

violent report, followed by a rumbling noise, was heard in the commune of Lancé, canton of St. Arnaud (Loir-et-Cher). On the following day it was ascertained that the noise had been heard over a wide area of country, and had caused much uneasiness; and a letter arrived from a landowner of Lile-Bouchard, announcing that he had seen a "fiery lance" shooting across the sky in a direction from S.W. to N.E. with great swiftness. Whilst on its way its point appeared to split, giving rise to two meteors, which continued their way parallel to each other for some distance. Another observer south of Tours had also seen them, and described them as having the shape of a bottle, and being of an orange colour. M. De Tastes, who communicated the first account to the Academy, on proceeding to St. Arnaud, was fortunate enough to learn that one of these meteorites had been seen to fall near Lancé, and he was also successful in finding it. Its weight was 47 kilogrammes (about 103 lbs.), and it had penetrated to a depth of 1.40 metres (about 5 ft. 9 in.). On being removed, it broke into three pieces. Of the second meteorite nothing was heard for some time, but it was ultimately found at a place called Pont-Loisel, about 12 kilometres ($7\frac{1}{2}$ miles) to the south-west of the place where the other had fallen; and an account of it is given to the Academy by M. Daubrée. It is of exactly the same mineralogical character as the one first found, thus showing it originally belonged to it, but its weight is only 250 grammes, and it had only penetrated to the depth of about half a metre. On ascertaining the course of the meteorite, it was found that this, the smallest portion, had fallen first, and that the larger one had continued its course for some distance farther. In this respect it resembled the meteorite which fell on March 14, 1864, near Orgueil (Tarn-et-Garonne), in which the smallest portion, weighing about 15 grammes, first fell, and then the heavier one, weighing 40 grammes.

M. Daubrée has recently analysed the meteorite, and his results are somewhat remarkable. The largest piece is of an unequal spheroidal shape, with a rounded surface; it is covered all over with a crust, probably caused by the incandescence and superficial fusion. In appearance the fracture is black, and almost basaltic looking, showing a globular structure and numerous small spheroidal grains. Here and there small metallic grains are to be seen, yellow in colour, like iron bisulphide, these and other metallic-looking grains showing much better when the surface is polished. Its specific gravity was 3.80. Treated with water, a very small quantity of chloride of sodium dissolved out, and M. Daubrée remarks that this is not the first time that this salt has been found in meteorites; and he brings forward evidence to show that it could not have been derived from the soil in which the meteorite was buried, but that it must have formed part of it when it fell. No traces of any salts of potash, nor of any sulphates or hyposulphates could be found. Dissolved in nitric acid, a silicate was found, which was proved to consist chiefly of magnesium and protoxide of iron, and there was an undissolved residue, part of which was colourless, the remainder dark black. By means of spectrum analysis, copper was thought to be recognised; but calcium, barium, and strontium were shown to be absent. No carbon was found; but, as usual, cobalt and nickel accompanied the iron. The following is the complete analysis:—

Free iron combined with nickel and cobalt...	...	7.81
Iron and other metals combined with sulphur	9.09	14.28
Sulphur combined	5.19	
Silicate	{ Silica	17.20
	{ Magnesia	13.84
	{ Iron protoxide	11.33
	{ Manganese protoxide,	0.05
Part unattacked by acid	33.44
Sodium chloride	0.12
Water	1.24
Total	99.31	

In its general appearance this meteorite resembled that which fell July 11, 1868, at Ornans (Doubs), but differs from it in the absence of free iron oxide. Other characters distinguish it from the black meteorites of Rutlam (East Indies) and that of Tadjera, near Sétif (Algeria).

Several meteorites have also lately been seen in Italy, which have excited considerable attention. One on the evening of the 8th of August, at about eight minutes past 11, was seen at Rome, and also at Velletri, Naples, and Palermo. A more interesting one than this was seen near Rome, at about 5.15 mean time, on the morning of the 31st of August, of which Padre Secchi has communicated a long account to the Academy. At about 5.15 in the early morning on that day a globe of fire, well marked and a little red in colour, appeared on the horizon towards the S.S.W., proceeding towards the N.N.E. Its progress was at first slow, but this gradually increased, and it left behind it a luminous train like a cloud lit up by the sun. When it had reached its highest point, E.N.E. from Rome, it suddenly expanded and took the shape of a cone having its base rounded in front; it brightened up greatly and finally disappeared. Three or four minutes after its disappearance a tremendous detonation was heard, which caused, in many places, houses and glass to rattle. This explosion was dull, different to thunder, and resembling more the explosion of a mine, and was followed by a rolling sound like file-firing. This noise was heard by Padre Secchi himself, but he did not see the globe of fire. The vapour-like residue left by the meteorite was at first in the shape of a long straight line, but it soon enlarged, and turned about like some great serpent until it disappeared about ten or fifteen minutes afterwards.

