

estimate the actual cost of the salmon that I captured in the waters of Canada and New Brunswick; and I must confess that when in Quebec, during the Rebellion, I found a Washington dollar worth only about thirty cents in coin, I began to contrast the joys of salmon fishing with the question of ways and means. And the blight that was thrown upon salmon fishing by the troubles of the war have since been perpetuated by the advent upon Canadian streams of certain sprigs of the English aristocracy with the traditional bad manners and supremely selfish instincts.

As "pioneer fishing" is the title of this essay, it seems quite appropriate that I should devote a paragraph to the pioneer custom of spearing fish. For recreation, the custom cannot be defended, and yet I must confess that I have frequently tried my hand with a three-pronged scimitar. My first exploits in this line took place on the river Raisin when I was a boy, when the game consisted of mullet, pickerel and sturgeon, and while the fish were running up stream in the spring, and their passage was obstructed by the mill dams. And it was there, moreover, where a sturgeon did his best to deprive me of my life by pulling me into the roaring stream. When once spearing pike in the Upper Mississippi with Chippewa Indians, I saw a large fish captured, which, when opened, was found to contain a blacksnake about three feet long. On that day I lost my appetite for a pike steak. While traveling down the Upper Tennessee, many years ago, one of the natives tempted me on a torch light expedition after salmon. I knew the man had never seen a real salmon, so I went for the purpose of testing the correctness of the name he used. We had some luck, and the fish proved to be the pike-perch or pickerel, whereby the folly was illustrated of calling things, and especially fish, by improper names. And yet I know that the genuine salmon has often been taken with the spear. I never had the heart to commit that sacrilege, but I have seen the Indians spearing salmon by torchlight from their canoes in many of the streams of Canada and New Brunswick. The sport was picturesque, of course, but very heathenish.

In former years, when the black bass of Lake George were large and had not been frightened out of existence by the fashionable villas on the surrounding shores, it was quite common for the natives to spear them by torchlight. They did it in the spring when the fish were on their spawning beds and entirely unfit to eat, and I have never been able to find words to describe the rascality of that kind of fishing. And it was, perhaps, because I had a "finger in that pie" that I subsequently had the following experience: I had gone with a companion, one autumn evening, from Norwich, in Connecticut, to Preston Pond, for the purpose of spearing pike by torchlight. Our conveyance was a wagon drawn by one horse, and on reaching the pond we secured a suitable boat, packed in it our traps, and as we supposed, carefully fixed our horse in the corner of a lot near by. We were excited, fished far into the night, caught many fish, and when tired out went ashore to prepare for our return home. At first we could not find our wagon nor the horse, but after a while we did find the vehicle, but the fills were broken and the whole concern very much of a wreck. We then rooted out the horse out of some bushes, when we found that his harness was all torn into fragments; and there we were, with our horse quite as wretched as ourselves, far from home, hungry as bears, and in a quandary that can hardly be imagined. The only thing connected with our equipage that was not broken was the horse's neck, and as he seemed ready for any change of circumstances, my friend and I mounted upon his back, and in that predicament returned to Norwich. I never visited Preston Pond a second time excepting for the purpose of saving what I could from the wreck, which had resulted from the grossest carelessness in the tie up of our horse and wagon.

CHARLES LANMAN.

Natural History.

ON THE TONGUE IN THE HUMMING-BIRD.

BY R. W. SHUFELDT, C.M.Z.S., ETC.

