An important problem still remains to be solved with regard to the mineral lands of the west. We have seen that the metallic veins so productive in the thick beds of the upper magnesian limestone of Iowa and Wisconsin, dwindle away on reaching the underlying thin layers of shell limestone. Now the question for solution is: do these mineral veins, when they reach the underlying magnesian limestone, again expand and become productive?

Such are the geological formations of the beautiful valley of the Ohio, projected by nature on a scale of grandeur commensurate with the vast territory, the mighty vegetation, the majestic rivers, the gigantic forests, and the wide expanse of trackless prairie, that characterize this magnificent region of the west.

Dr. Owen concluded his remarks by a series of queries intended to draw the attention of other geologists to some points in western geology which still demand investigation.

The hour of 6 having arrived, the Association adjourned.

The Chair reminded the meeting that Mr. Emerson would favor the Association and the public with a lecture, on the importance of natural history as a branch of common education, at 7½ o'clock this evening.

[Our engagements to various correspondents forbid the continuation of these "Proceedings," and we are reluctantly compelled to postpone the remainder to our October No.—Eds. Am. Jour.]

Art. XVIII.—*Description of a new species of Torpedo;* by D. Humphreys Storer, M. D.—with a plate.

[Read before the American Academy of Arts and Sciences, April 25th, 1843.]

In the January number of the American Journal of Science and Arts, I made a slight reference to a species of Torpedo which had been taken a few weeks previously upon the coast of Massachusetts. The description of a species captured on the coast of Ireland, published by William Thompson, Esq., Vice President of the Belfast Natural History Society, in the Annals of Natural History, answered so well to my specimen, that I was led to suppose it must be the *nobiliana*, Buonaparte. When however I carefully compared, with mine, the description and figure of the foreign species, contained in the second edition of Yarrell's British Fishes, I found no slight differences in the form of the disk of the body—in the size of the pectoral and caudal fins, and in

the situation and form of the temporal orifices in the two specimens; and at once suspected the American fish must be an undescribed species. As Yarrell's figure was engraved from a dried specimen, and consequently might not perfectly represent the form of the fish, I wrote to Mr. Yarrell, stating to him my doubts of the identity of the two fishes, and presenting him with my figure. His opinion coincides perfectly with mine. I have therefore the pleasure to offer you a description of a Torpedo hitherto unknown to men of science; and as no other species of this genus is known to exist on the shores of our hemisphere, I shall call it *Torpedo occidentalis*.

Dr. Mitchill introduced the *Raia torpedo* into his "Fishes of New York," published in 1815, upon the authority of several fishermen with whom he had conversed, who had been electrified by a species of Ray, when they were detaching it from the hook with which it was taken. He had never seen a specimen, but had no doubt of its being the *common torpedo*, and consequently catalogued it as such. Since the appearance of Dr. Mitchill's paper, I cannot find any farther notice of the existence of the electrical Ray in our waters. In my Report on the Ichthyology of Massachusetts, published in 1839, I cited the testimony of several observers to prove that an electrical fish, known as the *cramp-fish*, was occasionally taken on the shore of Cape Cod, but had never been seen by a naturalist. During the month of November, 1842, a specimen of this long looked for species was captured at Wellfleet by Mr. Seth N. Covell, and I was so fortunate as to obtain it.

For the following valuable letter I am indebted to Capt. Nathaniel E. Atwood of Provincetown. This gentleman, for nearly a quarter of a century, has been a practical fisherman.

"In answer to your first question, my father came to live on the south side of this harbor, called Long Point, in 1819. Previous to that time I never saw a cramp-fish. It happened that year, and four or five years after, that cramp-fish were found uncommonly plenty. I should think at this place there were found from sixty to eighty per year. Since that time they have been very scarce, and for the last ten years previous to this, I think the whole number found would not exceed thirty; this year about a dozen have been found. They are found here in the months of September, October, and November, and at no other

time of the year. The smallest I ever saw, I should think did not exceed twenty pounds weight, and was about as large as the head of a barrel; the largest I should think might weigh from one hundred and seventy to two hundred pounds; but as I have never weighed any of them, I cannot exactly tell their weight. The largest circumference is about twelve feet, or four feet diameter. You ask if I have ever received a shock from them? I can truly say that I have received a great many very powerful shocks, which have thrown me upon the ground as quick as if I had been knocked down with an axe. Although this shock is so powerful and severe, I have known individuals when taken from the water alive not to exhibit that power if they possessed it. You ask how they are captured? The largest number of their own accord run ashore upon our sandy beach. I have known two to be taken with the hook in our bay by persons fishing for other fish; and others, being discovered in the day time near the shore, are harpooned and dragged on shore.

