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## ACQUIRED FOOD HABITS OF SOME NATIVE BIRDS

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It seems reasonable to suppose that food habits formed since the development of agriculture in the West might vary more, both with locality and individuals, than those which have become fixed through countless centuries. Hence it will be stipulated at the outset that many of the following observations, which were made at Azusa, Los Angeles County, California, may be at variance with those of other observers, and will apply only under these particular conditions.

The greatest change which has taken place here in the upper San Gabriel Valley during historic times has been the utilization of nearly all suitable land for the growing of citrus fruits. There have been a few small avocado plantings, but other fruits now occur almost entirely as dooryard or family orchard trees.

Fortunately for the grower, and perhaps for the birds as well, the rind of an orange is impervious to the attacks of any ordinary bird, though when once opened the fruit is well liked by many of them. Only the Red-shafted Flicker (*Colaptes cafer collaris*) is able to chisel through the tough skin; after making a round opening large enough for the insertion of its bill, it scoops out a large portion of the pulp with its tongue. Examples of this sort of damage, however, are infrequent and usually, as it seems, in oranges which have already fallen to the ground, where they are more easily reached.

The flicker's attacks on avocados appear more serious, though this is partly due to the smaller numbers of the fruit available. Avocados which hang near a convenient perch are often found to have a roughly circular hole extending through to the seed. In a few of the fruits these holes have been considerably enlarged, but usually they are not much larger than the base of the bird's bill. Since flickers do not gather in large numbers, the damage from this source in commercial groves will not prove heavy, and even in the case of isolated trees most of the fruit hangs in such a position that the flickers probably would not be able to work on it. Many birds, as well as other animals, are fond of ripe, soft avocados, but since the fruit is picked while still hard, it is largely immune to the assaults of the smaller birds. Avocados of the thin-skinned varieties, however, sometimes bear numerous small pits which undoubtedly are caused by the sharp bill of an Audubon Warbler (*Dendroica auduboni auduboni*) testing the edibility of the fruit.

The House Finch or Linnet (*Carpodacus mexicanus frontalis*), of course, ranks in a class by itself as a destroyer of deciduous fruits. Its particular preference is for the softer varieties of peaches, as well as apricots and nectarines (and sweet cherries also, where these are grown). Where only a few individual trees are kept for home use, the concentration of its flocks often makes impractical the growing of such fruits, though the harder-textured cling peaches can be more successfully raised. Linnets are also very partial to loquats, in whose consumption they are aided by Western Mockingbirds (*Mimus polyglottos leucopterus*) and Arizona Hooded Orioles (*Icterus cucullatus nelsoni*).

For some reason, the linnets hereabouts have paid little attention to grapes. The foreign or *vinifera* varieties, and especially the small, tender-skinned seedless grapes, are eagerly eaten by mockingbirds and California Thrashers (*Toxostoma redivivum redivivum*). On the other hand, the tough-skinned "eastern" or native American varieties are not seriously molested. Figs are eaten principally by linnets, and also by mockingbirds, Black-headed Grosbeaks (*Hedymeles melanocephalus*) and California Thrashers.

As is well known, mulberries are favorites with many birds, notably, in the present instance, the Black-headed Grosbeak. A dooryard tree of a small "ever-bearing" variety has undoubtedly been an important factor in attracting increasing numbers of these fine songsters. San Diego Spotted Towhees (*Pipilo maculatus megalonyx*) also pick up many of the fallen berries. Pomegranates which have split while hanging on the tree are often emptied of their contents by mockingbirds; but the hard rind, when unbroken, is a quite sufficient protection. Persimmons, which ripen at a time when linnets are not plentiful, are eaten principally by mockingbirds, and also by Audubon Warblers. I have seen an Anna Hummingbird (*Calypte anna*) sipping the juice of a partly eaten persimmon which had ripened on the tree. Damage to persimmons, as in the case of apples and pears, can be minimized by picking them while still hard, as is done in commercial practice.

The fruit of the cultivated "spineless" cactus is eaten by mockingbirds, California Thrashers and Cactus Wrens (*Heleodytes brunneicapillus couesi*). The only other garden fruit or vegetable which I have seen the Cactus Wrens touch is sweet corn, which they appeared to relish when the husk had been stripped down to expose the grain.

The California Brown Towhee (*Pipilo fuscus crissalis*) eats fruit of many kinds, but so far as I have made observation it confines itself almost entirely to that which has fallen to the ground.

Phainopeplas (*Phainopepla nitens lepida*) nest abundantly in the orange groves and orchards, but are not attracted by fruit, with the exception of berries, particularly those of the native buckthorn (*Rhamnus crocea*). They are, however, exceedingly addicted to the fleshy, sweetish petals of the *Feijoa sellowiana* or Paraguay Guava. These shrubs bloom profusely in the early summer and companies of Phainopeplas constantly congregate about them.

