

## THE MEADOW LARK AND BALTIMORE ORIOLE.

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The oriole family includes the true orioles, the blackbirds, and the meadow larks. The different members of the tribe differ greatly among themselves in form, plumage, and habits. While the true orioles are strictly arboreal, hanging their nests among the most inaccessible twigs of tall trees, the meadow larks are mainly terrestrial, placing their humble domiciles on the ground or even sunken a little below the surface. Between these extremes come the blackbirds, some of which, as the redwing, breed among reeds and in low bushes, while others, as the crow blackbird, nest chiefly in the tops of trees. As might be expected, the feeding habits of these birds differ greatly. The oriole seeks its food almost exclusively in trees, while the meadow lark is a ground feeder. Consequently, the kinds of insects eaten are not the same. The oriole feeds largely on caterpillars and wasps, which live among leaves and flowers; the meadow lark, on the other hand, eats grasshoppers and other ground insects. After a careful consideration of their food, one can hardly fail to be impressed with the fact that both of these birds must be eminently useful to the farmer.

In the case of the meadow lark, insects constitute a large percentage of the food, and even in the winter months, when the ground is covered with snow, they form a very important element. The great bulk of these are grasshoppers, insects whose ravages have been notorious from earliest times and whose devastations in the Mississippi Valley are still fresh in the minds of the farmers of that region. The number eaten is so enormous as to entitle the meadow lark to rank among the most efficient of our native birds as a grasshopper destroyer. Nor are the other components of its insect food less important except in quantity. Some of the most injurious beetles form a considerable percentage of the stomach contents, while the useful species do not appear so often as might be expected from the terrestrial habits of the bird. The other insects eaten—ants, bugs, caterpillars, and beetle larvæ—are almost all destructive, and their consumption by birds is a decided benefit to man.

The oriole, although differing radically from the meadow lark in food and manner of life, is not the less beneficial from an economic point of view. It is a most potent factor in the destruction

of caterpillars, eating so many that if no other insects were taken it would still be classed as a useful bird. It does not, however, restrict its diet to caterpillars, but eats great numbers of injurious beetles, and also many bugs and grasshoppers. In the matter of vegetable food the record is nearly as good, for although corn, peas, and a few fruits are eaten, they appear in such small quantities as to have little economic significance.

#### FOOD OF THE MEADOW LARK.

The common meadow lark is a familiar bird of the open country throughout the United States, although it is less abundant in the desert areas. Alike on the meadows of the East, the prairies of the West, and the savannas of the South, its clear pipe may be heard in the spring, announcing the return of the season of mating and nest building. It chooses for its home meadow lands or other level ground free from trees, and, if possible, near a supply of water, for it delights to drink and bathe in clear running brooks. Its nest, usually over-arched to protect the eggs and the sitting bird from the weather, is built on the ground among last year's herbage, and is often so completely hidden as to defy the efforts of the most skillful searcher. The bird's preference for unmown fields, covered with what farmers call "old fog," has given rise to the name "old-field lark," by which it is known in some places.

While the great bulk of the species migrate from the Northern States, small flocks sometimes remain throughout the winter. South of the latitude of Pennsylvania the birds may be found at all seasons, though in somewhat reduced numbers during the colder months. Early in March they begin to move northward, and soon spread over the whole northern United States and extend into Canada. The southward migration begins in September, and by the end of October all are gone.

The common meadow lark (*Sturnella magna*) inhabits the eastern United States and ranges as far west as the Great Plains. The Western form (*S. neglecta*) is mingled with it in the Mississippi Valley, and thence to the Pacific Coast replaces it completely. The economic aspects of the two birds are practically the same.

As a rule farmers do not look upon the meadow lark (fig. 110) as an injurious bird, though a few complaints against it have been received. It has been accused of pulling sprouting grain and of eating clover seed (presumably newly sown) to an injurious extent. As these are the only charges of any consequence among thousands relating to damage done by other birds, it appears that the food habits of the meadow lark do not materially conflict with the interests of the farmer. This supposition is fully substantiated by the result of examinations of the contents of the bird's stomach, and it is still further shown that, far from being injurious, it is one of the most useful allies to agriculture, standing almost without a peer as a destroyer of noxious insects.

