

of Guadalupe Cañon in 1959, whereas Levy (verbal information) found but one pair in the Arizona portion, and none in New Mexico, in 1958. Oliver Milton made a general collection of birds in this cañon in 1957, but did not obtain this species. Other ornithologists had visited the area in previous years, apparently without encountering these conspicuous birds. Additional observations are needed to show whether they are merely irregular summer residents or a newly established, permanent addition to the avifauna of New Mexico and Arizona.

I wish to thank S. D. Ripley and P. S. Humphrey, of the Peabody Museum, Yale University, for furnishing me with information on the Milton Collection which is under their care.—DALE A. ZIMMERMAN, *Department of Biology, New Mexico Western College, Silver City, New Mexico.*

The Migratory Status of Some Western Desert Birds.—In a recent paper, MacArthur (Auk, 76: 320), speaking of the correlation of migration with a striking seasonal change in vegetation, stated that the proportion of Neotropical migrants breeding in western American desert habitats is "virtually none." He cites the uncertain nature of the "desert bloom" and the lack of seasonal contrast in food conditions as discouraging the establishment of breeding populations of such migrants.

A recent list of birds occurring on southern Nevada's warm deserts (Gullion, *et al.*, Condor, 61: 278-297, 1959) includes 10 species which are winter visitors to the Neotropical Region, or 22 per cent of the 46 species of native birds breeding in this area. In addition, a review of Linsdale's list of Nevada birds (Condor, 53: 228-249, 1951), and my unpublished field notes, shows that at least 16 (17 per cent) of about 96 native birds breeding in the cold desert region of central and northern Nevada are migrants to the Neotropical Region. Thus, a total of 23 species (19 per cent) among about 120 native birds breeding in Nevada's desert regions spend their winters in the Central American tropics, or farther south.

Although I must disagree with MacArthur concerning the absence of migrants from the Neotropics as breeding birds in western desert regions, there is no disagreement with his thesis that these migrants breed primarily in areas where striking seasonal changes in vegetation occur. More detailed examination of Nevada's desert areas reveals a wide diversity of vegetation types, with at least nine major types being apparent on the warm desert alone. An analysis of the warm desert habitats, and their avian occupants, shows that only two (*Myiarchus cinerascens* and *Icterus parisorum*) of the 10 Neotropical migrant species breeding on southern Nevada's Mohave Desert spend their summers in vegetation types which show little or no seasonal change. The other eight species are summer inhabitants of deciduous woodland areas, either mesquite bosques (*Prosopis* sp.) or riparian situations along stream courses and around springs and waterholes. Similarly, the cold desert areas farther north also provide a wide diversity of habitat conditions. If the cold desert is considered in the strictest sense, including only the seasonally unchanging shadscale (*Atriplex confertifolia*) and sagebrush (*Artemisia* sp.) covered flats and valleys, there are no birds breeding in this situation which are migrants to and from the Neotropical Region. But, if the mountain ranges rising above the desert terrain are included as part of the cold desert, with their deciduous riparian associations and extensive patches of aspen (*Populus tremuloides*), chokecherry (*Prunus virginiana*) and other deciduous trees and shrubs, no fewer than 16 Neotropical migrants can be included in the breeding avifauna of the cold deserts of Nevada.

The species nesting in the deciduous woodlands of Nevada's warm desert spend their summers in situations which can be classified as desert in so far as climate is concerned (less than five inches of mean annual precipitation, a rate of evaporation which may exceed precipitation by a ratio of 22:1, and a July mean maximum temperature above 100°F). However, these are still deciduous woodlands, and the presence of a significant proportion of Neotropical migrants among the breeding avifauna agrees with MacArthur's main thesis. The cold desert environments occupied by the Neotropical migrants for breeding purposes are truly temperate, deciduous woodland areas, not unlike some parts of the deciduous forests of the western Great Lakes area. Again, the high incidence (both in species and individuals) of these migrants in the breeding avifauna of these areas agrees with MacArthur's conclusions.

Although some 23 species of Neotropical migrant birds breed in the desert regions of Nevada, only two of these species breed in truly desert situations, where little seasonal change in the vegetation aspect occurs. All but two (one predator, *Buteo swainsoni*, and one granivore, *Guiraca caerulea*) of these migrants are predominately insectivorous in habit, and 19 of these species seek their food among the foliage of deciduous trees and shrubs.

It should be pointed out that by far the majority of the breeding terrestrial birds on the Nevada deserts are predominantly insectivorous in habit. Of the 46 species breeding on the warm desert, 31 (67 per cent) are primarily insectivores, and seven (15 per cent) are primarily granivorous in habit. Farther north, on the cold deserts, at least 64 (67 per cent) of the 96 native breeding species are insectivorous, and about 11 (11 per cent) are largely dependent upon the seed or fruit production of plants for their livelihood.

The uncertainty of the desert bloom has not only discouraged colonization of western American desert areas by granivorous Neotropical migrants, but by resident and Nearctic migrant granivorous birds as well. Only seven of about 120 common breeding species on Nevada's deserts are closely dependent upon the seeds and fruits of plants for their survival. Two of these seven (*Gymnorhinus cyanocephala* and *Carpodacus mexicanus*) are gregarious, highly mobile species, capable of moving considerable distances from one food supply to another. Three more (*Zenaidura macroura*, *Pheucticus melanocephalus*, and *Guiraca caerulea*) are migrant species, adapted to seasonal scarcity of food (see also, Gullion, Proceed. Ann. Conf. West. Assn. State Game and Fish Comm., 38: 211, 1958). Of all the native species occurring on Nevada's deserts, two birds, *Pipilo aberti* and *Lophortyx gambelii*, must survive throughout the year upon the seeds produced in a narrowly circumscribed area on the warm desert. The former species' range is limited to the mesquite bosques, irrigated by underground water courses, where the annual seed production is relatively stable. Only *Lophortyx gambelii* lives on the upland desert areas where the seed production is entirely dependent upon local precipitation. This species, accordingly, is subject to severe fluctuations in the size of populations, depending upon the vagaries of the local climate (the well-established exotic, *Alectoris graeca*, lives under the same limitations on the cold desert farther north). Rodents, not resident birds, apparently utilize the bulk of any surplus seeds produced as the result of a desert bloom in Nevada.—GORDON W. GULLION, *Forest Research Center, University of Minnesota, Cloquet, Minnesota.*