

## FOOD POISONING IN SHORE BIRDS.

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DURING the summer months, schools of blackfish (*Globicephala melaena*) find their way around the tip of Cape Cod into Massachusetts Bay. The majority finds its way out again into the open sea; some are beached and killed by fishermen, the carcasses being buried after the case oil is extracted; others become stranded and die along the shores. When this last occurs, local authorities bury all carcasses likely to become offensive. September 14, 1930, a quahaug fisherman reported to our Ornithological Research Station that following the coming and departure of a school of these mammals the month before, some blackfish had been stranded and died on Billingsgate Island and Jeremy's Point, isolated and uninhabited places in the bay; that migrating shore birds feeding at these carcasses were dead or seriously ill. The following day our investigation determined the following facts:

On a sandbar, above high-water mark, connecting the two elevated parts of Billingsgate Island, were the badly decomposed carcasses of two blackfish and one seal (*Phoca vitulina concolor*). These were covered with swarms of blow-flies (*Calliphora*) and filled with their maggots. Maggots crawled about the adjacent beach which had been heavily tracked by birds' feet. Within a radius of seventy-five yards were found 17 dead Turnstones (*Arenaria interpres morinella*) evidently having succumbed within a week. Nearby, were 5 Turnstones and 9 Sanderlings (*Crocethia alba*) so sick they could fly only a few feet and run not at all. Also, there were 37 Sanderlings sufficiently strong to escape capture but obviously ill. On Jeremy's Point were the rotting bodies of 25 blackfish covered with flies and filled with maggots. A flock of 47 Sanderlings and 3 Turnstones, apparently in perfect health, were about the carcasses, some perched on the bodies. They were seen to catch and swallow flies but none were seen eating maggots. The bodies of 2 Turnstones, dead two days, were found within 30 yards of the blackfish. Some years ago it had been attempted to make Jeremy's Point a protected Tern rookery, but the endeavor

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was abandoned after finding it impossible to exclude marauding mammals. On our previous visit to the Point, the preceding July, abundant evidence was found of the persecution of the inhabiting Common Tern colony by mammals. This day, September 15, numerous skunk and cat tracks were observed. So it is presumed that dead and sick shore birds there had been disposed of by the predators.

The behavior of the sick birds was characterized prominently by a general muscular paralysis, particularly of the legs. Undisturbed, they crouched motionless on the beach, legs drawn together under the body, bill extended flat on the sand. When approached, they endeavored to escape by walking. The less seriously ill could limp a few feet with many falls; the others found their legs quite unable to support them. None was able to escape capture by running. Some were unable to raise their bodies from the ground when attempts were made to use the wings; others were able to fly three or four feet at most; none made flights of over fifty yards.

At Billingsgate a Pigeon Hawk (*Falco columbarius*) twice swept down, seized an ailing Sanderling in its talons, and proceeded to eat the viscera through the back.

Nine Sanderlings and five Turnstones were captured, placed in gathering cages and brought to the station for observation. One of each species expired on the way. The others were put into our large over-night cage with a heavily sanded floor. Several low containers filled with fresh water were placed within easy reach of the birds.

Here the behavior of the birds duplicated that observed on the island—unwillingness to move, and paralysis. All were having a frequent diarrhoea with badly smelling, watery, green stools expelled with force as if due to a violent peristalsis. The feathers of the anal region were all stained green. Thirst appeared to be urgent, the birds drinking greedily when water was placed within reach. When sufficiently recovered to move about, they took a drink every few minutes. They appeared to enjoy standing in the basins. Drinking water acted as a stimulant. Within a few hours two birds recovered sufficiently to wobble about. The following morning two more had made similar progress. Careful observation determined the presence not only of muscle weakness but of a pro-

found disturbance of equilibrium and coördination as if the causative toxin had involved the cerebellum. For all the birds, the diarrhoea appeared to have terminated at the end of 48 hours. The muscle weakness disappeared first from the neck, next from the wings and last from the legs. The birds were able to fly across the cage before they were able to stand longer than a second or two.

By the evening of the 17th four Sanderlings and one Turnstone acted normally, were banded and released. The Turnstone mounted rapidly and flew out over the marshes on toward the hard sand beaches of the bay a half mile away; the Sanderlings flew 150 yards down into the marsh, and began feeding on a mud flat at once.

On the 18th the remaining birds were offered minced quahaug. This was taken readily by all but one Turnstone and one Sanderling which remained badly prostrated. These were fed forcibly. On the 20th all but these two were liberated, evidently fully recovered. On the 23rd these last two were discharged cured.

The Turnstone and Sanderling which had died on the way to the station were autopsied carefully. They were found to be grossly normal excepting the digestive tracts. Both were well nourished and fat. In the Turnstone the abdomen was hard and distended by gas filled intestine, the gizzard splotched with small areas of green material, the liver normal, gall bladder distended, duodenum empty but deeply congested, the cloaca fairly well filled with green putty-like material. The entire intestinal tract bore evidence of severe irritation. Aside from an empty gall bladder and normal gizzard, the Sanderling evidenced the same pathology, with the pathological changes more profound. Lack of equipment prevented bacteriological and microscopic study.

Since the clinical story and pathological findings parallel closely the maladies in man known as ptomaine poisoning, botulism and acute gastro-entero-colitis, it may be deduced that these birds suffered from symptoms of similar etiology, these diseases in man being due to bacterial contamination of ingested food. In all probability the birds did not eat the decomposed infected flesh of the blackfish but swallowed bacteria and toxins adhering to the bodies of the flies and possibly the maggots infesting the carcasses.

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