somewhat less in using a photographic theodolite than in using our instruments. But on the other hand our method enables us to observe the clouds even in twilight and moonlight, in rain and storm. Also, it is, no doubt, much cheaper than the photographic one. N. EKHOLM

Up ala, November 6

The Helm Wind

SOME years ago I passed a summer at Melmerby, which is about the best place for seeing the "helm," which is incorrectly described as affecting the Penrith valley (for, in fact, it never extends to Penrith) by your correspondent, M. Woeikoff.

Melmerby is at the foot of the Cross Fell range, and gets the "helm" with great violence. When an easterly wind comes on, the summit of Cross Fell becomes clouded; *it puts on its helm:* then from this a violent cold wind pours down the hillside (which is steep) and rises up again at no great distance. At Melmerby, and places similarly situated, there is clear sky, for the moisture in the sky is invisible, but further from the range it is precipitated where the current rises, and there is cloudy sky, without the strong wind. The phenomenon is, in fact, precisely that at Table Mountain, where the cloud on the crest is called the "table-cloth."

Judging from M. Woeikoff's description there seems to be a difference in the phenomena. Probably owing to the *gentle slopes* of the Varada chain the air does not seem to *rise again*, and there is no cloud-bank parallel to the chain. It would seem, too, that the wind extends to the *west*, unless there is a misprint. J. F. TENNANT

37, Hamilton Road, Ealing, W., November 13

THE MODE OF ADMISSION INTO THE ROYAL SOCIETY

OUR contemporary *Science*, in the last number which has reached this country, makes some remarks concerning the admission of candidates into the Royal Society, against which, in the interests of truth and accuracy, it is our duty to protest, the more especially as it is also implied that the French system of canvassing those who are already Fellows of the Society is also adopted.

The statements actually made are (1) that there is an "actual competitive examination, on the result of which a certain number of successful candidates are annually chosen," and (2) "that the English method has the additional disadvantage that it does not secure the men whom it is most desirable to honour." We read also, "During the schoolboy period the distinction between different individuals is a distinction of learning, and an examination is not unfitted to discover the boy who deserves reward. But learning is not the quality which a State needs to make it great. Casaubons are not the kind of men who have built up English science. The qualities which ought to be encouraged, and which it should be a nation's delight to honour are qualities too subtle to be detected by a competitive examination."

For the benefit of our transatlantic brethren we may as well state the facts as we know them. For reasons into which we need not enter here, as they do not affect the question at issue, nearly forty years ago the Royal Society determined to limit the yearly admissions to fifteen; and to throw upon the Council the responsibility of selecting the fifteen who are to be nominated for election, a general meeting of the Society reserving to itself the right of confirming or rejecting such nomination. It may be instructive to remark that for thirty years that right has not been exercised.

The way in which the matter is worked is as follows:—The friends of a man, who are already in the Society, and who think he is entitled to the coveted distinction, prepare a statement of his services to science, in many cases without consulting him in any way. This paper thus prepared is sent round to other Fellows of the Society, who are acquainted with the work of the candidate, and who sign it as a testimony that they think he is worthy of election. In this way when the proper time arrives some fifty or sixty papers are sent in to the Council for their consideration. In the Council itself we may assume that the selection of the fifteen is made as carefully as possible in view not merely of individual claims but of the due representation of the different branches of science. It is not for us to state the safeguards or mode of procedure adopted, but we think we may say that the slightest action or appeal to any member by the candidate himself would be absolutely fatal to his election. Finally, we may say that, years back, when a heavy entrance fee had to be paid, there were cases in which the question had to be put to one whose friends were anxious to see him elected, whether he would accept election. The small yearly subscription of 3*l.*, now the only sum payable, makes even this question unnecessary at the present time.

ON MEASURING THE VIBRATORY PERIODS OF TUNING-FORKS

THE tuning-fork when its number of double vibrations, to and fro, in a second, or briefly its *frequency*, has been ascertained, is a most convenient instrument for measuring minute divisions of time. As such it is now extensively used for physical, physiological, and military purposes (velocity of bullets and cannon balls). The antecedent difficulty of ascertaining the frequency, is however very great. The old processes, sufficient for roughly ascertaining musical pitch, and depending upon wires of known weight, length, and tension, or the action of the siren, are totally insufficient for modern purposes. It was the contradictory nature of the results furnished by the monochord in the division of the Octave into twelve equal parts that led Scheibler to his system of a series of tuning-forks differing from one another by known numbers of vibrations, leading to countable beats, and extending over an Octave. Nothing can be more convenient to use than such a series of forks for all musical purposes. They enable the frequency not only of any small as well as large tuning-fork, but also of any sustained tone to be ascertained within one-tenth of a vibration, that is, one vibration in ten seconds. The writer has for some years been in the constant habit of using such a set of forks with the most satisfactory results. His own forks were measured by Scheibler's (exhibited in the Historic Loan Collection of Musical Instruments at the Albert Hall this year), but extend over a greater range, from about 224 to about 588 vib., that is, rather more than an Octave and a major Third. The great advantage of such a tonometer is extreme portability, immediate application to any sustained tone (even that of a pianoforte string), and the independence of the result from any (almost always imperfect) estimation of unison by a musical ear. There are of course antecedent difficulties in ascertaining the pitch of each particular fork, but these are overcome by patient observation, the extension of the series beyond an Octave furnishing in itself the required check.

Scheibler died in 1837. In 1879 Prof. Herbert MacLeod and Lieut. R. G. Clarke, R.E. (*Proc. R. Soc.*, vol. xxviii. p. 291, and *Philosoph. Trans.*, vol. clxxi. p. 1) invented an optical arrangement, which under proper management (but the manipulation was very difficult) gave excellent results for large tuning-forks, like those of Koenig. And in 1880 Koenig (*Wiedemann's Annalen*, 1880, pp. 394-417) invented a clock method for ascertaining with extreme accuracy the frequency of one large standard fork of 64 vib. at 20° C. Before both Prof. MacLeod and Dr. Koenig, Prof. Alfred Mayer, of Hoboken, New Jersey, U.S., had invented a most careful and ingenious electrographic method, of which a full account has just appeared in vol. iii. of the *Transactions* of the National Academy

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