Another claim made for the P. of L. A. is that it leads to Lagrange's equations of motion. That is not remarkable, seeing that both are founded upon Newtonian ideas. I suppose Lagrange's equations can be made to lead to the P. of L. A. But the practical way of proving Lagrange's form is to derive it immediately from Newton's Principle of Activity. Thus, when there are n independent coordinates x, with velocities v, the kinetic energy T is a homogeneous quadratic function of the v's, with coefficients which are functions of the x's. This makes

$$2\mathrm{T} = v_1 \frac{d\mathrm{T}}{dv_1} + v_2 \frac{d\mathrm{T}}{dv_2} + \ldots ; \qquad (8)$$

therefore

$$2\mathrm{T} = \frac{d}{dt}\frac{d\mathrm{T}}{dv_1} v_1 + \frac{d\mathrm{T}}{dv_1}\dot{v}_1 + \ldots . \qquad (9)$$

But also by the structure of T,

$$\mathrm{T} = \frac{d\mathrm{T}}{dx_1} v_1 + \frac{d\mathrm{T}}{dv_1}\dot{v}_1 + \ldots . \qquad (10)$$

So, by subtraction of (10) from (9)

$$\mathrm{T} = \left(\frac{d}{dt}\frac{d\mathrm{T}}{dv_1} - \frac{d\mathrm{T}}{dx_1}\right) v_1 + \ldots ; \qquad (11)$$

and therefore, by Newton, the force on x_1 is the coefficient of v_1, and similarly for the rest.

Some people who had worshipped the idol did not altogether see that the above contained the really essential part of the establishment of Lagrange's form, and that the use of the activity principle to establish the equation of motion is proper, instead of *vice versâ*. To all such the advice can be given, Go back to Newton. There is nothing in the P. of L. A., or the P. of L. Curvature either, to compare with Newton for comprehensive intelligibility and straight correspondence with dynamics as seen in Nature. It must, however, be said that Newton's third law is sometimes astonishingly misconceived and misapplied, perhaps because it is badly taught.

OLIVER HEAVISIDE.

Leonids of 1902, and Quadrantids of 1903.

CLOUDS and full moonlight seem to have impeded observations of the Leonids to a considerable extent in November, 1902. The night of November 14 was fine here, but as there seemed little probability of a display on that date—as is fully confirmed by the negative results of other observers—no extended watch was maintained. The night of November 15 turned out very unfavourable. It seemed unusually bright here about 6h. 30m. on the morning of November 16. No observations were possible in the circumstances. Even if the sky had been clear, very probably nothing unusual in the way of a meteor display would have been visible, owing to the presence of the full moon, then shining with almost maximum brilliancy. M. D. Eginitis, with three assistants, observing at Athens during the night of November 15, did not see more meteors—in fact, they counted one less—than on that of November 14, 1901, on which night the American maximum took place. Both those nights were clear, but possibly the observations may not have been equally extensive. The maximum of 1902 probably took place in America, but in the absence of reports of clear observations at a few stations on the other side of the Atlantic, it is difficult to gauge with certainty the character of the display.

The Quadrantid meteors, on the other hand, were well seen here, considering the broken character of the weather. Anticipating that the display of 1903 would occur early on the night of January 3—the maximum had been determined as due at 8h. 55m.—a watch was begun at 8h. 45m., and during the next hour or so some very fine meteors were observed. The following are the times of their appearance, and their approximate flights:—

d.	h.	m.		
Jan. 3	8	53,	from 2° west of Gemini to Orion, = 1st magnitude.	
,, 3	8	56,	,,	1° east of the "Guards" to Pole Star, = 1–2 magnitude.
,, 3	9	20,	,,	between Castor and Pollux to Orion, = 1st magnitude.
,, 3	9	47,	,,	between the "Guards" half-way to Pole Star, = 2nd magnitude.
,, 3	9	59½,	,,	20° west of "Guards" to 10° higher up, = rich streak.
,, 3	10	0,	,,	20° west of "Guards" to Cassiopeia, = Capella.

Shortly after 10 o'clock, clouds came up from the horizon and by 10h. 15m. the whole north-eastern sky up to Gemini was covered. At 10h. 35m., that part of the sky had again cleared, and, between 10h. 40m. and 10h. 55m., eight meteors, varying from about 1st to 2nd magnitudes, were observed. They were all long-pathed, but generally not so much so as the early part of the display, nor did they seem to move in beaten tracks, as it were, like the first meteors. The direction of their flight resembled, on the whole, that of the former, but one of them (= Sirius) shot downwards for about 30° in a direction parallel to the tail stars of Ursa Major. It started from a point about 20° east of that constellation. The latter part of the display between 10h. 40m. and 10h. 55m. was the richest I have ever observed. I observed no meteors, except one or two between 9 and 10 o'clock, that could not be traced. They began to come so rapidly at 10h. 40m. that when making a note of the course of one, another would put in an appearance, and so prevent the completion of the first observation, their paths not being near any well-known stars. An interval of quiescence for a few minutes would then follow, when the phenomenon would be again repeated as before. At 11 o'clock, the sky became again clouded and a heavy shower of rain terminated open-air observation. Between 12h. and 12h. 20m., two more were seen through a window, of about the 3rd magnitude, one on either side of the tail stars of Ursa Major; then clouds once more intervened.

JOHN R. HENRY.

Dublin.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE fifty-second annual meeting of the American Association was held at Washington, December 29 to January 3, and was in many respects the most successful meeting ever held in the fifty odd years of the existence of the Association. As pointed out in the article in NATURE of July 24, 1902, in the account of the Pittsburg meeting of last June, this is practically the first time in which the Association has met during the winter since the close of the Civil War, and in this meeting culminated the prolonged efforts of a special committee of the Association, of which Dr. Charles Sedgwick Minot was chairman, to bring about an agreement among the scientific and other learned societies and the leading universities and other institutions of learning in the United States to set apart the week in which the first of January falls as a "Convocation Week," and in this week to bring together at one place as many as possible of the scientific societies. This culmination of the efforts of Dr. Minot's committee was eminently satisfactory. The meeting was a great success, and the institution of Convocation Week has apparently been established under the most favourable auspices.

Dr. Ira Remsen, president of Johns Hopkins University, presided over the Washington meeting, and the retiring president, the noted astronomer, Prof. Asaph Hall, U.S.N., delivered his address on the opening night of the session. His subject was "The Science of Astronomy," and it was published in full in our last week's issue.

The local arrangements for the meeting were complete, and the President of the United States acted as honorary president of the local committee, the active chairman being Dr. C. D. Walcott, Director U.S. Geological Survey, and the local secretary Dr. Marcus Benjamin, U.S. National Museum.

The addresses of the vice-presidents of the different sections were given in the afternoon of Monday, December 29, as follows:—

Prof. G. W. Hough before the Section of Mathematics and Astronomy, on "The Physical Constitution of the Planet Jupiter." Prof. Franklin before the Section of Physics, on "Limitations of Quantitative Physics." Prof. Weber before the Section of Chemistry, on "Incomplete Observations." Prof. Culin before the