As showing the enormous difference between the aphelion and perihelion velocities, Mr. Crommelin points out that nearly half the period, from December, 1856, to April, 1889, was spent on the small arc of the path which lies beyond the orbit of Neptune. At perihelion the similar arc will be traversed in two years. On the assumption that perihelion will occur on April 16, 1910, the comet should appear at its brightest for a few days after May 17, its distance from the earth being then only about 12,000,000 miles.

PRESSURE IN THE SUN'S ATMOSPHERE.—*Apropos* of the discussion as to the pressure obtaining in sun-spots, the results published by MM. Fabry and Buisson in No. 11 of the *Comptes rendus* of the Paris Academy of Sciences are of special interest. Using their interference method, they have investigated a number of the displacements of solar lines which may be due to pressure. They find that all the lines do not behave alike; some are displaced in one direction by different amounts, whilst others are displaced in the opposite direction. Such displacements may not be attributed wholly to pressure, but are allied to the asymmetrical broadening of lines in the arc investigated by Dr. Duffield.

For the solar work MM. Fabry and Buisson selected fine lines such as are symmetrically broadened, and for twenty lines between $\lambda\lambda$ 4000 and 4500 they find a displacement corresponding to a pressure of four or five atmospheres above atmospheric pressure. Twelve lines between $\lambda\lambda$ 5100 and 5500 gave a similar result, and it therefore appears that a pressure of 5 or 6 atmospheres obtains where the iron absorption takes place in the sun's atmosphere.

THE SPECTRA OF NEBULÆ.—In these columns on March 11 (*NATURE*, No. 2053, p. 19) we briefly summarised some results, dealing with the spectra of nebulae, recently published by Prof. Wolf. Some interesting comments on these results are now published by Dr. Eberhard in No. 4318 of the *Astronomische Nachrichten*.

First he directs attention to the enumeration of the nebular lines adopted by Prof. Wolf; this is not in accordance with the conventionally accepted enumeration, and seems likely to lead to confusion. Prof. Wolf found that the central star of the Ring nebula in Lyra is apparently less active, actinically, than the ring itself; Dr. Eberhard points out that this is a matter of the relative aperture of the instrument used, and the result was to be expected from the instrument employed by Prof. Wolf. He also reminds us that the unknown line at λ 345, suspected by Prof. Wolf in the spectrum of N.G.C. 2023, was certainly observed by Palmer in Nova Persei and in N.G.C. 6886.

According to Prof. Wolf's observations, H γ was found to be double in N.G.C. 6210, but Dr. Eberhard suspects that, as the dispersion employed was small, this was not an actual doubling, but the incidence of two separate lines, λ 4341 and λ 4363; he also questions some of the identifications given.

THE ORBITS OF SPECTROSCOPIC BINARIES.—In recent numbers of the Publications of the Allegheny Observatory the orbits of several spectroscopic binaries are discussed. In No. 10 (vol. i.) Mr. R. H. Baker discusses the orbit of the spectroscopic components of α Virginis, and derives final elements, which give the period as 4.01416 days, the eccentricity as 0.10, and the apparent semi-major axis as 6,930,000 km.

In No. 11 the same observer discusses the results obtained for the spectroscopic components of u Herculis, whilst in No. 12 the orbit of α Coronæ Borealis is derived, by Mr. F. C. Jordan, from measures of 136 plates taken during 1907 and 1908 with the Mellon single-prism spectrograph attached to the 30-inch reflector. The final elements give the period as 17.36 days, the eccentricity as 0.387, and the apparent semi-major axis as 7,671,000 km.

THE CIRCULARITY OF PLANETARY ORBITS.—From Prof. T. J. J. See we have received an abstract from the *Astronomische Nachrichten* in which he discusses the origin of the planetary system and the reason for the circularity of the orbits of the planets and satellites. Rejecting Laplace's hypothesis of a central rotating nucleus, casting off successive portions which became

planets, Prof. See suggests that the planets are bodies which came from outside into such a nebulous mass as Laplace's original "solar nebula." The circularity of the orbits then becomes the natural consequence of the revolution of such bodies, around the central nucleus, through the resisting medium of the nebulous matter.

THE NATURAL HISTORY MUSEUM.

THE subjoined letter appeared in the *Times* of Monday, April 19.

