been his assistant in the British Museum for a short period (1862-4), and his suggestive book, published in 1866, was one of the first dealing with this subject; much that appeared in the books of both authors was doubtless the result of their discussions during this period.

Maskelyne's own "Treatise on the Morphology of Crystals" did not appear until 1895, the year in which he resigned his professorship in Oxford, but much of it had been written thirty years before, and, if it had been published at that time, the book would have been regarded as a highly original treatise. The proof sheets were familiar to many of his students, and introduced them to a very attractive treatment of what was then a new subject. Owing to the late appearance of this book, his methods were chiefly made known to the world in an indirect way through his pupils, and it is possible that he may not have received the credit that is due to him. For example, it is mentioned in Lewis's "Crystallography" that the mathematical establishment of the angles possible between planes of symmetry in a crystal was first given by Maskelyne in his lectures in 1869, but no publication of such a result was made until that by Prof. Gadolin in 1871.

Among those who worked with him at the British Museum, in addition to his old friend von Lang, were Thomas Davies (1862-80), who was responsible under him for the arrangement of the "Collections"; Dr. Walter Flight, F.R.S. (1867-80); W. J. Lewis (1875-7), now professor at Cambridge; and his successor, Lazarus Fletcher (1878-80), now director of the Natural History Museum. He always spoke with particular admiration of Grailich, of Vienna, who was an early and intimate acquaintance. One of his dearest friends was that remarkable man, Henry Smith, of Oxford, with whom he frequently discussed mathematical problems. It was the good fortune of the present writer, when an undergraduate, to receive instruction from Maskelyne in an informal way in Henry Smith's house; on these occasions the lecture was delivered from an armchair in the drawing-room, Smith himself playing the part of a second student, and illuminating the discourse by questions and comments of profound significance. An example of the stimulus which Maskelyne's active mind gave to those with whom he came in contact is the investigation by Smith of the conditions under which lines in a crystal can be perpendicular to each other.

It is not necessary here to give a detailed account of Maskelyne's scientific papers. They range over a wide field, and are characterised by a charm of literary style which is well known to all who received letters from him. His activities date from so early a period that it is difficult now to ascertain what personal part he played in some of the scientific discoveries of the middle of the nineteenth century, but he worked for a time in Faraday's laboratory at the Royal Institution, was one of the earliest to take a practical interest in the newly invented process of photography, and, indeed, throughout his long life interested himself in almost every branch of scientific inquiry.

Faraday stayed with him during the British Association meeting at Oxford in 1847, when, he writes:—"I showed Faraday for the first time the making and developing of a photo of the College Quad from the window. His joy was that of a boy."

Maskelyne's interests outside science were also very wide, and he was the owner of one of the best and most carefully selected private collections of antique engraved gems; his catalogue of the Marlborough gems, which was privately printed, is well known.

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He possessed a remarkable elasticity and alertness of mind, as of body, even in advanced years, and his enthusiasm for all that was new in science, literature, and art was maintained to the end. Only four years before his death he was occupied on a scientific handbook for the use of the dairy farmers of Wiltshire, and was well known throughout the county as a man whose intellectual activities were always available for a good cause. Everything that he did was evidence of his taste, and was marked by a conspicuous refinement and distinction of style and manner.

In a letter written only three years ago he said:—"I think there must be some cement in the smaller sciences like mineralogy and crystallography that links their students by a bond unlike the relations that exist between the advocates of the larger sciences; jealousies and rivalries seem to hold aloof, and certainly from the days of Grailich and Lang to those of my old age some of my dearest and most honoured friends have come to me through the sciences that you and I have professed at Oxford since 1856."

It was in reality his own warm, impulsive, quick-tempered, and sympathetic nature which united him by the closest ties of affection to so many of his pupils and scientific friends. The charm of his manner and the astonishing versatility of his mind were the qualities that most impressed those who met him in the later years of his life.