"You also ask if I have known any one to receive a shock without having taken the fish up with the hand? I have received many shocks by taking hold of the pole of the harpoon, when I was at the distance of eight or ten feet from the fish, but the shocks are not so severe. I have also felt its effect when holding the rope attached to the harpoon, but in this and in cutting the liver from the fish when it is nearly dead, there is generally nothing more than a numbness felt in the fingers, and they seem to incline to straighten, so that I have known it difficult to grasp the handle of the knife while cutting the fish." "It does not run on shore on the north or town side of our harbor." "No part of the cramp-fish is used except the *liver;* this contains very good lamp-oil, equal to purified sperm-oil. I have never known it used for any other purpose of late; but formerly it was used for *cramp*, by bathing the parts afflicted, and it has been taken inwardly for cramp in the stomach, but of its effects when thus given I know nothing. The smallest of the fish I have seen, produced about one pint of oil, and the largest produced three gallons; the common size fish produce from one to two gallons."

The entire length of my specimen, which is a female, is four feet and two inches, and its greatest breadth is three feet: the greatest length of the pectoral fins is two feet, and their greatest breadth is fifteen inches. The first dorsal fin, which is three

inches and a quarter long and five inches high, is situated at the posterior portion of the pectorals, one half of its base being posterior to those fins. The second dorsal is two inches long, and two inches and three quarters high; it is two and a half inches back of the first dorsal, and three inches anterior to the commencement of the upper lobe of the caudal fin. The ventral fins are ten inches long, and five and a half inches wide. The anus is large, and is situated beneath the middle of the ventrals. The caudal fin is nearly triangular; its lower portion is the larger: the depth of this fin at its posteror extremity when expanded is eleven inches; its posterior margin is straight. The globe of the eye, which is circular, is an inch and a quarter in diameter: the cornea is oval; its longest diameter is one half of an inch, and is directed obliquely outwards; its shortest diameter is three eighths of an inch. The spiracles are oval, and smooth at their edge; they are one and a quarter inch in their largest diameter, and one inch in their shortest diameter, and are directed outwards and a little forwards. On the anterior and inner surface of the spiracles, just within the orifice, is a plaited membrane, the folds of which resemble somewhat the nasal septa; the longest of these folds are next to the median line, and they gradually diminish in length as they recede from it. The mouth when closed, measures six inches across from the angles, and when opened to its widest extent, it measures from the middle of the upper to the middle of the lower jaw five inches. The teeth are numerous, small and sharp—broad at their bases, and pointed at their extremities like spines. When the fish is placed upon its under side, and the anterior extremity of the disk is turned backwards, the nostrils are observed about three inches beneath its edge: they are covered above by a membranous prolongation, formed by a fold of the skin which arises from their exterior angle and is continued to the median line; the free edge of this fold is five eighths of an inch wide at its greatest width. A second fold commences at their outer upper angle, and passes downwards and inwards to the middle of the lower edge of the aperture. A third fold commences near the middle of the second, and is directed outwards and a little downwards. The nasal cavity is divided by a horizontal plate into two portions, and at right angles to this proceed numerous small septa going to the upper and lower margin of the nostrils. The color of the whole upper surface of this species, is a dark brown

with a few almost black dots distributed over it: the body beneath is white.

My friend Dr. Wyman dissected the electrical organs, and has furnished me with the following notes.