It will be generally admitted that the Natural History Museum is one of the greatest scientific institutions in this country. It receives a grant of more than 60,000*l.* a year of public money, and is the national centre for the cultivation and organisation of the natural-history sciences. It is therefore a matter of concern, not only to naturalists, but to the public generally, that this great national institution should be administered in the best possible way. Unfortunately, in the opinion of all independent naturalists now living and of all the leading naturalists of the last forty-five years, the system of administration of the natural history departments of the British Museum is so defective that the accomplishment of the great objects for which the museum exists is seriously hampered. Rumours of this have already reached the public ear. It is not, however, our design, for the present, to refer to these rumours beyond stating that there is a strong *a priori* probability of their truth, for they indicate a state of affairs which could hardly be avoided under the present system of administration. The defects in this system to which we now desire to direct attention are as follows:—

(1) The government of the Natural History Museum is nominally, and in the eyes of the public, in the hands of the trustees of the British Museum, a large body of distinguished men, forty-nine in number, of high rank and great importance in the State. This number is so large that the trustees cannot act effectively as a single body. The result is that the executive is restricted to a small section of them, known as the standing committee, an entirely irresponsible body, subject to no control or criticism except of a purely formal kind, though spending annually large sums of public money.

(2) While the actual government of the museum is in the hands of the standing committee, the appointment of all officers and servants is in the hands of the principal trustees—the Archbishop of Canterbury, the Lord Chancellor, and the Speaker of the House of Commons. This arrangement, by which the control after appointment is in different hands from those which make the appointment, is highly unsatisfactory. For, should the principal trustees appoint a director not acceptable to the other trustees, as has happened, it is clear that a very difficult position must necessarily be created, alike for trustees and director. Moreover, it is, in our opinion, inimical to the proper conduct of the museum that the appointment to the subordinate offices should be made by the principal trustees. This point has already been touched upon in the fourth report of the Royal Commission of 1874. The commissioners state that:—

"It is held to be singularly inappropriate that the three important personages who are the principal Trustees, occupied as they are in the discharge of the highest functions in Church and State, should be burdened with the duty of making appointments to offices of every grade in the British Museum."

(3) The standing committee of the trustees control, not only the Natural History Museum at South Kensington, but also the Library and the Museum of Art and Archaeology at Bloomsbury. This arrangement cannot be regarded as satisfactory, because with the rapid growth of archaeology and natural science in the last fifty years the interests represented by the two museums have become so vast, complex, and divergent that it is beyond the power of a single body of men, even of the knowledge of affairs and distinction of the trustees, to fully understand the interests involved. The subdivision of the subjects was recognised when the natural science part of the museum was removed to South Kensington, and it is obvious that two institutions situated so far apart, and dealing with

such different material, cannot be adequately administered by a single governing body.

(4) These remarks apply equally to the remarkable regulation according to which the director of the Natural History Museum is subject to the direction of the principal librarian. This arrangement, by which the director of the largest and most complex natural science institution in the country is subordinate, not merely theoretically, but actually, to a literary man at Bloomsbury, with no scientific knowledge, is so extraordinary, and has had such baleful effects, that we must devote a few words to it. Quite apart from the welfare of the Natural History Museum, it seems unfair to expect of the principal librarian that he should be responsible for the institution in Cromwell Road in addition to his other heavy responsibilities; but it is when we look at the other side of the question that the faultiness of the arrangement becomes fully obvious. To choose as director at South Kensington a man distinguished for his technical knowledge, and then to fail to give him reasonable freedom in the employment of his training and experience, seems as bad a plan as it is possible to conceive. We think it is clear that at one time the trustees were of this opinion. Sir William Flower was in 1884 granted a large amount of independence, and this might have been greater had he not declined part of the responsibility offered him. When the late director was appointed this freedom was curtailed. It was, we think, unavoidable that in these circumstances difficulties should arise, and we feel very strongly that the recurrence of such difficulties ought to be made impossible; and this can only be done with certainty by making the Natural History Museum an independent unit.

The Prime Minister, in his reply to the deputation on this subject which waited upon him last July, said that the trustees were men of wide experience and equally cognisant of natural history and archaeology. These statements are doubtless true, but the question is, are they competent to interfere in the management (as apart from the general supervision and financial control) of a great institution like the Natural History Museum, as complex and highly technical in its constitution as a modern laboratory or observatory? In our opinion, and in that of others who have looked into the question, they are not competent to do this. Yet they do interfere in details of management, not only on their own initiative, but also under the guidance, not of their own "director" especially appointed for his knowledge of museum work and of the larger needs of science, but of a librarian who makes no claim to knowledge under either of these heads. A proposal to place an eminent man of letters or an archaeologist at the head of the National Observatory or of the National Physical Laboratory would justly excite the ridicule of the literary no less than of the scientific world, yet under the present system, based upon an Act of Parliament of the eighteenth century, the librarian at Bloomsbury is forced into just such a position with regard to the National Museum of Natural History.