THERE still seem to be two opinions in vogue relative to the structure of the tongue in the hummingbirds. In his second edition to the "Key to North American Birds," Professor Elliott Coues tells us that "The tongue is in effect a double-barreled tube, supposed to be used to suck the sweets of flowers" (p. 458); while that painstaking anatomist, for whom I have always entertained a great admiration, W. MacGillivray, writes in the fourth volume of Audubon's "Birds of America" in referring to the same subject, that "The tongue, properly so called, moves in a sheath, as in the woodpeckers; its length is 10 twelfths. When it is protruded, the part beyond this at the base appears fleshy, being covered with the membrane of the mouth forming the sheath, but the rest of its extent is horny, and presents the appearance of two cylinders united, with a deep groove above and another beneath, for the length of 3 twelfths, beyond which they become flattened, concave above, thin-edged and lacerated externally, thick-edged internally, and, although lying parallel and in contact, capable of being separated. This part, being moistened by the fluid of the slender salivary glands, and capable of being alternately exerted and retracted, thus forms an instrument for the prehension of small insects, similar in so far to that of the woodpeckers, although presenting a different modification in its horny extremity, which is more elongated and less rigid. All observers who have written on the tongue of the hummingbirds, have represented it as composed of two cylindrical tubes, and the prevalent notion has been that the bird sucks the nectar of flowers by means of these tubes. But both ideas are incorrect. There are, it is true, two cylindrical tubes, but they gradually taper away toward the point, and instead of being pervious form two sheaths for the two terminal parts or shafts of the glosso-hyal portion of the tongue, which run nearly to the tip, while there is appended to them externally a very thin-fringed or denticular plate of horny substance. The bird obviously cannot suck, but it may thrust the tip of the tongue into a fluid, and by drawing it back may thus procure a portion. It is, however, more properly an organ for the prehension of small insects, for which it is obviously well adapted, and being exertible to a great extent enable the bird to reach at minute objects deep in the tubes and nec-

raries of flowers. That a hummingbird may for a time subsist on sugar and water, or any other saccharine fluid, is probable enough; but it is essentially an insect-hunter, and not a honey-sucker" (pp. 197 and 198).

During the past year the writer has made a large number of dissections upon a great many species of hummingbirds, both adult specimens and embryos; and the object of the present paper is to present his own view upon the structure of their tongues, which has been the outcome of those investigations.

It has proved to be my good fortune to fully confirm the researches in this direction made by MacGillivray, whose very lucid account of them I have just quoted; and I must dissent from Professor Coues's opinion, as I could never believe that the tongue of a hummingbird is such an "extraordinary structure" as he still seems to take it to be.

In examining into the real facts in the case the writer would advise the investigator to proceed in the following manner. Having secured a fresh adult specimen of any of our hummers, and placed it in alcohol for an hour or so, in order to sufficiently harden the tissues for our dissection, carefully skin the head. First a word, however, to those who may not be quite familiar with the bony structure of a bird's tongue. To make this clear, all one has to do is to take the tongue, say of a chicken, and that by carefully removing the jaw, and taking not only that part which shows in the mouth, but those delicate prolongations which extend backward from it, and curl somewhat up behind the skull. These latter and the mid-portion will be found to be covered with muscle and other structures, all of which must be carefully peeled off with a penknife. Then we have the bony parts only left, or the *hyoid arches*, which will be found to consist of the following separate parts, as shown in my drawing of them:

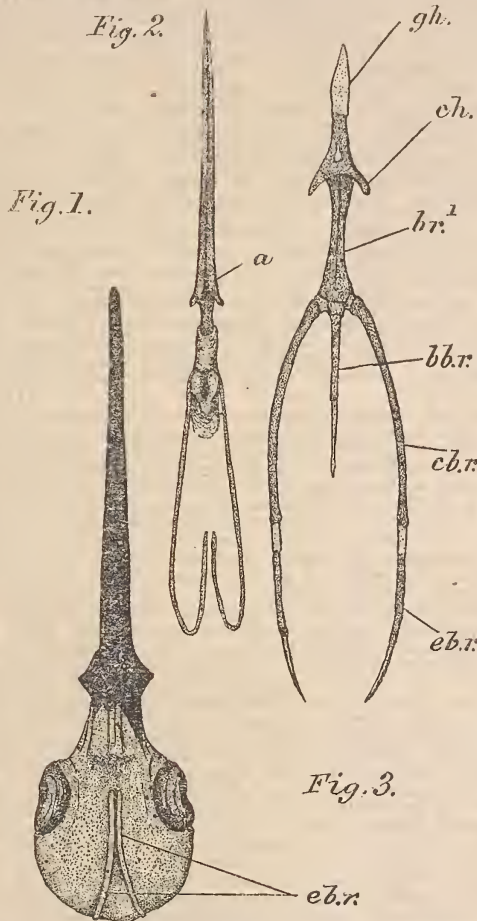


FIG. 1. Upper view of the head of the broad-tailed hummingbird (*T. platycercus*) after the skin has been removed; *ch. r.*, the epibranchials. (x 3).

FIG. 2. Upper view of the tongue of *hyoidean apparatus* of the same bird, immediately after removing it; *a*, the point where the incision is to be made to expose the glosso-hyals (x 2).

FIG. 3. Upper view of the tongue-bones of a chicken; somewhat enlarged, *gh.*, glosso-hyals; *ch.*, cerato-hyals; *br.*, first basibranchial; *bb. r.*, second basibranchial; *cb. r.*, cerato-branchials; and *eb. r.*, epibranchials.

First we find the bone and its cartilaginous tip (*gh.*), which were within the horny part of the tongue in the mouth; then a medium bony rod, in two pieces, with a posterior or hinder cartilaginous tip (*br.* and *bb. r.*). In some birds these pieces are united into one, while in others the hinder piece is absent. Now we have two limbs jutting out, one on either side, as shown in Fig. 3; when spoken of together these are the *thyro-hyals*, and are the parts which curl up behind the skull, and are so wonderfully prolonged in most woodpeckers, and in our hummingbirds. (See Fig. 2).

To return then to our specimen from which we have removed the skin, (Fig. 1), we have no trouble in finding at once the epibranchials (*eb. r.*) on top of the head. By the use of a sharp knife these can easily be lifted from their position, and finally with a little care the entire tongue removed from the head, when it will appear as I have drawn it in Figure 2. We next bring to our aid a lens of some considerable power, and after having examined our specimen, and carefully compared it with MacGillivray's account, which I quoted above, we may insert the delicate point of our dissecting knife at *a* in the figure, when by a gentle motion and a little well-directed force, the horny part of the tongue is easily split clear to its tip. Now our lens at once shows us that the cylinder (the right one in the figure) although hollow, is completely filled by the cartilaginous rod of the *glosso-hyal*, and is in reality not hollow at all.

In closing I would like to say that it must be evident to all that not a single structural character in the entire head of this hummingbird agrees in any way with the corresponding characters in the head of a swift, with which latter birds they, the hummers, have heretofore been associated in the same Order in classification.

FORT WINGATE, New Mex., June 26.

CHEEWINK.

CORALVILLE, Iowa, June 26.—*Editor Forest and Stream:* I inclose you a bit of excellent poetry. It was contributed to the *Independent* by S. B. McManus, of Lima, Indiana, and is as follows:

The catbird sets on the willer lim'
As is bendin' over the run ter drink,
And yapps what I reckon es seems ter him,
A wonderful gallus song—*chee-wink*.
Et haint' no meanin' es I can make out—
Et may be Latin or es elsewise Greek;
But he sets there a-singin' his tune like he mought
Hev a dozen pianers inside of his cheek.

But the brook likes the tune, an' goes laffin' a laff
Right under it, heartier, leastwise so I thint',
An et keeps up a kind of a banterin' chaff.
Fer ter hearten the singin', *chee-wink, chee-wink!*
En the blue Johnny-jump-ups (they allus maind me
Of my little gal's eyes so lovin' an' sweet)
They smiles like a human when they hears on the tree
The catbird a-fillin' the air complete.

And the cowslips they grin 'n' git yellere yet,
Like es of they was blushin' a new-fangled blush,
When they seen the "cheewink," in the willers rain-wet,
Er hoppin' about in the dead elder brush,
En the sweet-William tops all a bendin' with blows,
Nod back'ards 'n' for'ards a-keepin' of time
To the chirik little tune as it mellerly flows
Ont inter the air like a short-meter'd rhyme.