In the laboratory investigation of the food of the meadow lark, 238 stomachs were examined; these were collected in 24 States, the District of Columbia, and Canada, and represent every month in the year. A summary of the stomach contents for the whole year is as follows: Insect food, 71.7 per cent; vegetable food, 26.5; mineral matter, 1.8. Excluding the mineral element, which is not food, the record stands: Animal matter, 73 per cent; vegetable, 27. In other words, nearly three-fourths of the meadow lark's food for the year, including the winter months, consists of insects.

In August and September the meadow lark subsists almost exclusively on insect food, but this is not surprising, as insects are abundant at this season. In March, however, insects are not readily found; yet the meadow lark finds enough to make 73 per cent of its entire food. Similarly in December and January the insect food amounts to 39 and 24 per cent, respectively.

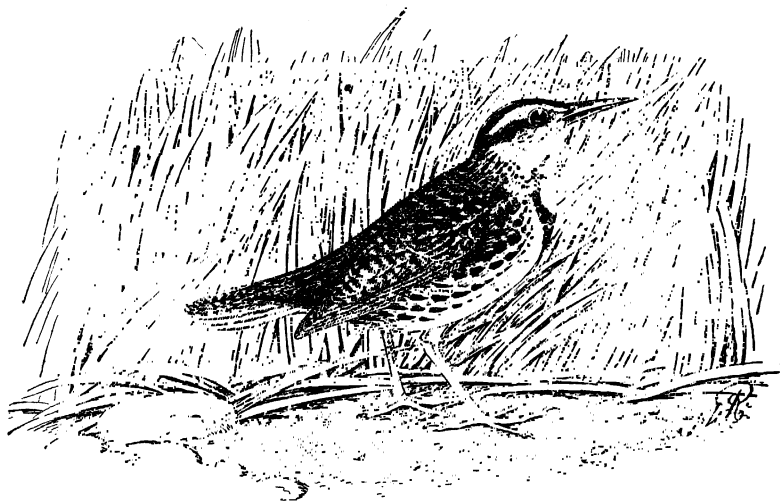


FIG. 110.—Meadow lark (*Sturnella magna*).

As an illustration of the meadow lark's vigilance in searching for insects, an instructive lesson may be drawn from the examination of the stomachs of 6 birds killed in Virginia when the ground was covered with snow. The smallest quantity of insect food in any one of the 6 stomachs was 8 per cent of the contents, the largest quantity 95 per cent, and the average for all 6 more than 47 per cent, or nearly half of the total food. The insects consisted of beetles of several species, bugs (*Hemiptera*), grasshoppers, crickets, a few wasps, caterpillars, spiders, and myriapods. Thus it is evident that insects form an essential element of the bird's diet, and are obtained even under very adverse circumstances.

Of the total insect food of the 238 birds examined, grasshoppers, locusts (green grasshoppers), and crickets constitute by far the most

important element, averaging 29 per cent of all food consumed during the year. Even in January they form more than 1 per cent, and increase rapidly until August, when they reach the surprising amount of 69 per cent. They decrease slowly during the autumn months, but in November still amount to 28 per cent, but naturally fall away quickly in winter. It is extremely doubtful if any other bird will show a better grasshopper record than this. Professor Aughey, in his report on the insects eaten by the birds of Nebraska (First Annual Report U. S. Entomological Commission, 1877, Appendix II, p. 34), credits the meadow lark with destroying large numbers of grasshoppers. It should be borne in mind that the birds which form the subject of this paper were not collected in any region especially infested with grasshoppers, but were gathered from nearly all parts of the United States. Out of the whole number of stomachs (238), 178 contained grasshoppers, one containing as many as 37. Of the 28 birds taken in August, in seven different States, all but one contained them, and one stomach, from New York, was filled with 30 common grasshoppers, 14 green grasshoppers (*Locustidæ*), and 10 crickets. Of 29 stomachs collected in seven States in September, every one contained grasshoppers, and two contained nothing else. Of the 40 stomachs collected in October from ten States, all but two contained grasshoppers and crickets.

