris or meteoric particles are distributed completely around the orbit, which extends in its outer limits to beyond the path of the remote planet Uranus.

Formerly we had no special meteor shower to distinguish the midsummer period, but it is quite possible that in future years June may acquire a similar notoriety for meteors as that which has been long held by August and November, and should the new shower fully justify expectation it will in a certain measure prove a recompense for the lack of grand displays of meteors which has characterised the past thirty-five years. There were great storms of meteors in November, 1866, 1872, and 1885, but the Leonids of Tempel's comet (1866) and the Andromedids of Biela's comet have failed to furnish a really brilliant display of first-class importance during more than the third of a century, and it seems difficult to predict the dates of great revivals, although the years 1933 and 1934 are likely to bring a considerable shower, if not a grand exhibition, of meteors at the middle of November.

Including the periodical comet of Pons-Winnecke, we now have six comets of which the orbits bear so striking and suggestive a similarity to those of rich meteoric streams that we may certainly conclude them to have the same derivative sources. There are also a number of other comets which furnish significant evidence that they are closely connected, if not identical, with active meteor showers. For example, the comet of Mechain-Tuttle seems to present conformity with a radiant point observed from $220^\circ+76^\circ$ from December 20 to 25. The comet Lexell (1770) agrees with a radiant point in June at about $280^\circ-24^\circ$. The comet of 1739 agrees with a radiant point at $153^\circ+40^\circ$ from October 14 to 22, and the comet Denning (1881) presents similar features of orbit to a meteor shower observed during the period July 25 to August 8 from a radiant at $303^\circ-10^\circ$.

There are many other instances in which cometary and meteoric accordances may be assumed with a fair degree of probability, yet when we consider the large number of orbits now definitely computed for comets and meteor streams we are bound to admit that chance coincidences must sometimes occur, and that it is difficult, except in special cases, to select the genuine instances of agreement.

Obituary.

PROF. L. C. MIALL, F.R.S.

THE death of Prof. Miall, announced in our columns last week, removes from the world a man who stood in natural history eminent in a position of his own, in education as one of the most sane and enlightened reformers of his time, and in personality one of the truly great among men.

Louis Compton Miall was born in 1842, the son of a Congregational minister in Bradford. After his early education at Silcoates he entered the teaching profession as an assistant master, but was soon tempted to accept the curatorship of the newly founded Literary and Philosophical Society of Bradford, where he developed a keen interest in geology and palæontology. A little later he was appointed to the curatorship of the Museum of the Leeds Philosophical and Literary Society, and in 1876, two years after the foundation of the Yorkshire College of Science, he was appointed as its first professor of biology, a position which he continued to hold in the University of Leeds until his retirement in 1907. With Sir Edward Thorpe, the late Sir Arthur Rücker, and Prof. A. H. Green he was one of the four scientific pioneers of university education in Yorkshire. He held the Fullerian professorship of physiology in the Royal Institution, 1904–5, was president of Section D (Zoology) of the British Association at the Toronto meeting in 1897, and president of the Education Section at Dublin in 1908. He was elected a fellow of the Royal Society in 1892, and made an honorary D.Sc. of Leeds in 1904.

On his retirement from Leeds in 1907 Prof. Miall took up his residence at Letchworth, within easy reach of Cambridge and of the British Museum, and he continued active in writing and teaching. In 1918, soon after the death of his gifted wife, to whom he was married in 1870, he returned to his native county, residing at Ben Rhydding. For some time he maintained an active interest in his books, and he left practically complete a work on "Garden-craft in the Past." Latterly his health failed somewhat, but almost until his death he retained wonderful vigour of mind and intellectual interest. In the middle of January he had a slight paralytic stroke, followed by a second, which left him in a weak state. From then his strength slowly ebbed, and he passed away peacefully, without suffering, in the house of his daughter, Mrs. Harold Wager, at Leeds.

To those who did not know him it is scarcely possible to give an adequate idea of the kind and strength of the influence which Prof. Miall exercised, or of the veneration in which he was held wherever his labours lay. In attempting to describe any section of his work there arises at once the memory of the man himself, his arresting personality, the scale and strength of his principles of heart and mind, his austere simplicity and perfect sincerity, his deliberate judgment, the comprehensiveness and sanity of his mental atti-

tude, his perfect lucidity of thought and speech, the richness and rarity of his store of learning in so many fields, and the scrupulousness of his taste, which abhorred and swept before it all that partook of the pretentious or the base.

