

an impurity; it is quite sufficient to know that an agreement in length of organ-pipe and aerial wave-length was assumed which does not exist, and that, moreover, the mechanical nature of the organ-pipe, and its delicate apparatus so wonderfully balanced for the attainment of its ends, had escaped observation. The admirable method of experiment for ascertaining the velocity of sound in gases, devised by M. Kundt, by means of glass tubes and lycopodium seed, is free from the same source of error; and, as might be anticipated, comparison shows a marked difference in estimates. In respect of carbonic acid gas and hydrogen gas, for instance, Dulong differs from Kundt, his estimate in the one case being less by one-fifth of the whole, and the other more by one-fourth; the divergence interprets itself, indicating the relation of their densities to the compelling force, the unseen mechanical action at the mouth of the organ-pipe. This will be clear when the "air-moulded reed" is fully understood in its nature and functions. When the magnetism of the earth is perceived, the dip of the needle to the north or south of the equator in accord with its localisation is explained.

The confession of "obscurity" amounts to a concession that the old theory has been found wanting, that it is inadequate to deal with facts. Whether in dealing with the larger questions here brought into discussion, or with the simpler class, the mere modifications of structure, it is equally incapable. If, for instance, a stopped pipe is pierced through the stopper and a short open pipe inserted, say a third or fourth the diameter and a third or fourth the length, what will be the effect of this on the pitch? The old theory would reply, the added length would cause a flattening of pitch, and then will come a proviso for safety's sake, that if the change converted it into an open organ pipe then the pitch would be raised in accordance with the open length. We go to Nature for her say in the matter, and find that the pitch is raised not flattened, and that the extent is about a quarter of a tone, and that *further lengthening* of the smaller pipe takes back the pitch again just its quarter tone. If another stopped pipe is drilled at the back with a hole of a diameter a third or fourth of that of the pipe, but so that it shall be at a higher level than the lip or edge of the mouth, in effect shortening the air column by admission of external air at a higher point, what will be the result? On the old theory we should expect the pitch to be higher in consequence. Appealing to the ear we know that, on the contrary, it is flattened. These results cease to be anomalies when viewed under the new theory, and indeed they would be predicted with confidence as the necessary outcome of the conditions.

The proposition that in an organ-pipe there is no constant wave-length for an ascertained pitch, will no doubt be discounted as novel and revolutionary, but it is true and will have to be acknowledged. A further proposition that in an open organ-pipe there are three different velocities speeding at different rates, concurring in every vibration, and essential to the synchronic time of its note, has a still more aggressive aspect defiant of law. Not so. It is because law—"known law," does not cover the facts, is unstable in its applications, and is deficient in prevision, that there is room for new hypothesis which does not play fast and loose with nature; the utmost exactitude of length in an organ-pipe is as indispensable in this as in the older theory, but the relation is one of proportion to a system, and the least and every variation will make imperatival suitable or corresponding modifications in other portions of the structure. Only a whistle, yet with more to marvel at for delicacy of organization and beauty of adaptation "than is dreamt of in philosophy."

As regards "fixity of wave-length," that characteristic reappears in a new relation, and we shall find that, allowing for retardation by friction, the super-nodal half-wave of the pipe corresponds very closely with length in atmosphere. The cause of the displacement of the node is involved in the physical action taking place at the mouth of organ pipes, the consideration of which is reserved for a further communication.

HERMANN SMITH

Auroral Display

As a few remarks on the aurora of the 4th may be of interest to some of your meteorological readers I append the following notes:—

At 6.15 P.M. on Wednesday, the 4th inst., an aurora commenced in the northern part of the sky which gradually went down towards the south.

7.15.—Semicircle from W. to E., streamers shooting up from it.

7.25.—Light more diffused, a few streamers at N.W.
7.30.—A semicircle of diffused light from W.S.W. to E.
7.35.—Bright line of light from W.S.W. to E.; no streamers.
7.40.—A very faint irregular line of light from W.S.W. to E.
7.45.—Diffused light.
7.50.—Same as at 7.45.
7.55.—Streamers shooting down from zenith all round. Very fine.

8.—Bright at N.N.E. Streamers N. and N.N.E. A sharp S.E. breeze.

8.5.—Bright light at N.W. No streamers.

8.10.—Streamers at N.E.

8.15.—Streamers at S.S.E.

9.—No aurora perceptible.

From the above, we note one peculiarity, namely, that the aurora was chiefly in W. + E. or W.S.W. and S.S.E.

WILLIAM HY. WATSON

Braystones, near Whitehaven, Feb. 9

[We have received letters concerning this aurora from several other parts of the country.]

THE PHOTOGRAPHIC SOCIETY

ALTHOUGH we published last week a letter from Mr. Baden Pritchard, Hon. Sec. of the Photographic Society, impugning the justice or accuracy of our strictures on that Society, our esteemed correspondent has not caused us to change our opinion.

We have now before us the Journal of the Society for the past year (a summer vacation of three months excepted), and certainly it furnishes *prima facie* evidence of the most apathetic and inefficient condition which is consistent with continuous existence. The numbers contain eight pages each, the page little more than half the size of that of NATURE, and in the whole year's proceedings there are twelve pages devoted to science, half of this being a lecture by Prof. Stokes; three or four papers of considerable value on technical points of photographic interest, and much which the charity of any semi-learned society would be largely strained in giving paper and ink to.

There is no mention of scientific or other committees, no provision for them in the laws, no reports of investigations made or to be made, no notice of scientific discovery abroad or recognition of discovery at home. Mr. Pritchard has no need to assure us that the body "does not profess to be a purely scientific one"—the scientific element in it, so far as its own record shows, is purely fortuitous.

But without demanding scientific labours from a body not "purely scientific," we do not even find evidence of common activity in the research of practical problems, and if any of its members are, as Mr. Pritchard suggests, engaged in researches on the process and nature of film best suited for transit of Venus observations, they have not had faith enough in the countenance of their Society to place their labours before it, or ask its assistance in performing them.

Since our article appeared, the revolution alluded to has taken place, and that part of the Society in favour of reform having a majority at the meeting appointed for the discussion of the question, have carried an amendment to the laws providing that henceforward the Society at large shall select its council, and that the majority of the actual council shall not have the power to select for retirement such members as it sees fit and to decide who shall replace them, as has actually been the case hitherto; it has also been decided that the presidency shall rotate. These measures were, as we learn from the photographic papers, strongly opposed by the council, and upon being carried by a majority of 30 to 23 (the council itself voting in the minority) the entire body resigned.

As the meeting at which this stroke of singular policy was made, was that for the election of the new members of council, these were enabled to assume the reins of government and prevent the, otherwise in-