time we have no information until our work began in 1972.

We made extensive searches through Puerto Rico and found *A. xanthomus* mainly to be confined to two circumscribed regions: 1) southeastern Puerto Rico, on Roosevelt Roads Naval Base, near Ceiba; 2) southwestern Puerto Rico, in a narrow coastal zone extending 35 km from Guánica to Boca Prieta. A few small, isolated populations exist outside the two main population centers, notably at San Germán. From roost count data, surveys of nesting areas and communication with other workers, we estimate that the total world population of *A. xanthomus* is now about 2400.

Although the evidence is circumstantial, the blackbird's decline since the 1940's is correlated with the arrival and increase of *M. bonariensis* in Puerto Rico. In the cowbird's spread through the Caribbean, it has been implicated in the decrease of other island bird populations, such as the Yellow Warbler on Barbados (Bond 1966) and the House Wren (*Troglodytes aedon*) on Grenada (Bond 1971).

M. bonariensis arrived on Mona Island in early 1971 (Bond 1973). In December 1972 M. Valéz and V. Marquez (fide H. Raffaele) saw a flock of 12 cowbirds on Mona. On several visits to Mona in 1974 and 1975, we saw groups of cowbirds associated with *A. xanthomus*, but because the blackbirds were nesting on steep cliffs, we could not examine any nests.

In October 1972 J. Lindebach collected the first *M. bonariensis* on Hispaniola (Bond 1973). By 1973 A. Dod (pers. comm.) found the species as far west as northcentral Dominican Republic (Santiago). In the Dominican Republic, cowbirds have been seen flocking with two common species: the Village Weaver (*Ploceus cucullatus*) and the Black-cowled Oriole (*Icterus dominicensis*). It is interesting that all Hispaniolan cowbirds collected or sighted whose sex was determined were males.

We anticipate that *M. bonariensis* will move rapidly through the remainder of the Greater Antilles. Cuba or Cozumel may act as the final stepping-stone for the species' invasion of North America.

We appreciate critical comments made by J. Bond and C. B. Kepler. A. Dod generously made available her observations from the Dominican Republic.

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CONTINUED EASTERN EXPANSION OF BREEDING RANGE OF ROSS' GOOSE

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The Ross' Goose (*Chen rossii*) has nested in yet another Hudson Bay Lesser Snow Goose (*Chen c. caerulescens*) breeding colony. On 29 July 1975 we found a Ross' Goose family with pre-fledging juveniles 5 to 6 weeks old among 1850 flightless Lesser Snow Geese captured for banding near the mouth of the Brant River (55°10′N, 82°52′W) in the Cape Henrietta Maria colony on the Hudson Bay coast of Ontario. This is the first Ontario breeding record and represents a significant extension of breeding range into the eastern portion of the Hudson Bay Lesser Snow Goose population. The probable manner of this extension and some implications are discussed.

The family consisted of three juveniles (2 ♀♀, 1 ♂), an adult male Ross' Goose and a larger female

which appeared to be a hybrid between a Ross' and a Lesser Snow Goose (cf. Trauger et al. 1971). We could not be positive that the two adults were a mated pair, but their behavior in the banding pen suggested that all five geese belonged to a single family. Despite the confusion and continual mixing of the crowded Snow Geese due to our activities, the two adult Ross' Geese tended to remain close to each other or with one or more of the juveniles. The Ross' Geese were photographed and measured before they were banded and released.

The culmen measurement of the male (39.3 mm) was within the range for Ross' Geese given by Trauger et al. (1971) while the culmen of the female (45.9 mm) exceeded the range for Ross' Geese and corresponded to that for "intermediate" (presumed hybrid) geese by these authors. Our method of tarsal measurements (♂: 71.7 mm, ♀: 75.1 mm) differed from that of Trauger et al. (1971) (i.e. measured from the abaxial epiphysis of the tarsometatarsus to the distal end with the foot bent versus 'total' length) but they were within the range of tarsal measurements for adult Ross' Geese and hybrids, respectively, obtained at the McConnell River, N.W.T. (60°51′N, 94°25′W) (J. P. Prevett and C. D. MacInnes, unpubl. data).