Almonds are greedily eaten by California Jays (*Aphelocoma californica*), which are able to hammer open even the hard-shelled varieties with their strong beaks. Many of the nuts are also carried away and buried. California Jays as permanent residents are comparatively recent immigrants into this immediate neighborhood. The establishment of this local clan may have been due to their discovery of almonds, but it is more likely a part of the general extension of range which has been very noticeable in and around Los Angeles during the last few years.

Linnets have earned unpopularity also by their destruction of the buds and blossoms of deciduous fruit trees. This habit is shared by the California Purple Finch (*Carpodacus purpureus californicus*), whose flocks, during their rare visits here, have been very largely so engaged. I have seen Cedar Waxwings (*Bombycilla cedrorum*) eating petals of apple blossoms, but waxwings seldom appear to be feeding at all during their irregular sojourns in the neighborhood. Economic loss from the destruction of blossoms, however, is certainly more apparent than real, since only a small percentage could have set fruit, and thinning is usually required in any case.

The crowned sparrows (*Zonotrichia leucophrys* subsp. and *Z. coronata*) doubtless rank next to the linnet in destructiveness. Damage from this source is not only to blossoms but to newly sprouted vegetables and garden plants. These birds have a special fondness for young plants of the cabbage family and for young beets and peas, so that in a small garden it is necessary to screen plantings made during the season in which they are present. Carrots, however, seem to be immune. Brown Towhees also eat some of these young plants, but because of their less gregarious habits, their depredations are not so apparent.

Large amounts of the seeds of introduced weeds are consumed by linnets and the various species of goldfinch. A plant of importance to bird life is the naturalized Tree Tobacco (*Nicotiana glauca*), which furnishes quantities of seed for linnets, goldfinches, towhees and crowned sparrows, while the nectar of its almost ever-blooming flowers is sought by hummingbirds and orioles.

The Arizona Hooded Orioles visit many kinds of garden flowers, especially the tubular sorts, in search of nectar. Their usual procedure is to pierce the base of the corolla while grasping the stem of the flower. Sometimes unopened lily buds are found to have been slit for their entire length. Evidently the place of nectar in the diet of song birds is limited more by their lack of facilities for obtaining it than by any want of appreciation for it. Sugar solution provided for hummingbirds was found to be equally popular with Arizona Hooded Orioles, Bullock Orioles (*Icterus bullockii*), Audubon Warblers and San Diego Song Sparrows (*Melospiza melodia cooperi*). Doubtless the list could be greatly extended were any attempt made to bring this new food to the attention of other species. Despite all that has been written about hummingbirds' pugnacity and "tyranny" over other birds, the hummingbirds have failed to show the slightest resistance to the appropriation of their source of supply by these larger birds. (See also Auk, XLIV, 1927, p. 306.)

For the feeding table, I have found plain bread or toast crumbs to be most effective in attracting Spotted Towhees, Brown Towhees, Song Sparrows, crowned sparrows and California Thrashers. In decided contrast to the thrashers, the mockingbirds have almost entirely ignored these offerings. Less anticipated was the equal indifference of the linnets which frequently visit the bird bath at which the food dish is placed. An unexpected autumn patron was a Long-tailed Chat (*Icteria virens longicauda*), which ate the crumbs with apparent relish on more than one occasion, and repulsed a much larger Brown Towhee which tried to drive it away. California Jays often eat crumbs, but obviously prefer suet, which they will carry away and hide when the supply is too great for immediate consumption.

The rules of precedence are as well recognized at the feeding table as in our highest social circles. In general they are based on relative size, but the matter of comparative aggressiveness also enters in; the Spotted Towhees, for example, always give way to their brown relatives, and the Golden-crowned Sparrows defer to the smaller but more pugnacious Song Sparrows.

More intensive research would undoubtedly show that the coming of civilization has in some degree affected the food habits of every bird which is of regular occurrence. Even the diet of the exclusively insectivorous species must be modified by the inclusion of introduced insect pests, to say nothing of the native insects whose numbers have been greatly increased by their adaptation to irrigated crops.

Originally, the native birds must have found little if any water available here during the greater part of the year, but many of them make frequent use of it when it is provided. The California Thrasher, though belonging to a group characteristic of arid regions, seems to be by far the most copious drinker of all.

Lest some of the foregoing statements might create a wrong impression, I should add that as a fruit grower I have never felt impelled to adopt any form of control against birds, nor should it be necessary anywhere until there is some radical change in the condition of overproduction which has prevailed for more than a decade. Unlike the usual forms of insect infestation, damage to horticulture by birds affects neither the quality of the crop as a whole nor the vitality of the trees. Had the deciduous fruit growers succeeded in poisoning all the fruit-eating birds, the resulting increase in unsalable crop surpluses would only have added to their own distress. As regards the home orchard, the raising of the softer stone fruits and the *vinifera* grapes may well be left to the commercial growers of those districts which are especially suited to their culture and where they are produced in their highest quality; while with most of the miscellaneous fruits it is simply a matter of planting in slightly greater quantity in order that the birds may enjoy their share in return for the benefits which they confer.

*Azusa, California, September 1, 1932.*