Dr. A. K. Fisher has made some interesting calculations upon the amount of hay saved by the destruction of grasshoppers by Swainson's hawk, and it would not seem to be out of place to attempt to reduce to a numerical basis the good done by the meadow lark in the consumption of these insects. Dr. Fisher gives the weight of an average grasshopper as 15.4 grains, and entomologists place the daily food of a grasshopper as equal to the creature's own weight, an estimate probably much within the limit of truth. Remains of as many as 54 grasshoppers have been found in a single meadow lark's stomach, but this is much above the number usually eaten at one time. Such food, however, is digested rapidly and it is safe to assume that at least 50 grasshoppers are eaten each day. If the number of birds breeding in 1 square mile of meadow land is estimated at 5 pairs, and the number of young that reach maturity at only 2 for each pair, or 10 in all, there will be 20 birds on a square mile during the grasshopper season. On this basis, the birds would destroy 30,000 grasshoppers in one month. Assuming that each grasshopper, if let alone, would have lived thirty days, the thousand grasshoppers eaten by the larks each day represent a saving of 2.2 pounds of forage, or 66 pounds in all for the month. If the value of this forage is estimated at \$10 per ton (which is below the average price of hay in the Eastern markets), the value of the crop saved by meadow larks on a township of 36 square miles each month during the grasshopper season would be about \$24.

Beetles of many species stand next to crickets and grasshoppers in

importance, and constitute nearly 18 per cent of the annual food, but as these insects vary much in their economic relations it will be best to consider the different families separately. Among the most important are the May beetles (*Scarabæidæ*), a family which contains some of our most injurious insects as well as many harmless species. But as the great majority of the members live upon vegetable food, and may at any time turn their attention to useful plants, the whole family may be classed as potentially harmful, consequently the birds do no harm by eating them. The average consumption of May beetles amounts to about 4 per cent of the entire food of the year. The greatest numbers are eaten in May, when they form over 21 per cent of the food. Most of these are dung beetles, but some remains of the well-known *Lachnosterna* are found. The snout beetles, or weevils (*Rhyncophora*), form a small but very constant element, averaging about 3 per cent for the year. June shows the greatest consumption, with over 7 per cent, and, singularly enough, January stands next, with almost 5 per cent. The principal families represented are the curculios (*Curculionidæ*) and the scarred snout beetles (*Otiorhynchidæ*), both of which include some of the most harmful insects known, and no useful ones. The plum curculio (*Conotrachelus nenuphar*) is a well-known example.

Other beetles, belonging to about a dozen families, collectively form about 3 per cent of the whole food. Of these the most interesting are the leaf beetles (*Chrysomelidæ*), which are supposed to be disagreeable to birds, but whose remains were found in 19 of the 238 stomachs examined. The Colorado potato beetle is a member of this family, and while none were actually found, it seems highly probable that meadow larks might eat them if they fell in their way.

One of the important questions in regard to the diet of insectivorous birds is the extent to which they eat predaceous beetles (*Carabidæ*), for many of these beetles are beneficial. From its ground-feeding habits the meadow lark might be expected to subsist largely upon carabids, as they also live mainly upon the ground and are very abundant. The examination shows that these insects constitute something more than 7 per cent of the food during the year, but are very curiously distributed, attaining maxima of 20, 16, and 17 per cent, respectively, in March, July, and November, while the minimum records (less than 1, 2, and 4 per cent) fall in January, May, and September. This is certainly a very moderate showing when it is considered that the meadow lark feeds almost exclusively on the ground where these beetles are so abundant, and it seems to indicate that instead of seeking them the bird simply eats such as fall in its way in default of better food.

