In 9 of the 11 years during which I have kept records I have heard a third type of song, not described by Saunders, in January and February. The song was similar in pattern to the warbling song, but being much softer, it appeared to fit the category of secondary song called "whisper song" by Lister (1953, Brit. Birds 46: 139). The songs were first heard as early as 13 January and as late as 2 March although the majority were recorded in February (Table 1). Each song lasted from about 1 to 3 seconds and was usually repeated a number of times with variations for a total period of from 1½ to 3 minutes. The birds sang in both mornings and afternoons, at temperatures varying from −6° to 12°C, and in sunshine, rain, and light snow. Some of the singing birds were adult males, while others were brown and could have been either immature males or females.

My records bear out Saunders' statement that the vireo song of the Purple Finch is uncommon. I heard this song only twice, both times in February 1971. Both times the singer was an adult male. The song consisted of short vireolike phrases of a few notes each. In one of these two cases the bird began singing the vireo song and after a short period changed over to the warbling song.

The well-known warbling song was heard as early as 9 February but, more commonly, during the latter part of February or in early March (Table 1). Adult males and brown birds were heard frequently giving this song. On one date in February and one other in March, I heard a bird sing a mixture of a warbling song and a whisper song. The former singer was an adult male, the latter had brown plumage.

It appears from my records that Purple Finches in northeastern Massachusetts sing three types of songs during mid- and late winter. The whisper song is heard commonly and the vireo song rarely (two records only) in February. The common warbling song begins usually in late February or early March and continues into spring.—STEWART DUNCAN, *Department of Biology, Boston University, Boston, Massachusetts 02215.* Accepted 4 Jan. 73.

**Volume of Forster's Tern eggs.**[1]—Few data on the volume of tern eggs have been published. The only ones I have been able to locate are those of Worth (1940) and Barth (1953) for the Common Tern (*Sterna hirundo*). This report presents egg volume data for Forster's Terns (*S. forsteri*) and evaluates present and past methods of estimating egg volumes.

The irregular shapes of birds' eggs prevent easy determination of egg volume from linear dimensions. Two formulae have been proposed by which egg volume (V) may be estimated from measurements of egg length (L) and greatest width or breadth (B). The earlier method (I), originally proposed by Bergtold (1929), Westerskov (1950) reduced to $V = 0.51\ LB^2$. The second method (II), originally proposed by Worth (1940), Barth (1953) later reduced to $V = 0.445\ LB^2$. As Barth pointed out, such formulae have the disadvantage of possible errors resulting from shape bias, and as the two formulae differ, it is not clear which one should be used for a given species. Shape bias can be avoided by using the methods of Preston (1968 and earlier) to determine egg shape and then calculating volume, but shape is frequently not determined. It may be useful, therefore, to compare the results of these formulae with those obtained from an additional

[1] Publication No. 20 of the University of Manitoba Field Station, Delta, Manitoba.

method (III), which, although probably more accurate because it avoids shape bias by determining egg volume from the differences between the weight of the fresh egg in water and its weight in air (Evans 1969), often cannot be used because of difficulties in obtaining fresh egg weights under field conditions. A direct method of obtaining volumes by immersing eggs in a graduated container also requires fresh eggs, and is most accurate when several eggs are measured together (C. H. Blake pers. comm.).

TABLE 1

EGG VOLUMES OF FORSTER'S TERNS

| Method used | Sample size | Range in cc | Mean in cc | SD |
|---|---|---|---|---|
| I[1] | 158 | 16.4–23.5 | 20.89 | 1.35 |
| II[1] | 158 | 14.3–20.5 | 18.19 | 1.17 |
| III | 11 | 16.9–22.0 | 20.08 | 1.55 |

[1] Calculated from length and greatest width data measured to the nearest 0.5 mm given in McNicholl (1971).

TABLE 2

VOLUMES OF NINE FORSTER'S TERN EGGS[1]

| Method used | Sample size | Range in cc | Mean in cc | SD |
|---|---|---|---|---|
| I | 9 | 17.1–22.5 | 19.69 | 1.59 |
| II | 9 | 14.9–19.6 | 17.17 | 1.39 |
| III | 9 | 16.9–21.2 | 19.84 | 1.57 |

[1] Summarized from McNicholl (1971).

TABLE 3

PAIRED $t$-TEST COMPARING EGG VOLUME CALCULATIONS

| Comparison | $t$ | $P$[1] |
|---|---|---|
| (1) I vs. II | 3.5811 | 0.01 |
| (2) I vs. III | 0.2085 | 0.5 |
| (3) II vs. III | 0.8270 | 0.01 |

[1] for $t$ values for $n - 1 = 8$ d.f.

While studying Forster's Terns during the breeding season at Delta, Manitoba in 1968 and 1969 (McNicholl 1971), I was able to obtain length-width data for 158 eggs and fresh egg weights for 11 eggs. Table 1 compares volume estimates based on these data for each of the three methods. Table 2 gives results for nine eggs that were assessed by all three methods. Table 3 lists paired $t$-test comparisons between methods in the latter eggs. The values in Tables 1, 2, and 3 show that method I results closely approximate those obtained by using the weight method (III) ($P > 0.5$), whereas the values obtained by using method II are significantly lower ($P < 0.01$) than those obtained using either of the other two. Similarly Evans (1969) obtained higher values using the weight method on White Pelican (*Pelecanus erythrorhynchos*) eggs than those Worth (1940) gave with his formula for the same species. The data thus suggest that of the two formulae, the first ($V = 0.51\ LB^2$), gives a closer approximation to actual egg volume in Forster's Terns, which may be taken as approximately 20.9 ± 1.4 cc (Table 1, method I). As the accuracy of each formula will depend on egg shape, both formulae should be tested against more precise egg volumes before using either to estimate egg volumes in a given species.

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**Hummingbird drinking seawater.**—On 27 September 1972, at Bahia Concha near Santa Marta, Colombia, I watched a green hummingbird (sp. ?) apparently drinking from the surface of the sea. Bahia Concha is a sheltered bay surrounded by steep, rocky limestone hillsides covered with cactus and thorn scrub. That afternoon the sea was relatively calm and the weather hot and dry.

I first noticed the hummingbird sitting on the branch of a tree overhanging the sea at the eastern end of the bay. The bird flew down to the surface of the sea, hovering a few inches above the small waves, and when the water surface was smooth between wave crests it flew down quickly, dipped its beak into the water, and then returned to the branch. It remained on the branch for 2 or 3 minutes and then repeated the beak-dipping procedure at intervals over a 20-minute period, after which it flew away. I remained as quiet as possible in the water about 10 feet from the bird and thus had a clear view of its behavior. As it held its beak in the water for 2 or 3 seconds on each of four occasions, I believe it was drinking the salt water, not picking up insects from the surface.

Although I noted no local sources of fresh water, the bird should have been able to obtain some water from its food as the cacti were in bloom on the hillsides. This suggests the possibility that drinking the seawater enabled it to obtain mineral salts required to supplement its normal diet. Verbeek (1971, Condor 73: 112) reported that hummingbirds will eat sand grains, presumably for the calcium salts they contain; the ingestion of seawater would supply the bird with these and other salts that it may require.—PETER R. BACON, *Department of Biological Sciences, University of the West Indies, Trinidad, West Indies.* Accepted 18 Jan. 73.