Prof. Miall's intellectual interests were not confined to science. He had a real love of art and music, and was keenly interested in the works of Greek and Latin authors and in the classics of English, French, and German literature. His activities in biology, both as teacher and as investigator, coincided with the great output of biological work which followed upon the publication of Darwin's "Origin of Species." His earlier scientific memoirs were mainly geological and palæontological. Shortly after he was appointed curator of the Museum at Bradford he was instrumental in bringing to light a newly discovered Labyrinthodont which had been found in a coal mine at Low Moor. It was in connection with this discovery that he first made the acquaintance of Prof. Huxley and Sir Charles Lyell, and the incident seems to have been a turning point in his career. Between the years 1869 and 1881 he published numerous papers on geology and palæontology. He also wrote a manual for students on "The Skull of the Crocodile," and, in conjunction with F. Greenwood, an important memoir on "The Anatomy of the Indian Elephant."

From 1881 onwards Prof. Miall's biological investigations were mainly confined to the structure and development of insects, and his books on "The Cockroach," "The Harlequin Fly," and "The Natural History of Aquatic Insects" are among the most important memoirs on insect structure and development published during the latter half of the nineteenth century. These books, which are written with great lucidity and charm, have been an inspiration to many naturalists, and are enduring examples of how to "study the works of Nature with open eyes."

In his love of Nature Prof. Miall had very much the temperament of Gilbert White, and in collaboration with his friend Dr. W. Warde Fowler he brought out a scholarly edition of "The Natural History and Antiquities of Selborne," enriched with an abundance of notes explaining and amplifying Gilbert White's observations. The historical side of biology always had great attractions for him. He paid attention to it in his teaching, and two books from his pen, "A History of Biology" and a remarkably interesting account of "The Early Naturalists and their Work," testify to the wide range of his reading and the great knowledge which he possessed.

Prof. Miall's zeal as an educational reformer is well known. In his book on "Thirty Years of Teaching" his ideals and aspirations are clearly set forth, and in his "Object-Lessons from Nature," "Round the Year," and "House, Garden, and Field" he has given a most delightful insight into the methods which should be employed in the rational study of natural history as opposed to mere collecting and the compilation of lists of species. He was far from disparaging the study of systematic zoology or botany, but he did most strenuously deprecate aimless work "which springs from no real curiosity about Nature and attempts to answer no scientific questions." He loved Nature with all his heart, and ever served her faithfully.

A. S.; H. W.

By the death of Prof. Louis Compton Miall, emeritus professor of biology in the University of Leeds, there passes away the last but one of the small body of teachers—less than a dozen in number—who, as members of the professoriate of the Yorkshire College, may be said to have laid the foundations of the University and, in a measure, to have fashioned its aims and destiny. The Yorkshire College, the progenitor of the University, was established in Leeds in 1874. Miall, who at that time was secretary and curator of the Museum of the Philosophical and Literary Society of Leeds, had acquired more than a local reputation as a geologist and botanist, and was then embarking upon the biological inquiries upon which his position as a man of science mainly rests. He was known throughout the West Riding as an excellent teacher and an admirable lecturer who could always command the interest and sympathetic attention of his audience. It was inevitable that the college should seek to secure his co-operation as a member of its staff. He joined it first as lecturer, and afterwards as professor of biology in its second session, and his appointment marks a turning point in its history. In its earliest days its governing body had no clearly defined policy concerning its scope and functions. It had been established partly in response to a demand for greater facilities in technical education, and partly from a desire to see in Yorkshire an institution similar in character to that of Owens College in Manchester. One section would make it a technical or trade school pure and simple, whilst another section, of more liberal views and with more sympathy towards the *literae humaniores*, hoped it might develop upon broader lines. The accession of Miall determined the issue; biology had no immediate or obvious place in the curriculum of such a trade school as was then contemplated. Professors of art subjects were thereafter added as quickly as the finances of the struggling institution permitted, and the college was thus fairly placed upon lines that directly led first to its inclusion in the federated Victoria University, and eventually to its independent establishment as the University of Leeds.

The turn in the fortunes of the Yorkshire College was without doubt largely determined by the personality and character of Miall and by the respect in which he was held by all who knew him and had the interests of the institution at heart, whatever might be their conception of its functions. By no section of the body corporate was he more warmly welcomed than by the staff.