Bugs (*Hemiptera*) are pretty regularly eaten throughout the year, averaging 4 per cent of all the food. The greater number belong to the family of stink bugs (*Pentatomidæ*), some of which are familiar

to all who have eaten raspberries from the vines. Those who have by accident tasted the bugs will never forget the flavor and will wonder that any bird habitually eats such highly seasoned food. Most of these bugs are eaten in March, when they constitute 14 per cent of the food of the month. While some of them are harmful as well as disgusting, others do much good by devouring other insects, so that the destruction of the various members of this family is not an unmixed benefit. It is important to note that one stomach contained three specimens of the notorious chinch bug, an insect whose ravages in our wheat and corn fields have cost the country millions of dollars.

Caterpillars, or the larvæ of butterflies and moths, form a very considerable part of the food of the meadow lark, but the adults are rarely eaten, only three small moths having been found in the 238 stomachs. Caterpillars were present in every month except February, and even the stomachs taken in December contained 4 per cent of this food, while the average for the year is nearly 8 per cent. From the terrestrial habits of the meadow lark, it is evident that the caterpillars eaten must be species that live on or near the ground and feed on grass or other low plants. To this category belong the various species of cutworms. A number of these were identified in the stomachs, and no doubt many more were eaten, but they are so fragile and so soon reduced to fragments by the stomach's action that specific identification is always difficult and often impossible.

The larvæ or young of beetles were found in every month except February, and formed more than 3 per cent of the food of the year. They increased to 11 per cent in May, and were sufficiently numerous to be important throughout the season except in August, September, and October, when they amounted to less than 1 per cent.

Ants form a fairly constant element of the meadow lark's diet, averaging a little less than 3 per cent for the year. None were found in January, but in April they formed 4 per cent of the food. They decreased during the succeeding months, but increased suddenly to over 16 per cent in September, after which they again fell to an insignificant figure. Other Hymenoptera (wasps, etc.) average about  $1\frac{1}{2}$  per cent for the year, and are only important in June and July, when they amount to 6 and 4 per cent, respectively. Spiders and myriapods (thousand-legs) seem to be eaten quite freely, and aggregate nearly 5 per cent of the food. The largest number (8 per cent) are eaten in March and December, but the percentage falls off during the winter and in midsummer. Besides the insects already mentioned, several were found representing other orders. Flies (*Diptera*) were contained in a few stomachs, a dragon fly (*Odonata*) in one, an earwig (*Forficulidæ*) in one, and a common cattle tick (*Ixodes*) in one. Snails, or fragments of their shells, were found in seven stomachs, sow bugs (*Oniscus*) in two, a small crustacean in one,

and the bones of small frogs or toads (*Batrachians*) in three. These last were from stomachs taken in Florida, and do not appear to be a favorite food.

From the foregoing, it is evident that the meadow lark is preeminently an insect eater; still it has recourse when necessary to vegetable food.

As before stated, the total vegetable food for the year amounts to 27 per cent. Of this, grain (corn, wheat, and oats) aggregates 14.4 per cent, or a trifle more than half. The percentages of the different kinds of grain are: Corn, 11.1; wheat, 1.8; oats, 1.4. The largest quantity of grain was eaten in January, when the stomachs contained 53 per cent of corn, 11 per cent of wheat, and 9 per cent of oats. During the summer months the grain disappears, to appear again as the supply of insects fails. Sprouting grain was not found in any stomach. In April the total amount of grain was a little less than 15 per cent, and this may have been taken from newly sown fields. In May no wheat or oats were found, and only 1.9 per cent of corn.

Seeds of plants classed as weeds were found in every month except May, and it is probable that a greater number of stomachs in that month would have shown at least a few. Excepting the single stomach taken in February, which contained 75 per cent of barn-grass seed (*Chamæraphis*), weed seeds attain their maximum of over 25 per cent in December. The average for the year is a little more than 11 per cent, or the same as corn. The remaining vegetable food averages less than 1 per cent. Fruit seems to be accidental, each of the varieties named having been found in only one or two stomachs, and in small quantity. The same is true of the articles enumerated in the miscellaneous list. Complaints have been made against the meadow lark on the score of eating newly sown clover seed to an injurious extent; this seed, however, was found in only six stomachs, and each contained but a few seeds.

