clear and thoroughly appreciative description of Edison's carbon telephone, and published it in the printed reports of his lecture which appeared in the public journals. The beautiful results shown since the beginning of the present year by Mr. Hughes with his microphone were described by himself in such a manner as to leave no doubt but that he had worked them out quite independently, and that he had not the slightest intention of appropriating any credit due to Mr. Edison. It does seem to me that the physical principle used by Edison in his carbon telephone and by Hughes in the microphone is one and the same, and that it is the same as that used by M. Clérac, of the French "Administration des Lignes Télégraphiques," in the "variable resistance carbon tubes," which he had given to Mr. Hughes and others for important practical applications as early as 1866, and that it depends entirely on the fact long ago pointed out by Du Moncel, that increase of pressure between two conductors in contact produces diminution of electric resistance between them.

I cannot but think that Mr. Edison will see that he has let himself be hurried into an injustice, and that he will therefore not rest until he retracts his accusations of bad faith publicly and amply as he made them.

WILLIAM THOMSON

Yacht *Lalla Rookh*, Cowes, July 30

It may be of interest at the present time to recall the fact that the word "microphone" was first employed by Sir Chas. Wheatstone upwards of fifty years ago. In a paper entitled "Experiments on Audition," published in the *Quarterly Journal of Science* for 1827, Wheatstone remarks:—"The great intensity with which sound is transmitted by solid rods at the same time that its diffusion is prevented affords a ready means of effecting this purpose [augmenting the loudness of external sounds], and of constructing an instrument which from its rendering audible the weakest sounds may with propriety be named a microphone." As the original paper may not be readily accessible, an extract from it is appended to this letter, wherein will be found a description of the simple arrangement proposed by Wheatstone—it is in fact a metallic binaural stethoscope—together with some experiments with the instrument given by the author. The entire paper will appear in the republication of Wheatstone's scientific papers, which the Physical Society will shortly issue, and the instrument itself can be obtained for a trifling sum from Mr. Yeates, of King Street, Covent Garden.

Monkstown, Dublin, July 29

W. F. BARRETT

"Procure two flat pieces of plated metal, each sufficiently large to cover the external ear, to the form also of which they may be adapted; on the outside of each plate, directly opposite the meatus, rivet a rod of iron or brass wire about 16 inches in length, and one-eighth of an inch in diameter, and fasten the two rods together at their unfixed extremities, so as to meet in a single point.

The rods must be so curved, that when the plates are applied to the ears, each rod may at one end be perpendicularly inserted into its corresponding plate, and at the other end may meet before the head in the plane of the medial line.

The spring of the rods will be sufficient to fix the plates to the ears; but for greater security ribands may be attached to each rod near its insertion in the plate, and be tied behind the head. A more simple instrument may be constructed to be applied to one ear only, by inserting a straight rod perpendicularly into a similar plate to those described above.

The microphone is calculated only for hearing sounds when it is in immediate contact with sonorous bodies; when they are diffused by their transmission through the air this instrument will not afford the slightest assistance. It is not my intention in this place to detail all the various experiments which may be made with this instrument; a few will suffice to enable the experimenter to vary them at his pleasure:—

1. If a bell be rung in a vessel of water and the point of the microphone be placed in the water at different distances from the bell, the difference of intensity will be very sensible.

2. If the point of the microphone be applied to the sides of a vessel containing a boiling liquid, or if it be placed in the liquid

Wheatstone's microphone, 1827.

itself, the various sounds which are rendered may be heard very distinctly.

3. The instrument affords a means of ascertaining, with considerable accuracy, the points of a sonorous body at which the intensity of vibration is the greatest or least; thus, placing its point on different parts of the sounding-board of a violin or guitar whilst one of its strings is in vibration, the points of greatest and least vibration are easily distinguished.

4. If the stem of a sounding tuning-fork be brought in contact with any part of the microphone, and at the same time a musical sound be produced by the voice, the most uninitiated ear will be able to perceive the consonance or dissonance of the two sounds; the roughness of, discords and the beatings of imperfect consonances are thereby rendered so extremely disagreeable, and form so evident a contrast to the agreeable harmony and smoothness of two perfectly consonant sounds, that it is impossible that they can be confounded."—*Quarterly Journal of Science*, 1827, Part II.