This meteor was also seen a long way from Rome, at Viterbo and at Veroli, but the noise of the explosion in each place was equally strong, and caused houses and glass to rattle. A small piece of the meteorite which fell near him was picked up by a curé soon after the explosion at Affile, near to Subiaco, where the ball of fire and the noise of the explosion were well seen and heard. The fragment has been recognised as a piece of a very ferruginous meteorite, very hard, and covered over with a crust. It is also said that at Orvinio "black stones" have been picked up. But this is not all. A well-instructed farmer had assured me, says Padre Secchi, that the same morning at 3.30, being at Casale S. Lorenzo, near to Porto d'Anzio, whilst he was waiting for his men, he saw out at sea, at an elevation of about 30° or 40°, a mass of fire or light like a fire, of a round form, apparently fixed, and which could not be confounded either with a lighthouse or any fire at sea. The position of this fire was exactly the same as that from which the meteorite afterwards appeared, and which he saw very distinctly in the heavens at 5.15, when he was so much struck with the coincidence of direction that he judged it to be the same mass of fire which had then reached the earth. The size of the meteorite at its first appearance and at the moment of explosion is represented as little less than the diameter of the moon. The extreme distances at which it was seen are 150 kilometres (93 miles) apart.

Another meteorite was seen at Subiaco on August 6, at four in the morning; and another near Ascoli on the 18th of September.

J. P. E.

DARDANELLES AND BOSPHORUS UNDER-CURRENT

IT will be in the recollection of such of your readers as I have followed the discussion on Ocean Currents, that I ventured nearly two years ago* to predict the existence of an Under-current of dense Ægean water into the Black Sea, "on the double ground of a priori and a posteriori necessity;"—that is, I affirmed it to be a necessary result of the excess of Specific Gravity in the water

* Proceedings of Royal Society, Dec. 8, 1870, § 123.

of the *Ægean* above that of the *Euxine*; whilst, I argued, if the salt continually passing out of the *Black Sea* by the surface-current were not thus replaced, the continual excessive influx of River water would, in time, wash the whole of the salt out of its basin.

My position was assailed by Captain Spratt, who affirmed (1) that his own experiments in the *Dardanelles* had shown the existence of still water beneath twenty fathoms; and (2) that the return of salt to the *Black Sea* was effected by a *surface* in-current during the winter, when the rivers are low, and when the wind sets from the *Ægean* along the *Dardanelles*, the *Sea of Marmora*, and the *Bosphorus*.

On an examination of Captain Spratt's experiments, however, I came to the conclusion that, when rightly interpreted, their results bore out my view of the case; and, as I stated in my letters of Nov. 14, 1871, my interpretation of them had the sanction of three eminent Naval Surveyors. Captain Spratt maintained that because a surface-buoy from which a "current-drag" was suspended at a depth beneath twenty fathoms remains stationary, the waters in which the "drag" hangs must also be motionless. To me, on the other hand, it appeared indisputable that if the surface-buoy is floating in a current which puts a strong strain on the suspending line, that strain would draw the "current-drag" through still water; so that the stationary condition of its suspending buoy can only be accounted for on the supposition that the action of the surface-current on it is neutralised by some pressure in the opposite direction, which can be nothing else than that of an under-current meeting the "current-drag."

The question is discussed in an Appendix to the forthcoming Report of my last year's work in the *Shearwater*, of which the following (written on board of her a year ago) is an extract:—