The testimony of the stomachs does not indicate that grain is preferred to other seeds, and it can not be urged that it is less easily obtained than seeds of weeds, for grain is a prominent crop throughout much of the country inhabited by meadow larks, and on account of its larger kernels is picked up more easily than smaller seeds. The meadow larks might be expected to injure grain when they collect in flocks, as they sometimes do, but at the time of harvesting wheat and oats they are not found in flocks, and the record shows that practically no wheat or oats were found in the stomachs, it being the season when insects were most abundant and formed nearly the whole food. As an illustration, the stomach of a bird killed in a field of shocked oats contained nothing but insects. In September and October, when corn is being harvested, the amount of this grain found in the stomachs was less than 1 per cent. In November, when insects begin to fail, the vegetable food increases, but it is worthy of note that weeds (*Ambrosia*,

*Chamæraphis*, etc.) are preferred, for in this month grain amounts to only 6 per cent, while weed seeds reach 15 per cent.

In summing up the record of the meadow lark, two points should be especially noted: (1) The bird is most emphatically an insect eater, evidently preferring insects above all other food; and (2) in default of its favorite food it can subsist on a vegetable diet. Prof. S. A. Forbes, in discussing the food of predaceous beetles (Bull. Ill. State Lab. Nat. Hist., Vol. I, No. 3, p. 159), calls attention to the fact that species which are able to vary their diet and subsist upon vegetable food when their ordinary supply of insects fails, are much more valuable than those which are entirely carnivorous. This is exactly the case with the meadow lark. For this reason a relatively short migration enables it to bridge over periods of scarcity of its favorite food.

#### FOOD OF THE BALTIMORE ORIOLE.

The Baltimore oriole, golden robin, or hang-nest (fig. 111), as it is variously called, is so well and so favorably known throughout the country that it may seem almost unnecessary to show that its food habits are as beneficial as its song and plumage are pleasing. In most places where this bird makes its home, the people, especially the farmer-folk, would no more think of killing it or destroying its nest than would the Hollander shoot the stork that nests on his roof.

The Baltimore oriole (*Icterus galbula*) breeds throughout the eastern United States north of Virginia, and reaches somewhat farther south in the Mississippi Valley. It is abundant in New England, and extends west over the tree-covered parts of the Great Plains, beyond which it is replaced by another species of much the same appearance (*I. bullocki*). In New England the oriole usually comes with the flowering of the apple trees, in the latter half of May; in the West it appears somewhat earlier. As its food consists largely of insects that live in the foliage of trees, its arrival in the North is delayed until these have become plentiful. It begins to move southward early in August, and is rarely seen in September, though one of the specimens examined was taken in Connecticut as late as November 16; but this must be regarded as a belated straggler. The species passes south of the United States, to spend the winter in the warmer countries beyond.

The present preliminary report is based on the examination of the contents of 113 stomachs, collected in 12 States, the District of Columbia, and Canada, and ranging from Massachusetts, on the east, to Kansas and North Dakota, on the west. They were all collected during the months from April to August, inclusive, with the exception of a single specimen taken in November. They are distributed by months as follows: April, 2; May, 45; June, 32; July, 18; August, 15; and November, 1.

The food for the whole season consisted of 83.4 per cent of animal matter and 16.6 per cent of vegetable matter. The mineral matter



found in the stomachs is not really food, and was taken in such small quantities that it may be disregarded. As April is represented by only two stomachs, and November by one, the results for these months can not be considered as final. Excluding November, the largest amount of insect food was eaten in May, when it formed 92 per cent of the food, and the smallest in April and July, when it formed 70 per cent. The single November stomach contained 98 per cent of insects.

