the moon, our luminary must receive about 2,000,000 in twenty-four hours. The great majority of these would necessarily be invisible. One-half of the number would fall on her averted face. Of the remainder more would fall during sunlight than during the hours of darkness. Of those that fell during hours of darkness the greater number would be concealed by terrestrial cloud. Of those that were not so concealed one-half would fall on the illuminated part of the moon's disc, and, perhaps, be rendered invisible by the lunar brightness. It is easy to see that large abatements must therefore be made from the number of falls if we wish to estimate the probability of making a successful observation. This consideration has a bearing, by the way, on the reasonableness of expecting to be able to witness the arrival of Prof. Goddard's projected rocket if the aim were good and a hit secured; but that is by the way.

If, in consideration of all these adverse contingencies, we reduce the estimate of impacts to 1 per cent. of the above-quoted figure, we have 20,000 hits on an average moonlight night. Why has not one of them ever been observed? Among the number of meteorites must be a certain proportion weighing one or two hundredweight or more. When masses of that magnitude enter our atmosphere they grow incandescent and light up a whole countryside, it may be for some seconds. That is the result of impact upon our yielding atmosphere. If they reached the surface of the earth, as presumably they do that of the moon, with cosmic velocities ranging up to 40 miles a second, would they not break up there with an outburst of light like that of a nova among the stars? Furthermore, as these impacts must include not only single masses of considerable size, but also meteoric showers, the areas affected must presumably at times be large enough to be quite observable through a good telescope. It may be suggested that when the fall is normal, or at any large angle to the moon's surface, the projectile buries itself too deeply in the substance of the moon to be visible. But among the arrivals must be some that arrive at grazing, or something like grazing, incidence on the moon, penetrating little, or not at all, beneath its surface. Why are their glowing paths never seen and the furrows which must so have been ploughed, in the course of ages, upon the moon's ancient surface never described to us?

Probably there is an easy answer to these questions, but, even if easy, it would be interesting to those of us who are not astronomers.

J. W. GORDON.

11 King's Bench Walk, Temple, E.C.4, April 12.

THE question of meteors on the moon is not now raised for the first time. In my article on astronomy in "Science in Modern Life," vol. i., p. 35 (I give this, not as being the first mention of the subject, but because it is the most accessible source), I wrote:—"There is one puzzling question raised by Prof. Shaler, *i.e.* how is it that the fall of meteors on the moon, which must be as dense as those falling on the earth, has not covered all the markings with a veil and obliterated the differences of tint? It has, however, been calculated that even if the atmospheric density at the surface be only 1/10,000 of that on earth (a quantity which it may well exceed), then, since the rate of decrease is so much slower than on the earth, at a height of something over 40 miles the densities of the atmospheres would be equal, and at still greater heights that of the moon would be the denser. Now most of the meteors that enter our air are completely burnt up at greater heights than this, so that the thin lunar atmosphere may actually be as effective for stopping meteors as our own."

It is comparatively rarely that meteors reach the earth's surface, and when they do so the speed has been so diminished by friction that there is no intense flash. The above reasoning makes it quite possible that the conditions on the moon are similar. If so, an impact-flash bright enough to be seen from the earth would be extremely rare, and then it would be seen only if an observer with a powerful telescope happened to be looking at the right spot at the right moment. There are also very few meteors the flash of which in the atmosphere of the earth would be bright enough to be seen from the moon. Some furrows on the Mount Wilson lunar photographs might, however, possibly be due to meteor falls.

ANDREW C. D. CROMMELIN.

Calendar Reform.

THE simplified calendar proposed by the Rev. E. Fanfani and described in NATURE of March 17, p. 88, is apparently inspired by a sound principle, viz. to make the minimum of change in existing conditions. It is, however, very desirable, if the months are otherwise to remain unchanged, to secure that the existing inequality in the lengths of the half-years and quarters should be corrected.

The late Prof. Millosevitch, of Rome, with whom I corresponded on the subject, expressed the view that this was the greatest—indeed, in his opinion, the only great—defect of the present calendar. This object can be effected by taking a day from August and adding it to February—a change which was suggested in NATURE of February 23, 1911, although its value was not, I think, fully appreciated at the time. This change can be made without altering the date of the vernal equinox (as fixed by the Papal Bull of February 23, 1582) by adding the day taken from August to the February of the following year. This alteration has the important advantage of giving us four quarters each containing three months and (the 365th and 366th days being apart from the week) exactly thirteen weeks. A common measure for the relation of monthly and weekly values would thus be available—a matter of much importance in accounting.

As regards the exact relation to be established between month-day and week-day, if, as M. Fanfani proposes, the leap day is to be left in its present position, which is in several respects desirable, facilities should be provided for terminating a quarterly period at the end of February. This is best accomplished by beginning with a Sunday on December 1. That would be the permanent date of Advent Sunday—the true *beginning* of the ecclesiastical year. The *central* day of the ecclesiastical year would then be May 31, which might be most appropriately selected for exclusion from the weekly series.

Of the five (or for the next 279 years four) dates of Easter Sunday possible under such a calendar one would be April 12. When Easter Sunday fell on that day Pentecost would fall on May 31. If Easter Sunday were fixed for that day, May 31 would be the annual permanent Pentecost, the founders' day of the Christian Church.

If Easter Day were allowed to oscillate over the four possible Sundays, it would be ascertained by the existing Easter tables without disturbance, and still always fall during evening moonlight.

Ecclesiastically, I submit that these proposals are equally simple with, and present superior advantages to, those suggested by M. Fanfani. From the point of view of legal administration, commerce, and accounting they are effective in removing the defects in the working of our present calendar.

The above changes could be introduced without any disturbance or interruption in 1924–25.

March 19. ALEXR. PHILIP.