GOSSE. Bds. Jam. p. 1 (1847).—BRYANT, Pr. Bost. Soc. Nat. Hist. VII, p. 104 (1859) (Bahamas); *ib.* BREWER, p. 306 (1860) (Cuba). —ALBRECHT, J. f. O. 1862, p. 203 (Jamaica).—MARCH, Pr. Acad. Nat. Sci. Phila. 1863, p. 150 (Jamaica).—GUNDL. Repert. Fisico-Nat. Cuba, I, p. 221 (1865); *ib.* J. f. O. 1871, p. 253 (Cuba).—CORY, Bds. Bahama I. p. 134 (1880).—A. & E. NEWTON, Handb. Jamaica, p. 111 (1881).—CORY, List Bds. W. I. p. 23 (1885).

Recorded from the Bahamas, Cuba, and Jamaica.

GENUS **Catharista** VIEILL.

Catharista VIEILLOT, Analyse, p. 21, 1816.

Catharista atrata (BARTR.).

Vultur atratus BARTR. Trav. Car. p. 285 (1792).
Cathartes atratus MARCH, Pr. Acad. Nat. Sci. Phila. 1863, p. 151 (Jamaica).—A. & E. NEWTON, Handb. Jamaica, p. 111 (1881).
Catharista atrata CORY, List Bds. W. I. p. 23 (1885).

This species is claimed to have occurred in Jamaica. No other West Indian record.

THE SENSE OF SMELL IN CATHARTES AURA.

BY IRA SAYLES.

IN the 'Standard Natural History,' edited by John Sterling Kingsley, published by S. E. Cassin & Co., Boston, Vol. IV, p. 271, in an article written by Walter B. Barrows, I read as follows:

"The name condor, Humboldt says, is from a word in the language of the Incas, signifying to smell," and adds: 'There is nothing more astonishing than the almost inconceivable sagacity with which the condor distinguishes the odor of flesh from an immense distance.'"

Mr. Barrows then adds: "This belief in the extraordinary power of smell possessed by carrion vultures is largely an inherited or traditional one, and was long ago shown to be without foundation. That they have some smell is well known, and Owen has even shown that in the turkey buzzard the olfactory nerves

are highly developed. Recognizing this fact in the anatomy of the bird, there is yet very little evidence that the power is ever used in the detection of food."

He proceeds by referring to experiments made by Audubon, Bachman, and Darwin.

Audubon's experiments:—"The perfectly dry, stuffed skin of a common deer, placed in the attitude of death, attracted a vulture [*Cathartes atratus*] within a few moments, though there was nothing eatable about it; after satisfying itself of which, by walking over it and tugging at it, the bird circled about over the field until it espied a small snake, not thicker than a man's finger, upon which it at once pounced. Moreover, a large and putrid carcass of a hog carefully covered by canes and brush so as to be invisible, remained undiscovered by the vultures in spite of the intolerable stench it sent out, though they frequently passed by accident quite near it, and the dogs at once discovered it. Yet a small, freshly-killed pig hidden near the same place was at once traced out by the vultures, by the blood which was allowed to run from it as it was carried to its hiding place."

"Bachman tried these tests, and added some new and perfectly convincing ones. The rough painting of a sheep, skinned and cut open, soon brought vultures to examine and tug at it, and though the experiment was repeated scores of times, it never failed, on each fresh exposure, to attract the hungry birds. A wheelbarrow-load of tempting carrion was next covered by a single sheet of thin canvas, above which bits of fresh meat were strewn. The fresh meat was soon eaten, but, though the vultures must have frequently had their bills within an eighth of an inch of the carrion beneath, they did not discover it.

"While at Valparaiso in 1834, Darwin experimented on twenty or thirty condors which were kept in a garden at that place. They were tied in a long row at the foot of the wall, each bird by a single rope, and Darwin walked backward and forward before them, at a distance of about ten feet, with a piece of fresh meat in his hand, wrapped securely in a piece of white paper. No notice whatever was taken of it by the birds. He then threw it on the ground within a yard of an old male condor, who looked at it carefully for a moment and paid no further attention. With a stick it was pushed closer and closer, until he touched it at last with his beak, when instantly the paper was torn off, while every bird in the long row began struggling and flapping its wings."

Criticisms.—I have made these quotations in full for the purpose of offering a few criticisms, and adding my own observations.

First point. Mr. Owen, as a comparative anatomist, declares that the olfactories are largely developed. Mr. Owen's testimony on this point I take as entirely satisfactory. Now I boldly challence the world to produce an instance of a large, well-developed nerve of sense, in any species, which was not so developed by use, and which is not used. This, I think, is pretty good Darwinism.

For what, however, does the Turkey Buzzard need a large and well-developed organ of smell? Animals with any large sense-organ need that organ for one of two purposes—*either to guard against danger, or to aid in finding food.* Hunters, in their search for deer, know well that they must calculate on keeping their quarry at the windward. The deer's sense of smell is keen, and he flies from the tainted breeze at his highest speed.

The Buzzard does not need the sense of smell for protection against danger. *To aid in its search for food is, therefore, its only use in this bird.* I might rest my argument right here, and leave it for others to overthrow my position.

I premise here that I do not call in question the Buzzard's keenness of vision. That is granted; but any experiment that goes only to prove the Buzzard's keenness of vision, by no means proves its sense of smell dull.

Now, what are the conditions on which the sense of smell is available? First, there must be something to taint the medium, whether water or air. Anglers sometimes put some strong odor on their bait. The water dissolves this, and the fish, under certain conditions, smell it, and rush for it. Something which the air can dissolve is exposed in the air, which the air takes up and diffuses, and animals with a keen sense of smell for this thing speedily find their way to it. Kill any animal by bleeding, during the warm weather, and that animal will scarcely breathe its last before swarms of the green meat-fly will be humming around it.

