

But there still remains to be found the actual mechanism of thunder-storms, concerning which various more or less theoretical opinions have been published. The matter will probably remain in doubt until settled by the same kind of investigation that demonstrated the inward spiral path of cyclonic winds. Synoptic charts for a stormy afternoon, with hourly or even half-hourly intervals, and stations only a mile or two apart, would probably settle the question beyond dispute; and the first local weather service that succeeds in preparing a set of such charts will gain a prize worth working for.

### LETTERS TO THE EDITOR.

*\*\* Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.*

#### The incandescent light on steamers.

THE instance cited in No. 104 of *Science*, of early electric lighting of steamboats by the incandescent system, though earlier than that given by Professor Trowbridge, is not the earliest.

I crossed the Atlantic in May, 1882, in the steamer City of Richmond, of the Inman line, which was beautifully lighted by the incandescent system. It is my impression that the lamps were of an English make, the form of the carbon filament being somewhat different from that then used by Edison and other Americans.

C. H. AMES.

#### Chopping-stones.

It is not improbable that the implement figured in a recent article by Miss Babbitt (iv. 529, fig. 3) could have been used as a fuel-breaker, when fastened in a wooden and hide handle; but a more evident use for such notched pebbles, namely, as net-weights, is seen in an industry of the present day among the gill-net fishers, both Indian and white, of the Great Lakes. Net-weights of this character are produced in large quantities at all points on the lakes where gill-netting is in vogue, forming frequently a part of the ballast in the bottoms of the 'Mackinaw' fishing-boats, and lying conspicuously scattered over the sand and beach in the neighborhood of fishing-stations. A less primitive appliance for sinking the nets is coming into use; so that the notched discoidal pebbles, attached to the net with short pieces of twine, are now regarded as old-fashioned by the more thrifty fishermen. The unnotched pebble net-weights, bound with bark, of the Red-Lakers, are interesting as a still more primitive form; but more extended observation in gill-net appliances would have shown Miss Babbitt that the notched form is of far more usual occurrence than she leads us to suppose, and that it possesses tons of examples on the shores of the Great Lakes.

I have found such implements associated with the remains of recent Indians (chert chippings, broken pottery, etc.) in the sand-dunes at Evanston. The modern net-weights are distinguishable from those of the chert deposits in only one particular, that while the surfaces of the former are smooth, and their

notches rough and angular, those of the latter show on their surfaces the effects of disintegration from long exposure on the sand to atmospheric agencies, their notches, too, having assumed the same crumbling character as the rest of the pebble. A large number of them (over twelve) which came to my notice at one place indicates their use as net-weights rather than as 'chopping-stones.'

W. A. PHILLIPS.

Evanston, Ill.

#### The use of slips in scientific correspondence.

I have been interested in Mr. Mann's and other articles on filing scientific notes.

Any one wishing to file such notes will find that a very convenient method of doing so is by the use of the Shannon file, which may be found at any large stationery store. The punch for punching the holes through the paper is the most convenient I have seen, as the holes are always the same distance apart, and at the same distance from the edge.

S. P. SHARPLES.

#### The decadence of science about Boston.

In a late issue (No. 104), *Science* comments upon the decadence of science about Boston. Is it not an explanation of this decadence that more and more in late years the mental atmosphere of Boston has become one of intellectual finish, rather than of intellectual earnestness? Of course, each of these traits has its excellences, as each may be exaggerated; but the latter of the two certainly is far more favorable to the active growth of science in a community. Moreover, the effect of an intellectual atmosphere becomes most evident when it has begun to influence the lives of young men grown up in its midst, and who take their cue in life from it. Is not this effect to be noticed in the present case?

X. C.

#### Koch's 'comma bacillus.'

In the reproduction of the drawing of the 'comma bacillus,' made to illustrate my paper in *Science* for Feb. 6, some defects are noticeable, to which it seems necessary to call attention, inasmuch as the design was to represent as accurately as possible the morphology of this much-talked-of micro-organism. The ends of some of the commas in the figure seem to be cut off square, whereas in the slide and in the drawing they are all rounded. Since writing the paper referred to, I have been favored by Dr. Koch with a slide of the 'comma bacillus,' in which the long spiral forms are far more numerous than in the slide sent to the Army medical museum, from which the drawing was made. Several of these spiral filaments are often seen in a single field, and many of them are longer than that seen in the centre of fig. 1.

GEO. M. STERNBERG, surgeon U.S.A.

Johns Hopkins University, Baltimore,

Feb. 11.

#### Carnivorous habits of the muskrat.

My observations of these animals were conducted principally along the banks of the Alleghany River in the vicinity of Warren, Penn., where these enemies of fresh-water bivalves are very numerous.