These are some of the principal defects in the present system of administration of the museum. There are others to which, had we space, we should like to direct attention, but we have said enough to show that the present system of administration is defective in important particulars, which it is very desirable in the interests of science and education to remedy without delay.

In conclusion, we may point out that, in addressing this letter to you at the present moment, we cannot be accused of acting in haste. The defects to which we have directed attention have long been known to men of science, and many attempts have been made to remedy them. A short history of these attempts from 1864 to 1898, in which every distinguished man of science has participated, is appended to this letter. The present attempt originated in September, 1907, when the professors of zoology of the United Kingdom addressed a petition to the Prime Minister asking for an inquiry into the methods of administration which, as they subsequently explained by a detailed statement made in a deputation to the Prime Minister in July, 1908, had had such lamentable results.

It only remains to be added that this last effort has apparently been as devoid of result as have been its predecessors, and it has therefore become necessary to place

before the public the main facts of the case. That public pays the cost of the Natural History Museum to the tune of 60,000*l.* a year. It does so presumably because it regards the museum as an absolutely efficient and well-organised scientific institution, having the full confidence of the scientific experts of the country. It is, therefore, necessary that the public should realise that, in the opinion of the professional naturalists, a continuance of that confidence is being gravely jeopardised by the continued refusal of those in authority to bring up to date its administrative methods. What we demand is an inquiry by a Royal Commission into the present administration of the Natural History Museum. The way would then be open for the establishment of a satisfactory scheme of reconstruction.

J. C. EWART.
A. SEDGWICK.
SYDNEY J. HICKSON.
GILBERT C. BOURNE.

April 17.

DAYLIGHT AND DARKNESS.

A MEETING in support of the Summer Season Time Bill, otherwise known as the Daylight Saving Bill, was held at the Guildhall on Tuesday, April 20, when the following resolution was adopted:—"That the passing of the Daylight Saving Bill would improve the physical, mental, moral, and financial welfare of the nation, and that it is deserving of the support of all classes of the community."

The chief speaker at the meeting was Sir Robert Ball, who referred to the effect of latitude upon duration of daylight, and described the zone system of time reckoning. It is difficult to understand, however, how his remarks can be considered to give support to the proposals of the Bill. The fact that different meridians are used in different parts of the world as standards of time-reckoning, or that a date-line exists about longitude 180°, provides no reason for a seasonal change of the standard meridian. The reference to the difference in the duration of daylight in different latitudes was also unfortunate; for when the difference of latitude is taken into consideration we find that the people in North Britain already enjoy about an extra hour of daylight in summer compared with those in the south, so that they do not need legislative action to obtain it.

As much misconception appears to exist as to the system of time-reckoning and the effect of latitude upon the length of day, it may be of interest to state a few elementary facts relating to them. The number of hours the sun is above the horizon of different latitudes within the limits of the British Isles is shown in the subjoined table for the ends of the months from April to August:—

	Latitude					
	50°	52°	54°	56°	58°	60°
	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>	<i>h. m.</i>
April 30...	14 37	14 40	15 2	15 16	15 33	15 51
May 30 ...	16 0	16 18	16 40	17 5	17 34	18 8
June 30 ...	16 18	16 40	17 4	17 32	18 5	18 45
July 30 ...	15 18	15 34	15 50	16 10	16 32	16 58
Aug. 30 ...	13 35	13 42	13 50	13 58	14 8	14 19

In this table no account is taken of the lengths of dawn and twilight, which vary both with the season and the latitude. Twilight lasts until the sun is about 18° below the horizon, and where the apparent diurnal path does not descend to this point there is twilight all night. Thus defined, at the end of April places in our islands between latitudes 57° and 60° have twilight all night; during June the sun does not get 18° below the horizon of any place in our islands, and all places north of Edinburgh have twilight all night from about the end of April to the end of July. It is not suggested that work or recreation can be carried on without artificial light during the whole duration of twilight, but even if half this duration be taken it will be found that over a large part of our islands there is sufficient natural light for these purposes up to 10 p.m. or 11 p.m.