



Figure 2. Remains of 10 Common Terns entangled in fish line at Belle Isle, Wayne County, Michigan (photographed 13 July 1963).

in some foot-high weeds and grass, and the bird undoubtedly attracted the other adults by its efforts to escape. Within a few feet were several empty nests, from which the entangled young had evidently come. One of the adults had been banded by me (band no. 623-41380) as a downy young at this same colony on 9 June 1959. The band showed signs of wear on the inner portion.

In the last 15 years I have many times found dead adult terns entangled in fish lines but all the others had been hooked in the mouth or deep in the throat. In every other instance only the bird carrying the line had become entangled.—WALTER P. NICKELL, *Cranbrook Institute of Science, Bloomfield Hills, Michigan.*

**Diving times of wintering water birds.**—Between 20 October 1962 and 27 January 1963, I timed the durations of the dives of 7 species of waterfowl near Vancouver, British Columbia, Canada (Table 1). All dives were made in salt water with the exception of those of the American Coot, which were made in a brackish lagoon. During the periods of observation, air temperatures ranged from  $-1^{\circ}\text{C}$  to  $17^{\circ}\text{C}$  and averaged  $8.4^{\circ}\text{C}$ ; salt water temperatures ranged from  $4^{\circ}\text{C}$  to  $11^{\circ}\text{C}$  and averaged  $8.1^{\circ}\text{C}$ . Water temperatures in the lagoon ranged from  $7^{\circ}\text{C}$  to  $10^{\circ}\text{C}$  and averaged  $8.3^{\circ}\text{C}$ . Dives and pauses (the intervals between successive dives in a series) were measured with a stopwatch.

Only feeding dives were used in the calculations. Escape dives and "pelagic dives" were rejected, and it can be assumed reasonably that those used were all "bottom dives" as defined by Dewar (J. M. Dewar. *The bird as a diver*. London, Witherby, 1924.). Only series containing five or more dives were used, and the dive/pause ratio was calculated from the mean values of all dives and pauses for each species regardless of sex. Because of the small scale of available nautical charts and the rockiness of the sea bed, water depths could not be calculated accurately. The approximate depths in

TABLE 1  
DIVING TIMES OF VARIOUS WATER BIRDS

Species	Number of dives	Approximate depth (m)	Dive time (seconds)			Pause time (seconds)			Dive/pause ratio
			Minimum	Maximum	Mean $\pm$ S.E.	Minimum	Maximum	Mean $\pm$ S.E.	
Horned Grebe, <i>Podiceps auritus</i>	22	1.2-3.1	29.0	39.9	33.4 $\pm$ 0.72	9.3	17.6	12.4 $\pm$ 0.57	2.7
Pelagic Cormorant, <i>Phalacrocorax pelagicus</i>	44	1.5-6.1	23.7	60.4	45.3 $\pm$ 1.35	8.5	35.1	23.2 $\pm$ 1.17	2.0
Common Goldeneye, <i>Bucephala clangula</i>	19	1.2-5.5	24.8	41.2	34.9 $\pm$ 0.94	11.0	21.1	15.9 $\pm$ 0.82	2.2
Oldsquaw, <i>Clangula hyemalis</i>	28	4.6-11.0	47.6	67.1	59.3 $\pm$ 0.92	6.2	28.2	14.4 $\pm$ 0.84	4.1
Surf Scoter, <i>Melanitta perspicillata</i>	20	3.1-9.2	32.7	65.3	51.9 $\pm$ 2.29	13.3	38.1	23.2 $\pm$ 1.80	2.2
Red-breasted Merganser, <i>Mergus serrator</i>	8	1.8-9.2	41.8	46.8	43.9 $\pm$ 0.59	19.7	28.8	24.0 $\pm$ 1.21	1.8
American Coot, <i>Fulica americana</i>	87	0.9-1.8	1.8	12.4	5.9 $\pm$ 0.21				< 1.0

Table 1 have been determined by applying tidal corrections and calculating the minimum and maximum depths to which any of the dives *may* have been made.

Dewar suggests that the dive/pause ratio provides a measure of the diving efficiency of the bird as it represents time spent under water in relation to total time spent in diving. If the durations of the dive and pause are mainly functions of water depth, it follows that the dive/pause ratio for a species should remain approximately constant. This is suggested by comparison of the ratios here obtained with those by other workers. G. F. van Tets (pers. comm.) measured 20 dives of a wintering Pelagic Cormorant. The mean duration of the dives was 29.1 seconds, and the dive/pause ratio was 2.0 (against 2.0 here). Dewar's data yield a dive/pause ratio of 1.8 for both Common Goldeneye (2.2) and Red-breasted Merganser (1.8). From data on the Oldsquaw (Gordon, *Brit. Birds*, 13: 244, 1920), I calculated the dive/pause ratio to be 4.2 (here 4.1) and for the Surf Scoter (Alford, *Brit. Birds*, 14: 106, 1920), 1.7 (here 2.2). Although I did not measure the durations of pauses in series of dives by the American Coot, they were certainly longer than the dives. For the European Coot (*Fulica atra*), Dewar calculated the dive/pause ratio to be 0.2, mean duration of dive to be 6.2 seconds, and maximum duration to be 12.8 seconds.—DOUGLAS D. DOW, *Department of Zoology, University of British Columbia, Vancouver, Canada*.

**Observations on the Spotted Rail and Pinnated Bittern in Costa Rica.**—In early July, 1963, we found Spotted Rails (*Pardirallus maculatus*) in a fresh water marsh 5 km (3 miles) southeast of Turrialba, Province of Cartago, on the Caribbean slope of Costa Rica. Two rails and one Pinnated Bittern (*Botaurus pinnatus*) were taken while we were making additional observations in July and August.

For Costa Rica these specimens represent the first published record of the bittern and the first published record with locality and date for the rail. Both are tropical South American species until recently known from Middle America only from a few widely scattered localities. In recent years the Spotted Rail has been recorded from Mexico (Veracruz and Chiapas), British Honduras, and Costa Rica (specimen in British Museum; no data published); the Pinnated Bittern has been recorded from Mexico (Veracruz, Tabasco, and Quintana Roo) and Nicaragua (Dickerman, *Wilson Bull.*, 73: 333–335, 1961; Dickerman and Warner, *Wilson Bull.*, 73: 336–338, 1961; Watson, *Wilson Bull.*, 74: 353, 1962). In Veracruz, as in Costa Rica, the two species have been found together in the same marsh (Dickerman and Warner, *op. cit.*). It now seems probable that these furtive species will prove to have a fairly continuous range in suitable habitat throughout the Caribbean slope of Middle America.

The marsh of our records is a wet pasture of 21 hectares (52 acres) on the grounds of the Inter-American Institute of Agricultural Sciences, at an elevation of 600 meters (1,950 feet). Forbs and bushes are cut from the field periodically to maintain the habitat for grazing. The dominant grasses which remain are *Panicum purpurescens*, which grows to a height of one meter and is found where the substrate is wet and muddy, and *Paspalum fasciculatum*, which attains a height of 2.5 meters and prevails on the small patches of dry ground. The birds were always found in the *Panicum* zone.

Eight or nine Spotted Rails occupied the marsh during July. They were found in the same parts of the marsh on each visit, and the call of a disturbed bird was usually answered by another from nearby. This suggests that, whether or not paired, the birds were maintaining territories. The call is a four-noted whistle consisting of one higher and longer first note and three shorter notes following in rapid succession. The series begins about one octave above middle C and descends one note during the