1°. The muskrat opens the shell by first severing the posterior adductor muscle. This can readily be accomplished, as the animal seldom immediately empties the branchial chamber after capture, but remains with the valves slightly gaping, with the siphons open, until it receives quite severe handling, upon which the water in the branchial chamber is violently ejected. The valves will also partially open if the

shell is allowed to remain untouched for some time, as if the animal was trying to acquaint itself with its new surroundings. After one adductor is severed, the valves open, so that the other may be easily reached.

2°. I have often seen the posterior margins of the valves slightly notched, and the epidermis scratched, from the efforts of the muskrat to open the shell.

3°. The shells are never opened by tearing away the hinge-ligament, although this portion is sometimes injured.

4°. During the winter season the shells were deposited, often many bushels, upon the edge of the ice which fringed the shores. This offered an explanation to me for the large quantities of dead shells which I had frequently noticed in certain localities at the bottom of the river.

5°. With the mussels in the muskrat shell-heaps were many flat stones, gathered for the purpose of eating the algae growing upon them.

6°. Among the species eaten by the muskrats of the Alleghany River may be mentioned the following as of the most frequent occurrence: *Unio ligamentinus*, *U. phaseolus*, *U. gracilis*, *U. patulus*, *U. clavus*, *U. crassidens*, *U. occidentalis*, *U. ovatus*, *U. luteolus*, *U. gibbosus*, *Margaritana rugosa*, *M. marginata*, and *Anodonta edentula*.

CHAS. E. BEECHER.

Albany, N.Y., Feb. 9.

I have been familiar, ever since my boyhood, with the fact that these animals live largely upon the mussels and other shell-fish of our rivers and creeks. It is also well known to duck-hunters, at least in this region of country, that they pick up no inconsiderable portion of their subsistence from dead and wounded birds found by them after the sportsman has abandoned the search. Only last spring I killed a duck in this vicinity which fell out of reach and floated off. Upon recovering it within less than an hour afterwards, on the farther shore of the 'slough,' its breast had already been eaten away by a muskrat; and it is no uncommon occurrence to surprise them at such repasts.

THEO. S. CASE.

Kansas City, Mo., Feb. 9.

If those interested in the carnivorous habits of the muskrat will refer to *Science*, No. 62, they will find there a notice of a discussion upon this subject, which took place before the Biological society of Washington in the spring of 1884. In regard to the fact that piles of *unbroken* *Unio* shells are found near muskrat burrows, it seems to me that there can be but one explanation, and that is the suggestion made at the Biological society, that the shells are gathered by the muskrats, piled up, and left out of water until too weak to keep their shells closed, when the rodent finds it an easy matter to pick out the meat.

RALPH S. TARR.

Cambridge, Mass., Feb. 6.

#### JOHN GWYN JEFFREYS.

THE ranks of English naturalists have met with a serious loss in the death of John Gwyn Jeffreys, LL.D., F.R.S., etc., which took

place suddenly at his residence, Kensington, on the 24th of January.

Dr. Jeffreys was born at Swansea, Jan. 18, 1809, and at the time of his death, with the exception of Sir Richard Owen, was probably the oldest British naturalist. Up to the last he was busily engaged on the investigation of the deep-sea dredgings of the Lightning and Porcupine expeditions; and, only three days before the reception of the news of his death, a copy of a recent paper on the relations of the American and European mollusk faunae was received from him.

Dr. Jeffreys was the descendant of one of the oldest families of Wales, and was called to the bar at Lincoln's Inn. For many years, however, he had retired from practice, and had been devoted to the investigation of the natural history of mollusks, especially those of the British islands, northern Europe, and the adjacent seas. His work on the British mollusca is the standard book of reference on that topic, and his investigations into the fauna of the deep sea were known and appreciated among men of science everywhere.

Dr. Jeffreys, from a lad, had been a student of conchology, devoting his holidays to collecting, and was among the earliest, most energetic, and persistent dredgers of the British seas. In his earlier days he was intimately acquainted with that classical band of British naturalists to whom science owes so much, and who toiled for the most part unappreciated. In later years he was equally active, and participated in the important expeditions of the Lightning, Porcupine, Valorous, etc., and was only prevented by an accident from participation in the voyage of the Challenger. His first important paper was published by the Linnean society in 1828; and since then hardly a year has passed by without contributions from his pen, many of which were printed by the Royal society, of which he was for forty-five years a fellow. The extent and importance of his researches can only be fully appreciated by specialists engaged in similar studies. He was president of the biological section of the British association in