The Meteor Shower of Aquarids (July)

On July 27 ninety-three shooting stars were seen here, between 10h. 30m. and 14h. 30m., which, after making allowance for time occupied in charting the paths, is equivalent to about twenty-nine per hour for one observer. There was a rich shower of *Aquarids* from a point near μ Aquarii, at R.A. 343° , 14° S. declination, which gave twenty-two meteors. These were rather bright, not very swift, with moderately long paths (averaging 17°), and quite devoid of streaks. I had seen about five meteors of this system on the preceding night, and on the 28th I watched a very hazy condition of sky—in which the stars shone dimly—for four hours, and of forty-four meteors seen five or six others were *Aquarids*. This active shower was well seen by Capt. Tupman on July 27, 1870, with an accurately-defined radiant at 340° — 14° , from fourteen meteors (see No. 43 of his catalogue), and on the four following nights he traced about forty-seven others from the same shower, though the centre seemed a little further south, at 340° — 19° on the 28th. On the 27th he recorded seven meteors of this stream within the twenty-one minutes, from 14h. 3m. to 14h. 24m. It was also seen by me, at 342° — 12° (ten meteors), on August 3-17 last year; and Schmidt gives radiants at 337° — 11° for July 20-31, and at 344° — 11° for August. Neumayer, in the southern hemisphere, also has a position at 337° — 10° (July), and Heis at 339° — 10° for July 27-31. The average centre from these eight independent determinations is at 340° — 13° for this important shower, which evidently comes to a strong maximum on about July 27-29. The end of July has long been known as a meteor-epoch of considerable intensity, with a maximum, according to Quetelet, between the 27th and 29th, which is thus amply confirmed by recent observations, and proves these *Aquarids* to be but little less in importance to the annually-recurring showers of *Lyrids*, *Orionids*, *Taurids*, and *Geminids*.

It should be pointed out that, in future observations of this special shower, care must be taken not to confuse it with other contemporary showers in Aquarius. There are two radiants on or near the equator in about R.A. 334° and 349° , and one (of very slow meteors) at about 336° — 6° , also a fourth at 326° — 12° (mean position of five radiants seen by Schmidt and Tupman). They are distinct showers, though separated with difficulty, owing to proximity of position; and it is interesting to note that, if we average them with the strong radiant at 340° — 13° referred to above, we have a central radiant at 337° — 6° , which coincides exactly with Mr. Greg's position for the *Aquarids* (Nos. 109 and 137 in his catalogue of 1876), which apparently continue from July 5 to October 31.

W. F. DENNING

Ashleydown, Bristol, July 29

P.S.—My observations were continued on the night of July 30, when seventy-six shooting stars were seen in four hours; thirteen of these were *Aquarids*, and seven of them visible in the half an hour preceding midnight, after which few were observed. From this I infer that the maximum had probably occurred on the morning of the 30th, when, unfortunately, a thick haze prevented work.—W. F. D.

Physical Science for Artists

WILL you permit me, through your columns, to tell Mr. Abbey that the phenomena—"les rayons de crépuscule"—he

refers to in his letter in *NATURE*, vol. xviii. p. 329, are of not unfrequent occurrence on the west coast of India, in the plains as well as the highlands. Moreover I can recollect being much struck with the appearance whilst travelling in Ireland in the autumn of 1863. The convergence of rays in the east, while the sun was setting, was then new and singular to me, but I have since often observed the phenomenon.

On some occasions the atmosphere has seemed clear, until sunset, when the blue sky has literally reddened, and it is then that the cloud shadows show best as bands of blue stretching from west to east, and visible in the zenith as well as nearer their converging points.

E. H. PRINGLE

Clevedon, July 27

Taunton College School

IN your last number, in an article by Mr. Shenstone, of Exeter School, on the formation of a laboratory, he incidentally speaks of the council of this school, of which I am headmaster, as having "quenched the torch of science in the west." As this statement may be prejudicial to me, and can only arise from Mr. Shenstone's being imperfectly acquainted with the facts, I trust to your spirit of fairness to allow me to state publicly (1) that the senior half of the school in the last six months has been through a course of electricity and magnetism illustrated by experiments, and has just passed a creditable examination in those subjects under a Cambridge examiner of high reputation; (2) that there has been a course of lectures on botany this term; (3) that all those boys whose interests require it have been taught chemistry; (4) that we have had a very favourable report of the boys' proficiency in mathematics, which I presume, has some claim to be considered science, though to my great surprise at the present day it is often spoken of as if it had none. The council have left me perfectly free to teach as much or as little science as I choose; I choose, and in all probability always shall choose, to give every opportunity of acquiring scientific knowledge to my pupils, consistent with their instruction in other necessary subjects, and if I find any with strong scientific tastes, to foster them to the utmost. As my academical position was mainly, though not entirely, due to my scientific knowledge, it would be strange if I acted otherwise.

