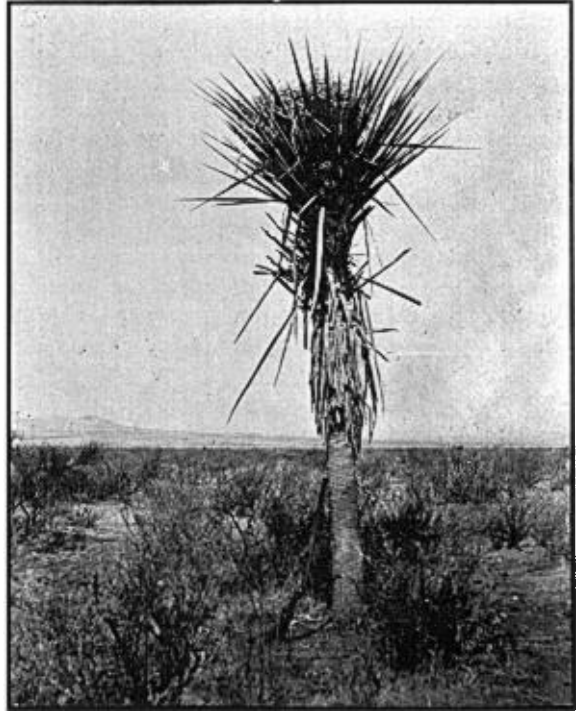


quicker, white-necked ravens. The attack was vigorous, not to say vicious, with quick repeated blows and pecks till the feathers flew. From start to finish the big birds sought only to escape, but this seemed impossible. They pounded the air in vain effort to out-fly their tormentors, dove to the ground but were forced to take wing again, circled and beat and tacked to no purpose, and finally began mounting steadily in big circles, taking their punishment as they went, the smaller birds keeping above and beating down on them in succession till all were specks in the sky, and finally lost to view. Such a drubbing I never saw a smaller bird inflict on a larger, before or since, and it was probably well deserved. The nests of the white-necked ravens are unprotected from above and eggs are said to be a delicacy to any raven.

Be that as it may, the breeding grounds of the two species rarely conflict, *sinuatus* keeping to the tall cliffs and mountains and apparently for good reasons rarely entering the nesting valley of *cryptoleucus*.



FROM THE BIOLOGICAL SURVEY
EST OF *CORVUS CRYPTOLEUCUS* IN *YUCCA MACROCARPA*;
MARATHON, TEXAS

Notes on the Bird Conditions of the Fresno District

BY J. M. MILLER

A LARGE portion of the San Joaquin Valley has undergone so rapid a change during the past twenty years that the conditions of bird life there have been practically revolutionized. The topographical features which at one time favored or discouraged bird life have disappeared and new features present the conditions for a different and more varied fauna. This change has been due to artificial irrigation. Large areas where formerly only the bare plain stretched away without a tree in sight for miles are now covered with orchards, vineyards and thriving alfalfa fields and dotted with homes and shade trees. This rapid transition presents a field for local study which has never been thoroughly covered.

The early prairie-like conditions of the plain before the advent of the big irrigation systems favored only a decidedly limited fauna both in species and num-

bers. Along the banks of streams, such as the San Joaquin and Kings River and a few smaller creeks where moisture was plentiful and trees and plants abundant, birds thrived and the avifauna was about the same as that of the lower mountain districts. But in many places no such stream existed within a radius of less than ten or fifteen miles. Scarcely a tree or living shrub existed any nearer; and birds or any inhabitants would have to be such as could adapt themselves to such barren conditions.

During the summer months the long absence of rain dried the alluvia so that the country was almost desolate in appearance. The level of the plain was broken occasionally by winding, shallow depressions, called by the settlers "sand hollows." These by some are said to be the remains of old water courses. The influence of irrigation has brought the underground water so near the surface that the "sand hollows" have been transformed into extensive ponds which are the reproductions in miniature of the old Tulare Lake. The same cause, irrigation, from which Tulare lake nearly went dry a few years ago, has filled these dry hollows with water and they are now teeming with all the varied forms of plant and animal life once found along its shores.

The burrowing owl, one of the most prevalent species formerly, is now becoming extinct wherever the country is thoroughly cultivated. These owls live and nest in the discarded burrows of squirrels, and the plentiful irrigation, which, in time, drowns out the squirrels, is far more fatal to the owls. The nightly "cuckoo" of these birds is seldom heard wherever the country is intensively cultivated. The meadowlarks also are far from being as plentiful as they once were, for the same causes which are exterminating the owls make nesting a very difficult and uncertain matter for the ground-nesting larks.

It may be said that the advent of orchards and vineyards and the multiplication of other conditions upon the plains favoring the lives of many other birds, has caused the bird population along the streams and in the foothills to overflow into this new territory. The population in some districts has increased extensively and a few species have increased to such an extent as to become a positive nuisance to the fruit growers at certain seasons of the year.

The migrations through the valley are of separate interest. During the winter months birds of the higher mountain districts are often seen upon the plains. However, it can hardly be said that the new conditions influence the migration of birds to any degree. An abundance of spring migrants arrive every year, but in all probability they are the same species which formerly came every spring to the more favorable localities of the valley.

A Morning With the Birds of Juan Vinas, Costa Rica

BY MERRITT CARY

WHILE in Costa Rica last year with Prof. Lawrence Bruner and M. A. Carriker, Jr., of the University of Nebraska, I secured a number of bird notes which I thought might be of interest to CONDOR readers.

For three weeks we had been collecting at the Estancia Jimenez, far up on the southeast slope of the Volcan Irazu, and in Monte Redondo, a mountainous