But this is not all. The fish can never smell the tainted water up stream. It must be in the water below the tainted bait. Moreover, the tainted current takes a peculiar form, gradually spreading laterally and up and down, giving to the tainted tract approximately the shape of a cone.

In precisely the same manner, any odor spreads through the air. If the air is very calm, the odor rises in the shape of an inverted cone. If now a bird passes above it, and the odor is one springing from the customary food of such birds, it will descend in search of its scented food. If the wind has a gentle movement, the odor rises obliquely; and the bird, in hunting its food, will descend obliquely along the scented tract.

If the wind is high, the odor is born off horizontally; and the bird, when it crosses the tract of scented air, will follow it horizontally.

One word further. The Buzzard is not formed for digging the earth, or for tearing away any obstacles, in order to reach a tainted carcass.

Now, let us proceed with the experiments tried, and relied on as proofs that Buzzards do not use their sense of smell in search of food. First, Mr. Audubon's perfectly dry, stuffed deer skin. Admit that the Buzzards came, because they saw what appeared to be a deer. Does that prove that the Buzzard does not search by smell? It is a mere negative, utterly devoid of the slightest relevancy in the argument.

Second, the Buzzard caught a little snake. That only shows that the Buzzard can see.

Third, the big dead hog *thoroughly concealed.* The author says the Buzzards passed near it *by accident.* Is he sure that they flew near it by accident? I affirm that they passed near it in search of it, but it being thoroughly concealed they failed to find it; and had they thought it in the brush-heap they could not have reached it. Dogs found it, of course, and removed the brush.

Fourth, they did find a pig—a *little* pig—by tracking its blood.

Now these experiments determine nothing whatever concerning the sense of smell—the object of the experiments.

Bachman's painted sheep simply and only shows that the Buzzards can see, and can be imposed on. I remember that a certain ancient Greek painter so cunningly imitated grapes, that the poor little birds came and pecked at his pictures. Poor things, they were deceived; so were Bachman's Buzzards. But, really, does this prove anything concerning the sense of smell? Not in the least.

Secondly, he takes "a wheelbarrow-load of *tempting* carrion," completely covers it from view with canvas and scatters fresh meat above the canvas. The Buzzards come and eat the fresh meat, picking it piece by piece from the canvas covering; but did not tear off the covering and get at the carrion. Very well. Now he leaves us with the impression that he concludes that the Buzzards did not smell that carrion at all. Undoubtedly, however, the Buzzards thought themselves eating the very carrion itself; and, when they had eaten all they saw, they supposed that no more remained. This was only their usual experience. When they eat carrion from the ground, there always remains a great deal of stench in the ground, but they have no appetite for fetid ground, so they do not tear it up and fill their craws with it; no more did their stomachs have a craving for stinking canvas.

Mr. Darwin walked before the Condors with fresh meat securely wrapped in white paper, and the Condors took not the least notice of it; but so soon as the old male Condor got his nose down so he could take the air, he seized it, and tore off the paper in an instant. Now, Mr. Darwin forgot to tell us which way the wind blew, or whether or not there was any wind at all. His experiment proves absolutely nothing.

I have now some observations that are *positive*, relative to the keenness of the smelling power of the Turkey Buzzard.

In Christmas week, 1874, my folks in Virginia killed their hogs. As country women usually do, they saved the coarsest offal, put it in a pot, and set it away in the corner of the meat-house, intending to add the ley of wood-ashes, cut the grease, and make soap of it. The pot was forgotten. I was at the North at that time, and returned in February, knowing nothing of the pot.

In April, that pot revealed itself by serving a writ of ejectment on any one that ventured into the meat-house. It was discovered, and itself was ejected from the meat-house to the woodshed one evening, of which proceedings I knew nothing.

I am an early riser. Next morning, as soon as light, I was up and about the chores of the plantation. I had occasion to pass through the wood-house; and I went out faster than I went in. The dogs had found that pot full of stench and had eaten all their stomachs could endure.

The wind was blowing a furious gale from the east. It was all a man could do to keep his feet. About sunrise I chanced

to look to the west, and saw a large number of Buzzards, more than two miles away, crossing a line back and forth, from north to south; and I soon discovered that they were coming eastward. It did not occur to me that they were tracing the tract of tainted air from that pot full of putrescence. I kept quietly about my business and the Buzzards kept about theirs; and in less than twenty minutes from the time I first discovered them, they were on hand, wheeling about that woodshed. They were fifty or sixty strong. They staid around during an hour or two, when they gave up the search and left for other parts. Here was, therefore, a cone of tainted air, with its apex in that pot. It was drifted rapidly to the west, rising at an exceedingly low angle. The Buzzards crossed that cone back and forth so accurately that I could mark its limits almost exactly. Now there is no possible hypothesis applicable to the solution of these Buzzards' actions, but that they smelt that stench more than two miles. I might give many other notes on this matter, but I deem this perfectly apropos and convincing.

I have great regard for Mr. Audubon, Mr. Bachman, and Mr. Darwin, for what they have well done; but, in a series of experiments for ascertaining a great scientific fact, that these men should so blunder, and so falsely reason, is to me certainly astonishing. In attacking their conclusion, in this case, I feel that they are merely human.

FOURTH MEETING OF THE AMERICAN ORNITHOLOGISTS' UNION.

THE fourth meeting of the American Ornithologists' Union was held at the National Museum in Washington, November 16, 17, and 18, 1886. The number of members in attendance was about the same as at previous meetings, namely, about twenty Active Members and thirteen Associates. The official report of the Secretary stated that but a single death had occurred among the members during the past year,—that of Mr. Snowdon Howland, of Newport, R I., an Associate Member, well known as an