He received the honorary degree of Doctor of Science at Oxford in 1903, and the Wollaston Gold Medal from the Geological Society in 1893. He was an honorary fellow of Wadham College, and a corresponding member of several foreign societies. In 1858 he married a daughter of Mr. J. D. Llewelyn, F.R.S.; she survives him, together with three daughters, one of whom married the late Mr. H. O. Arnold-Forster, and another Sir Arthur Rücker. H. A. M.

MRS. W. P. FLEMING.

BY the death of Mrs. Williamina Paton Fleming, astronomy has suffered an almost irreparable loss. Concerning the general spectral classification of stars Mrs. Fleming had accumulated a store of knowledge which was second to none.

Born at Dundee, Scotland, in 1857, she became an assistant at the Harvard College Observatory, Cambridge, Mass., in 1879, and in 1898 was officially appointed as the curator of astronomical photographs, a department wherein Harvard holds a unique position. Here Mrs. Fleming was charged with the supervision of a number of ladies whose duty it is to examine minutely, and to classify, the ever-growing library of plates taken at the Cambridge and Arequipa stations. Her special personal labours were chiefly devoted to the study of the enormous number of stellar-spectra plates which form the Draper Memorial. This collection was commenced in 1886 as a memorial to the late Dr. Henry Draper, and consists of an immense number of photographs of stellar spectra taken with the 8-inch and 11-inch Draper telescopes. Each plate covers a comparatively large area, and contains the spectra of a large number of stars, and when we learn, from Prof. Pickering's latest report, that there are now 18,182 plates taken with the 11-inch, and 36,852 taken with the 8-inch telescope, it is easy to understand that Mrs. Fleming's task was no light one.

The chief result of these studies was, perhaps, the production, in 1890, of the "Draper Catalogue of Stellar Spectra," in which Mrs. Fleming classified the spectra of 10,351 stars down to about the eighth magnitude. This Durchmusterung, with its revision,

will probably long remain unexcelled as a comprehensive, comparative study of the broad features of stellar spectra. Its magnitude prevents it, of course, from dealing with the individual spectra in detail, but it stands not only a memorial to Dr. Draper, out also to the patient and specialised studies of Mrs. Fleming.

The minute examination of such a wonderful collection of photographs afforded great opportunities for discovery, and right well did Mrs. Fleming and her staff avail themselves of them. Of the eighteen novæ discovered since 1885, fourteen first stood revealed on the Harvard photographs, by reason of their characteristic spectra; of these, ten were found by Mrs. Fleming.

The first nova thus found was Nova Normæ, on a plate taken at Arequipa on July 10, 1893, and examined by Mrs. Fleming on October 26 of the same year. Some of these discoveries were rather more belated; for example, Nova Persei (No. 1) "appeared" in 1887, but was not "discovered" until the plate was examined at Harvard in 1895.

Then, again, Mrs. Fleming's researches led her to the discovery of a great number of new variable stars, stars having peculiar spectra—such as those of the Wolf-Rayet type—and nebulae. In a list of 108 nebulae discovered at Harvard, and published in No. VI., vol. ix., of the "Annals," Mrs. Fleming was credited with fifty-two, discovered during the period 1888 to 1907. It was also her examination of the Harvard plates, in 1891, that revealed the duplicity of β Lyrae, which, up to that time, had remained an enigma, from the changes in its spectrum, to astronomers. Such discoveries as these, by Mrs. Fleming, have been a consistent feature of the Harvard "Circulars" for many years, and from Prof. Pickering's report for the year ending September 30, 1910, we learn that, during that year, Mrs. Fleming's keen examination revealed twenty-one new variable stars, one star of the fourth type, two of the fifth, four of the sixth, four gaseous nebulae, and one star the spectrum of which appears to be unique. Not a bad haul of discoveries for one year!

Those who had the good fortune to come into personal contact with the deceased astronomer found her most unassuming in her manner, although fitted and ever-ready to give, from her wonderful store of knowledge, every assistance possible to anyone who desired information concerning the remarkable variations of stellar spectra. At Harvard, in America, in fact, throughout the whole astronomical world, her death will be felt as a great loss.