HENRY PEARCE KNATTON

Taunton College School, July 27

Deep-sea Dredgings off the Gulf of Mexico

I WISH to correct an omission of mine in a notice of the work of the United States schooner *Blake* (*NATURE*, vol. xviii. p. 198). Capt. Sigbee's modification of Thomson's wire-sounding machine was used for the deep-sea soundings. The steel wire was No. 20 American gauge, and the time required to reel in with it was always one minute per 100 fathoms. The steel wire rope used for dredging, which was made expressly at the suggestion of Prof. A. Agassiz, was the one mentioned in the notice as being of galvanised steel, with a hemp core (not coil, as printed), and which in the notice appears as if it were the same wire rope that was employed for sounding. The sentence will read correctly if the words "used for dredging" be inserted after the words "the wire rope" in the paragraph. The importance of this suggestion of Prof. Agassiz will be best understood when the immense saving of space gained—one coil of 3,000 fathoms of this wire rope occupying on the reel only a space of 5 feet long, 5 feet high, and 4 wide—and the immense saving in time of lowering and hoisting the dredge, are taken into account.

E. P. W.

ANTHROPOLOGY IN FRANCE¹

IN the numbers of the *Bulletins* of the French Anthropological Society for 1876 are many papers of importance, some of which we shall briefly bring before our readers.

An admirable series of photographs of natives of New Caledonia, taken by order of the local French authorities, has been made the subject of some interesting notices by M. Paul Topinard. Comparing these pictures and a number of the skulls of indigenous New Caledonians with those of native Australians, he finds that while the former

exhibit a greater unity of type than the latter, they also differ from them in presenting a roundness in the contour of the face, due to a predominance of the cellular tissue, which contrasts strongly with the well-marked muscles of the Australian. Their affinity with the negro and New Guinea Papuan types is incontestable. M. P. Topinard discusses in another paper the relative merits of the cranio-metric and facial modes of measurement, adopted the one by Daubenton and Camper, the other by Blumenbach, and Prichard, and the results obtained by M. de Quatrefages with the instrument invented by him, and named *goniometre parietal*. The speaker considers Prichard in error when he attempts to include all Mongolian groups generally under his so-called "ogival" cranial form, this form belonging, in fact only to the Esquimaux.—M. Lagneau wishes to draw the attention of anthropologists to the peculiarities still observable in the people of some parts of La Gironde, known as "Gavaches," or "Marotins," who are descended from certain Angevins, called into the district in about 1525, to repair the ravages caused by a virulent epidemic. In their indolence and slowness they differ strikingly from the vivacious Gascons, among whom they live.—The discovery in the lacustrine houses of Switzerland and Savoy, and in the Lake of Bourget of bronze rods, surmounted with movable rings, has called forth explanations from all quarters. Carl Vogt, among others, has come forward in response to M. Mortillet's invitation to supply him with a clue to their use, and according to him we still have a similar instrument in the "Ringelstock" of the German herdsman, which is formed of a stout nut-stick, terminating in a lateral branch, on which are hung several metal rings. If the noise is not successful in bringing back the animal, the instrument is thrown at its head with an alarming clatter of bells. M. Hamy entertained the members of the society with an account of the eccentricities of Siamese and Chinese fashion in the development of the finger-nails, which, according to some of the fac-similes laid before the meeting, at times attain a length of forty, and even forty-five centimetres, although usually only that of ten or twelve centimetres; in most instances this process of lengthening carries with it a corresponding twisting and interlacing of the nails, which acquire the semblance of antlered horns.—M. Bertillon has for some time been engaged in a careful analysis of the preponderance of one sex over the other in first or second legitimate, and illegitimate births in France, and some other countries, more especially Austria. He finds that in France to every 100 females born alive, there are 105 males; while in regard to still-born births the excess is as 137 to 100. These relations are, however, found to differ essentially when illegitimate births are considered alone, in which case the proportion is as 1,031 males to 1,000 females. In Austria, where the official reports kept of the sex of first and second births admit of more precise calculations in regard to this point, it is found that first births are more frequently masculine, in the proportion of 110.3 to 100; second births being as 105.2 males to 100 females, while the general relation of the sexes for all births is as 106 males to 100 females. This, however, applies only to legitimate births; the proportion falling in the illegitimate to 105 males against 100 females. MM. Lagneau, Broca, and others, took part in the discussion which followed on the reading of M. Bertillon's paper on the Influences of Primogeniture on Sex. In relation to this subject we may refer to M. Sanson's report (laid before the society on May 4, 1876) of the influence of age, vigour, &c., on the offspring, as noted by himself, on sheep and other domesticated animals.—French local archæology and palæontology have received careful attention from the society during the past year. M. Pommerol has described the curious megalithic monuments which are to be found in close vicinity to the mineral springs, ancient mortuaries, and church at Saint-Nectaire, in Auvergne. A dolmen, hitherto known only to the local peasantry

¹ *Bulletins de la Société d'Anthropologie de Paris*. Tome onzième, 1876.