

While not now facing extermination, the present numbers of Gambel's quail do not compare with those of the past. The rehabilitation of old and creation of new habitats, prevention of overgrazing, less clean farming, less game hoggishness, and scientific game laws are recommended for preservation and increase of the species.

This study is of an ecological type, but it emphasizes, rather than minimizes, the need of taxonomic work. Specific identification of stomach contents (for which there was no space in the report) would have been greatly facilitated if even a complete state or local list of the seed plants or insects of the locality had been available.

The plates, figures, and tables add to the value of the work. From the standpoint of the ornithologist, the conservationist, or the ecologist, this is perhaps the best study on any western game bird that has yet appeared.—LEON KELSO.

Whitehead on 'The Effect of Arsenic, as Used in Poisoning Grasshoppers, upon Birds.'¹—During the past few years increase in grasshopper-control operations has resulted both in apprehension as to the security of bird life and controversy over the effects of arsenical poison on wild birds and domestic stock. Ornithologists and conservationists in general are greatly indebted to Prof. Whitehead for his careful and exhaustive study of this problem.

In this timely publication the author briefly summarizes the history of grasshopper depredations and campaigns for their control in relation to bird life. It is clearly brought out that all who have had much experience with use of the customary arsenical baits are convinced that the poison, when made according to approved formulas and properly applied, can cause little or no injury to bird life.

Prof. Whitehead conducted a number of experiments extending from 10 to 66 days on 144 birds, including Chickens, Turkeys, Ducks, Quail, and nestlings of ten species of song birds. Poisoned bran bait of various strengths and more than seventeen thousand poisoned and unpoisoned grasshoppers were fed the birds. It was found that 3.36 mgs. per ounce of bird weight constituted a slightly toxic dose for a Chicken.

Numerous tables give the results of the various experiments. Domestic Fowl and Quail were confined in pens and left without food for 24 hours. Poisoned bran was then scattered in the pens at the rate of 100 pounds per acre and the birds left another 24 hours without other food. As no indication of poisoning appeared, it was concluded that birds are not injured through picking up well-scattered poisoned bran.

In other experiments grasshoppers dead from poisoning were fed the birds. As a sidelight on such experiments, it is evident from studies made by the Biological Survey that insectivorous birds rarely pick up dead insects but choose live and active individuals. It is apparent therefore that poisoning under natural field conditions is much less likely than under laboratory conditions where the birds were allowed no choice of foods.

It is significant that none of the Domestic Fowls died from eating poisoned grasshoppers even though they fed on them for periods of 66 days and, exclusively in some cases, for 10 days. Lack of other foods forced the Chickens at all times to consume the poisoned grasshoppers on an empty crop. It is generally understood that the poison is more likely to have toxic or fatal results when taken on an empty stomach. Furthermore, it should be pointed out that at least in part of the experiments the birds were fed upon poisoned food over a much longer period of time than poisoned grasshoppers would be available under field conditions.

¹ The Effect of Arsenic, as Used in Poisoning Grasshoppers, upon Birds, by F. E. Whitehead, Okla. Exp. Sta. Bul. 218, June 1934, 54 pp., 8 figs., 11 tables.

Prof. Whitehead showed conclusively that poisoned grasshoppers are not so attractive as unpoisoned insects and that even when no other food is available, less than half as many poisoned as unpoisoned individuals are eaten. Even when the birds fed solely on poisoned grasshoppers, they were able to consume much less than half the minimum lethal dose. The evidence indicates that arsenic does not have a cumulative effect on the fowls; moreover, ingestion of poisoned food does not materially affect the weight or growth of the birds.

The author concludes that Quail received only from 1 to 7 per cent of the minimum lethal dose of arsenic in eating a normal meal of grasshoppers.

In feeding nestling Robins, Prof. Whitehead was able to give them as many as 134 poisoned grasshoppers without affecting normal growth.

Chemical analyses and autopsies made of birds feeding on poisoned insects did not reveal any serious consequences to the birds. Further, it was concluded that there could be no danger in human beings eating fowls that had fed on the grasshoppers.

The general conclusion that poisoned grasshopper bait made according to accepted formulas and properly distributed can cause little or no injury to bird life is in accord with findings obtained by the Biological Survey. Chemical analyses of 22 birds of 8 species taken after feeding in a poisoned field in South Dakota (1931) showed no greater proportion of arsenic than did check birds taken in distant unbaited areas.—CLARENCE COTTAM, *U. S. Biological Survey, Washington, D. C.*

Other Ornithological Publications.

Allen, Francis H.—The Federation of the Bird Clubs of New England. A Record of its First Ten Years. Pp. 1-16. Published by the Federation, 1934.

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Andrews, Roy Chapman.—The Gobi Bird Group [at the American Museum of Natural History]. (Natural History, November, 1934.)

Beveridge, George.—Increasing Birds in North Uist. (Scottish Naturalist, November—December, 1934.)

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Bowen, W. Wedgwood.—Review of the Subspecies of the African Scrub-Robin (*Erythropygia leucophrys* Vieillot). (Proc. Biol. Soc. Washington, Vol. 47, pp. 157-168, October 2, 1934.)—Two new races described.

Campbell, Louis W.—Birds of Lucas County [Ohio] and Vicinity (mimeographed).—Full migration data for several years.

Chapman, Frank M.—My Florida Bird Guests. (Natural History, October, 1934.)—A supplement to a previous article on the same subject, published in the January-February issue. Excellent photographs of several familiar birds.

Conover, H. B.—A New Trumpeter from Brazil. (Proc. Biol. Soc. Washington, Vol. 47, pp. 119-120, June 13, 1934.)—*Psophia viridis dextralis* (p. 120) Rio Tapajos, Para, Brazil).