The appearance of the female fit the description for hybrids given by Trauger et al. (1971) and closely resembled hybrids studied by Prevett in the nesting colony of Lesser Snow Geese at the McConnell River. In particular, the shape of the head and bill contrasted markedly from that of Lesser Snow Geese in the banding pen, and, to a lesser extent, from the male Ross'. The juveniles were much smaller and had very noticeably whiter plumage than the juvenile Lesser Snow Geese. They closely resembled juvenile Ross' Geese. Also, most culmen and tarsal measurements were similar to those of Ross' goslings of a similar age at McConnell River (Prevett and MacInness, unpubl. data). Only the tarsus of the male was larger than 12 measurements from McConnell River, but it was within the range of 6 hybrid goslings. Measurements of the juveniles were as follows: ♀—culmen 35.1 mm, tarsus 74.5 mm; ♀—culmen 33.5 mm, tarsus 67.7 mm; ♂—culmen 34.7 mm, tarsus 74.9 mm.

Ross' Geese have been shot in small numbers for many years by hunters on the Hudson and James Bay coasts of Ontario (Cooch 1954, 1955, Lumsden 1963). Most were killed near the villages of Fort Severn and Winisk on the southern Hudson Bay coast. Since the majority of Lesser Snow Geese shot at these locations appear to come from the McConnell River colony and colonies on Southampton Island (Dzubin 1974), most of the Ross' Geese were probably also from these breeding areas. Recoveries of Ross' Geese banded at McConnell River bear this out (Prevett and MacInnes 1972), although there is also a recovery from a bird marked at the Simpson River in the central Canadian arctic (H. G. Lumsden, pers. comm.). Since Lumsden's (1963) paper, a few Ross' Geese have been reported shot in Ontario most years, although records are incomplete and the following numbers are minima: 1963—4, 1964—0, 1965—2, 1966—6, 1967—3, 1968—0, 1969—3, 1970—2, 1971—4, 1972—0, 1973—1, 1974—6, 1975—1.

Since 1969, 17,879 Lesser Snow Geese have been banded at the Cape Henrietta Maria colony (H. G. Lumsden, pers. comm.) but the Ross' Geese reported here are the first to have been found. However, since never more than about 5% of the nesting Snow Geese were caught in any year, Ross' Geese could have nested previously in the colony but not been detected. Mr. Michel Hunter, a resident of Winisk reported seeing on 5 June 1967, a pair of Ross' Geese at the mouth of the Shagamu River (55°53′N, 86°47′W) that he thought probably had a nest nearby. No Snow Geese were nesting in the area and since breeding Ross' Geese around Hudson Bay have always been associated with Snow Goose nesting colonies, it is possible that an injury to one of the pair may have prevented it from continuing northward during the spring migration. Local Cree Indians are of the opinion that occurrences of scattered non-colonial nesting by Lesser Snow Geese are attributable to this cause.

The main range of the Ross' Goose (breeding in the Queen Maud Gulf area of the central Canadian arctic and wintering in California) is west of the areas used by Hudson Bay goose populations (Ryder 1969). However, Ross' Geese have been known from the latter areas since 1771 (Hearne 1795), although it was not until 1953 that the species was discovered breeding in the Hudson Bay region (Cooch 1954). Since then the Ross' Goose has been found nesting in four Lesser Snow Goose colonies located around the periphery of Hudson Bay—East Bay, Boas River and McConnell River (including Wolf Creek) (see MacInnes and Cooch 1963) and La Pérouse Bay (Ryder and Cooke 1973) (see Kerbes 1975:15 for locations).

Recently, Prevett and MacInnes (1972) showed that Ross' Geese were increasing in the Hudson Bay Lesser Snow Goose population and they predicted that Ross' Geese would eventually be found nesting in all colonies in the region. Spread of Ross' Geese into additional Lesser Snow Goose colonies evidently is effected through mixing of the two species in winter along the Texas and Louisiana Gulf Coast and continued association during spring migration. However, partial separation of geese from the Cape Henrietta Maria and Baffin Island colonies from geese from the western Hudson Bay colonies while on the wintering range has imposed some restriction to the spread of Ross' Geese into these colonies (in a manner analogous to the westward spread of the blue phase *Chen c. caerulescens* described by Cooch (1961)).