The electrical organs of the Torpedos have already been well described, especially by Mr. Hunter and Mr. John Davy; and in the present species there exists nothing which does not sufficiently correspond with the descriptions of these anatomists. The organs in which the electricity is developed, are situated in the space comprised between the anterior edge of the pectoral fin and the cranium, the outline of which is sufficiently obvious in the plate. They are of a kidney shape, the concave edge being directed towards the bronchiæ, and measure fifteen inches in length and eight in breadth. They consist of multitudes of triangular, quadrangular and hexagonal columns, extending from the upper to the under surface of the body, and each column is subdivided into numerous cavities or cells by transverse septa, of which Mr. Hunter counted more than one hundred to the inch, and each cell is filled with a gelatinous fluid. The most remarkable peculiarity, however, is the disposition of the nerves by which the electrical organs are supplied, and which have undergone a development of which there is probably no parallel in the class of fishes. The fifth and eighth pairs of nerves are the electrical nerves. The fifth pair of nerves, B, is distributed to the anterior part of the head, and the anterior portion of the electrical apparatus; and the eighth, C and C′, known as the vagus or branchio-gastric nerve, has its usual distribution to the organs of respiration, and the œsophagus and stomach, and in these directions its branches are of the usual size; but the additional branches which go to the batteries, as also is the case with those of the fifth, have acquired a volume many times that of the spinal marrow itself, and are to be regarded as an index of the great activity of the organs to which they belong. One other peculiarity equally remarkable remains to be noticed, viz. the ganglia from which the posterior nerves, the eighth pairs, originate. By referring to the plate the following parts will be seen: 1. cerebral hemispheres; 2. optic lobes; 3. cerebellum. These constitute the brain properly speaking, and have the same relative size as in the Raiadæ generally; but behind is a ganglionary mass (4) which exceeds the brain itself in bulk, and from which the electrical nerves, as will be

seen in the plate, are derived; this has been denominated the branchio-gastric ganglion in fishes, and as well as the nerves which have been already described, will serve to indicate the immense activity of the electrical apparatus.

EXPLANATION OF PLATE III.

Fig. 1. Torpedo occidentalis.

Fig. 2. Brain. 1. Cerebral hemispheres. 2. Optic lobes. 3. Cerebellum. 4. Branchio-gastric ganglion. A. Olfactory nerve. B. Fifth pair; B′, branch to the anterior part of the head. C, C′. Branchio-gastric or electrical nerves; D, branch to œsophagus and stomach; E, spinal marrow.

ART. XIX.—*Description of some New Species of Plants;* by S. B. BUCKLEY, A. M.

[BEING unable to find room for Mr. Buckley's detailed account of a botanical tour through the mountains of Alabama, Georgia, Tennessee, and Carolina, we have, in accordance with his request, merely extracted the description of new species for present publication. We also append, in a note, the diagnostic character of a new genus of Santalaceæ, established by Dr. Torrey, upon materials chiefly furnished by Mr. Buckley, to whom it is dedicated; a full account and figure of which will hereafter be given in this Journal.*—EDS.]

STREPTOPUS MACULATUS (*n. sp.*): stem and nerves of the lower surface of the leaves minutely pubescent; leaves sessile, ovate-lanceolate, acuminate; pedicels generally in pairs at the summit of the branches, not distorted; sepals subspatulate, acuminate, yellowish-white with numerous purple spots, rather longer than the filaments; anthers oblong; style longer than the stamens; stigma short.

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* BUCKLEYA, *Torr.*—Flores dioici. Perigonium calycinum, profunde quadripartitum; laciniis demum deciduis. *Masc.* Stamina 4, perigonii laciniis opposita. *Fœm.* Perigon. tubo cum ovario connato; limbo quadripartito. Discus epigynus carnosus, breviter quadrilobus. Stamina nulla. Ovarium inferum, unilocularis, uniovulatum; stylus unicus brevis; stigma quadrilobum. Drupa oblonga, compressa, putamine crustaceo, sulcato. Semen endocarpio adhærens. Embryo in axi albuminis copiosi carnosi reclusus, gracilis.—Arbuscula Tennesseensis. Folia alterna, disticha, integerrima, scabro-pubescentia. Flores terminales, parvi, virides; masculi umbellulati: fœm. solitarii.

B. DISTICHOPHYLLA = Borya distichophylla, *Nutt. gen. N. Am. pl.* 2, *p.* 232.