WILLIAM E. ROLSTON.

THE SCIENCE MUSEUM.

IN NATURE for May 4 we announced the publication of the report of the Departmental Committee on the Science Museum and the Geological Museum, and we gave some extracts from it. Since then "Further Correspondence and Memoranda" have been published (Cd. 5672), and besides this there have been many letters in *The Times* on the subject. These have come mainly from biologists, urging that any building erected as a science museum at South Kensington would ultimately interfere with the possibilities of the expansion of the Natural History Museum. As a counterblast to the memorial from representatives of the physical and mechanical sciences published in the report, there has been issued another from representatives of the biological science. As usual, the men of science are working against each other, a sorry spectacle which must greatly gratify those who are asked for money to help its progress.

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It would appear also from an "Historical Memorandum," printed in the white paper referred to, and from a letter from Sir Norman Lockyer, which was printed in Tuesday's *Times*, that the authors of the correspondence to which reference has been made have not been too careful about their facts; the main facts are shortly stated in Sir Norman Lockyer's letter, which we reproduce, but even he does not tell us the whole story. When land was to be allocated to the Natural History Museum, 1863, two proposals were before the Government, according to Lord Palmerston, its spokesman (*Hansard*, June 15, 1863), schemes demanding three acres and eight acres respectively. Lord Palmerston compromised with five acres, about the same area on which it is now proposed to build the Science Museum.

To the Editor of THE TIMES.

SIR,

Some four years ago I considered it my duty to call the attention of the Royal Commission of the Exhibition of 1851 to the fact that practically the whole of the land belonging to them had been allocated, and that, so far, no proper provision had been made for a Museum doing for the Physical, Chemical, and Mechanical Sciences what the British Museum Library does for books, the Galleries for Antiquities, the National Gallery does for pictures, and the Natural History Museum does for the Biological Sciences.

As the action of the Royal Commission on my Memorandum has produced a situation which has given rise to some correspondence in *The Times*, I ask your permission to deal with the main question, which is being lost in the various side issues and details now being discussed.

In the original idea of the Prince Consort, by whom the purposes to be served by the Estate were laid down, a Science Museum was contemplated. The Commission sold their first plot of land west of Exhibition Road to the Government in 1863. Lord Palmerston, in introducing the Vote for this purchase, said in the House of Commons (*Hansard*, June 15, 1863):—

"Now, the question is, what do we want? What are the requirements that press on the Government? In the first place we want a Patent Museum." . . . "Then we want an addition to the British Museum." . . . Thereafter he referred to the need for a Portrait Gallery, now provided elsewhere.

The White Paper Cd. 5673 giving, at the instance of Lord Cromer, "Further Correspondence" on this subject, includes an historical memorandum which refers to leading points in the development of the ground. Some of these, however, may well be noted here.

In 1880 the building of the Natural History Museum was completed, and the land on which it was built was fenced off on the north side. The area then fenced in contained very nearly 11½ acres, more than twice the land assigned to the Natural History Museum by Lord Palmerston. The building itself covered very nearly 3½ acres, leaving 8 acres unoccupied. From that day to this, i.e. a period of thirty-one years, there has been very little reduction of this unused ground, sacred for all this time to nursemaids.

In 1874 the Duke of Devonshire's Royal Commission on Science urged the importance to the nation of the development of the Science Museum and of the organisation of a Solar Physics Observatory—both institutions in direct furtherance of Science and the Arts, the aim of the Commissioners in selling the land to the Government in 1863. The Government acted on both these recommendations. In 1876 a Loan Collection of Scientific Apparatus was organised, and the Office of Works gave permission for an Observatory to be erected on the ground.

In 1876 the success of the Loan Collection was so marked that the Royal Commission offered 100,000*l.* to commence the building of an adequate Science Museum. In 1888 the Government came into possession (with the regrettable exception of the N.W. corner) of the whole area of land between the Cromwell Road and Imperial Institute Road, nearly 21 acres (20.9).