I hoe an' I listen 'n' listen 'n' hoe;
That bird in the willer a-pipin' away
Makes my worries go fast, an' my pleasures go slow,
'N' the sun ter shine clear on the cloudiest day.
Et's a mighty small thing, I suppose, fer ter make
A man ter feel happy, folks most like may think,
But fer me ter be cheerful, et don't allus take
More'n the catbird a-singin' *chee-wink, chee-wink!*

Now isn't that just splendid? But what a pity he doesn't take FOREST AND STREAM, so that he might have been a little better versed in natural history, and not have spoiled it all by confounding the catbird with the "cheewink." I sat down on reading it and wrote the author that I thought it a pity his fine poetry should be spoiled by so palpable an error; and he sent a reply which I inclose:

"*Warsaw Daily Times*, Warsaw, Ind., June 18, 1887.—Mrs. Violet S. Williams: Mr. McManus handed me your letter to answer. I certainly think you are mistaken in regard to the catbird out here in Hoosierdom; that bird says *cheewink* as plainly as the whippoorwill. I am pleased, however, to know that you are pleased with our poet, and it may possibly be your good fortune some day to listen to him, as he contemplates going on the lecture platform. He is spending a few days in our city. I am, most respectfully, your obedient servant, QUINCY A. HOSSLER."

Now will you please say if the catbirds of Hoosierdom or any other locality were ever known to hollow *cheewink*? VIOLET S. WILLIAMS.
[Although we have seen the catbird from the Atlantic Coast to the Rocky Mountains, we have certainly never heard it utter the call *cheewink*. The *cheewink* of the Missouri River Valley and Rocky Mountain foothills does, however, utter the characteristic catbird "mew." The apparent mistake of the poet should be explained in some way.]

ROBINS FEED THEIR YOUNG IN CAGES.—Cold Spring Harbor, July 7.—*Editor Forest and Stream:* A short time ago my terrier picked up a young robin which had fallen from the nest, and as it seemed to be uninjured by the dog, I took it down to the fish hatchery and put it in a bird cage. It was about ready to fly, and therefore too old to accept a man as its natural nurse, and declined all overtures of food. Knowing that it would starve under these circumstances, I thought of trying to see if the old birds would feed it. All of my men were of the opinion that the old ones would poison it, a theory I had heard from boyhood; and to test it, the cage was placed in a lilac bush near where the bird was found, and the old ones fed it regularly for a week. It grew strong and fat, and thinking that I had carried the experiment far enough, and that the old ones would soon abandon it, I opened the door at night and in the morning it was gone. Both the parent birds fed the young robin, and one or both of them could be seen at the cage or about it almost every day. As the consumption of worms by the young robin is vastly greater than any one would imagine who has never attempted to raise any, it is probable that in the alleged case of poisoning of the young, they might have died from starvation. Who knows that old birds poison their young when confined in cages? and what poisons do they use?—FRED MATHER.

NEW MEXICAN SQUIRRELS.—With reference to his article on New Mexican squirrels, which recently appeared in FOREST AND STREAM, Dr. Shufeldt desires us to say for him that for the moment the prairie dog (*Cynomys columbianus*), which occurs all over this region, shipped his mind as a representative squirrel of the Fort Wingate fauna. Its name should at least have been mentioned, even if its far better known habits rendered unnecessary the more extended description bestowed upon the other three species mentioned in his list.

ALBINO HEDGEHOG.—Boston, July 10.—In regard to communication from Mr. C. F. Richardson, in issue of July 7, I have a stuffed specimen of a perfect albino hedgehog, captured some years since in Stoddard, a small town in southwest New Hampshire. It was the first one I had seen, but on referring the subject to Prof. Agassiz, he informed me that they were not as rare as I had supposed, and stated that specimens existed in all our museums.—E. M. MESSENGER.