"Now since, according to Captain Spratt, this stationary condition of the 'current-drag' was shown at all depths below forty fathoms in the *Sea of Marmora* (even down to 400 fathoms), and at all depths below twenty fathoms in the *Dardanelles*, it seems an irresistible conclusion that whilst there is a rapid superficial out-current, running in the *Dardanelles* at the rate of $2\frac{1}{4}$ miles per hour, there is a deeper under-current from twenty fathoms to the bottom, running more slowly inwards from the *Ægean* into the *Sea of Marmora* through the *Dardanelles*, and thence, it may be presumed, through the *Bosphorus*, into the *Black Sea*. And this conclusion finds complete confirmation in the results of a comparison between the respective Densities and rates of movement of the *Dardanelles* water at different depths, as observed by Captain Spratt himself. For whilst the progressive decrease in the movement of the 'current-buoy,' from $2\frac{1}{4}$ knots at the surface to almost nothing at twenty fathoms, indicates (as just now shown) first a cessation of all movement in the stratum in which the 'current-drag' hangs, and then a reversal in the direction of the current as the lower depth is approached,—the Density increased from 1,020 at the surface to 1,028 at twenty fathoms, and 1,029 at forty fathoms; the surface-water thus corresponding with that of the *Sea of Marmora*, whilst the water of the entire stratum from twenty fathoms to the bottom was equal in density to that of the *Mediterranean*. I hold, then, that the existence of an Under-current of dense *Mediterranean* water through the *Dardanelles* into the *Sea of Marmora*, is incontestably proved by the very experiments and observations which have been adduced by Captain Spratt as demonstrating the unsoundness of the Under-current doctrine."

Having understood that the *Shearwater*, on the completion of the Survey of the *Gulf of Suez*, would proceed to the *Dardanelles*, I requested the Hydrographer to direct that the question of the Under-current should be thoroughly examined; and he issued instructions accordingly.

I yesterday learned through the *Levant Herald*:—(1) that the existence of a strong Under-current has been placed beyond all question, a boat having been carried along by the "current-drag" suspended from it, in opposition to the surface-current; (2) that the rate of this Under-current is estimated as greater than the speed of the *Shearwater's* steam-launch; and (3) that it runs at a depth of twenty fathoms,—precisely that at which my interpretation of Captain Spratt's experiments has led me to predicate its existence.

I venture to think that this verification of my prediction will be regarded as a confirmation of the general Physical Theory of Under-currents on which it was based; and it is now for those who oppose that Theory to show by what other force than the difference in the weight of the *Ægean* and the *Black Sea* columns, consequent upon their great difference in Specific Gravity, the *Dardanelles* Under-current can be sustained.

WILLIAM B. CARPENTER

NOTES

MR. C. MELDRUM writes from Mauritius that he has been looking into the subject of the West Indian hurricanes, and he believes that they show a periodicity of frequency corresponding nearly with that of sun-spots. So far as he has yet examined the subject, the maximum of cyclone frequency is a year or two after that of sun-spots. It was so ten years ago, and is so again probably, the mean cyclone frequency occurring in 1862, and this year, 1872, being the most marked for hurricanes since. We greatly regret to hear that Mr. Meldrum is suffering severely from illness brought on by over-work. It will scarcely be credited that the only allowance made to him by the Government for an assistant is 50*l.* per annum!

WE learn from the *Gardener's Chronicle* that M. Milne-Edwards has undertaken a task for which all naturalists owe him thanks. The archives of the Museum of Natural History in the *Jardin des Plantes* contain a collection of 6,000 volumes and more than 1,500 manuscripts, which are almost entirely unknown to the scientific world; for nearly 60 years the dust that lay upon them has never been disturbed. In 1803 it was proposed to create a special department for these and other works and documents, but the idea was abandoned, and since that time the collection has remained huddled away in a corner, on account of space being wanting in the library of the museum. M. Milne-Edwards has determined that such a state of things shall not be perpetuated, and has arranged that the collection shall be carefully examined, catalogued, and placed at the disposition of the scientific world. The manuscripts include a considerable number by Buffon, Cuvier, and Daubenton; there is a series of 24 pen-and-ink drawings by the last-named naturalist, representing the various types of Merino sheep, and exhibiting great artistic ability, and many albums filled with drawings of plants and flowers. It is proposed to add the books to the library of the museum, but there is so little space to be disposed of there, that it is expected the MSS. will be transferred to the great National Library, in the *Rue Richelieu*.

SIR DAVID BAXTER, who endowed in his life-time a Chair of Engineering at the University of Edinburgh, has by his will left the munificent gift of 40,000*l.* for the general purposes of the University.

THE death is announced, on the 16th inst. at Torquay, at the age of 75, of Lady Hooker, widow of Sir W. J. Hooker, K. H., formerly Director of the Royal Gardens, Kew.

MR. RAY LANKESTER, M.A., Fellow of Exeter College, Oxford, writes to correct the statement in our University Intelligence last week, that he has been appointed Deputy to the Linacre