Although the winter ranges of all Hudson Bay Lesser Snow Goose colonies overlap, differential migration of blue and snow phase individuals results in a strong east–west cline of increasing abundance of blue phase in the eastern and white phase birds in the western portions of the Gulf Coast wintering ground (Cooke et al. 1975). Since the Cape Henrietta Maria and Baffin Island colonies contain much higher proportions of the blue phase (75 to 90%) than the other Hudson Bay colonies (25 to 30%) the eastern part of the wintering ground contains geese predominately from the former areas (Dzubin et al. 1975). This pattern is reinforced by traditional use of wintering areas by individual Geese (Prevett, unpubl. data). Heretofore Ross' Geese have been found nesting only in the western Hudson Bay Lesser Snow Goose colonies; similarly, a large majority of Ross' Geese on the wintering ground was associated with the predominately white phase Snow Goose flocks in the western areas (Prevett and MacInnes 1972). The presence of breeding Ross' Geese

at Cape Henrietta Maria indicates that this remaining barrier to the eastward spread of Ross' Geese has been overcome. It is probable that Ross' Geese now breed in all Lesser Snow Geese colonies in the Hudson Bay region.

Along with the recent increase of Ross' Geese around Hudson Bay, hybrids between the two species have been noted (Trauger et al. 1971). The incidence increased rapidly at the McConnell River after the first hybrids were noted there (Prevett and MacInnes 1972). Probably a significant reason is the relative scarcity of available conspecific mates for Ross' Geese in the Hudson Bay population. For example, in 1970 the ratio of Ross' Geese to Lesser Snow Geese in Texas and Louisiana was estimated at 1:718 (Prevett and MacInnes 1972:435).

The formation of hybrid pairs is a probable mechanism for the spread of Ross' Geese to new Lesser Snow Goose breeding colonies. Frequently male Snow Geese pair in winter or during spring migration with females from different colonies. Since females usually return to their natal colony to breed, males, as a result, often switch colonies (Cooke et al. 1975). The same tendency may be true of Ross' Geese. Hence, it is possible that the first Ross' Goose nesting at Cape Henrietta Maria was a male paired to a female Snow Goose. The hybrid female banded at the Cape Henrietta Maria colony in 1975 might have hatched from this nest and returned with a Ross' mate to nest. If this is true, and allowing two or three years to reach sexual maturity, a Ross' Goose bred in the Cape Henrietta Maria colony as early as 1972 or 1973. The implications of hybridization for the Ross' Goose are potentially serious and we intend to study them.

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AGE DIFFERENCES IN THE DIGGING FREQUENCY OF HERRING GULLS ON A DUMP

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Several recent studies have shown that in certain species which use skilled feeding methods, such as plunge diving, immature birds do not perform as well as adults (see Buckley and Buckley, Ecology 55: 1053–1063, 1974 for references). It is currently postulated that this lack of skill may be a factor contributing to delayed breeding in these species.

Herring Gulls (*Larus argentatus*) when feeding on garbage dumps dig for food by removing inedible items in order to expose edible ones. During a recent study of the feeding ecology of gulls on a dump on Walney Island, Cumbria, England, I had an opportunity to compare the feeding behavior of adult and immature Herring Gulls, especially with respect to their digging habits. Relatively few immatures fed on the dump and I thought that this might be due in part to their inefficiency in exploiting this food source. Examining this idea was the object of the present study between 1 March and 2 May 1974.

From the moment a bird landed on the dump I started a stopwatch and counted the number of large items it pulled out or threw aside over time. The period was terminated when the bird's head was completely obscured by other gulls. I scored only the removal of large items such as folded newspapers, cans, rags, and paper bags. These could be easily seen, even when the bird I was watching was partly hidden by others.

In another set of observations, I counted the number of food items (those lying on the surface and those found by digging) a bird ate over a timed period. These were small food items that could be swallowed easily on the spot. The discovery of a large food item ended the observation and the item was not included in the count.