The most important item of the insect food is caterpillars, which aggregate more than 34 per cent of the whole. Contrary to what might have been expected, the Connecticut stomach taken in November contained 81 per cent of these insects. This accords with what has been noted by many observers in the field, that the oriole spends a

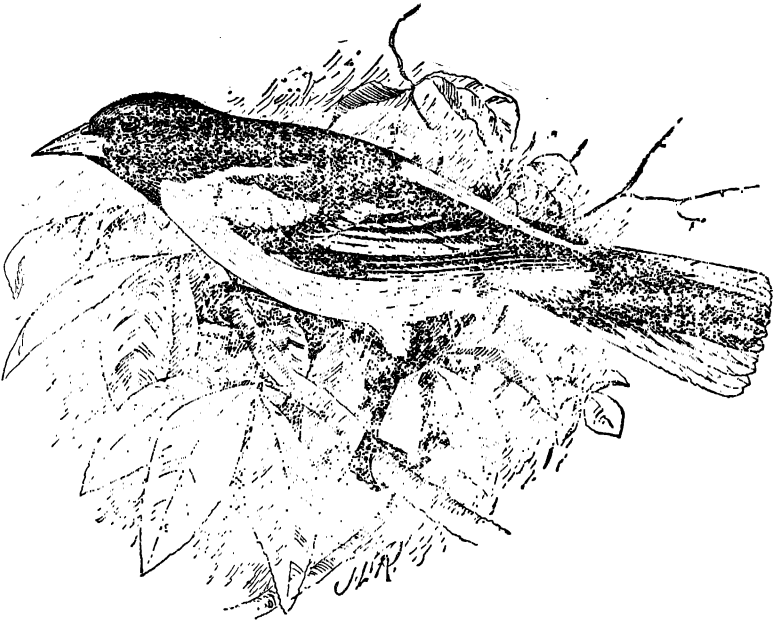


FIG. 111.—Baltimore oriole (*Icterus galbula*).

great deal of time searching among leaves and branches, where such insects abound. An average of 25 per cent of caterpillars was found in the two stomachs taken in April, and this percentage continued without much variation until July, when it dropped to 12, July being the month when most fruit was eaten. After July the percentage of caterpillars eaten increases rapidly.

Beetles of various families and species rank next to caterpillars in abundance. Those most eaten are the click, or snapping, beetles (*Ela-teridæ*), insects having very hard shells, which would seem to render them undesirable for food. Although eaten during May, June, and July only, click beetles constitute 9 per cent of the food for these months, or 4.5 per cent for each of the six months under consideration.

These beetles and their larvæ, known as "wireworms," are among the most destructive insects with which the farmer has to contend. Professor Comstock says of the click beetles:

There is hardly a cultivated plant that they do not infest; and working as they do, beneath the surface of the ground, it is extremely difficult to destroy them. Not only do they infest a great variety of plants, but they are very apt to attack them at the most susceptible period of their growth, before they have attained sufficient size and strength to withstand the attack, and often the seed is destroyed before it has germinated. Thus fields of corn or other grain are ruined at the outset.

As there are over 500 species of snapping beetles in North America, it is easy to understand how welcome is any assistance in the struggle against them, and it is gratifying to know that the oriole is especially fond of them.

The May beetles (*Scarabæidæ*) stand next to the click beetles in importance as food of the oriole. They were found in stomachs collected during every month from May to August, but only in May and June was the percentage important, viz, 12 and 7 per cent, respectively. The average for the whole season was  $3\frac{1}{2}$  per cent. These insects consisted of the common May beetle (*Lachnosterna*), several species of dung beetles (*Aphodius*), and a number of the leaf-eating beetles (*Dichelonycha*). So far as known dung beetles do no harm, but the other two genera are very injurious. Leaf beetles (*Chrysomelidæ*) are not supposed to be a favorite food of birds, owing to their disagreeable excretion, but they were eaten by the orioles in every month except November. In July they amounted to 8 per cent, in August 5, and averaged nearly 3 per cent of the food for the season. More than half a dozen species belonging to this family were identified in the contents of the stomachs. Among them was the well-known striped squash beetle (*Diabrotica vittata*), which in the larval state bores the roots of squashes or cucumbers, and when adult feeds on their leaves.

Another member of the same family (*Odontota dorsalis*) feeds on the leaves of the locust, and in some places ruins the trees, while another of the same genus (*O. rubra*) feeds on apple trees. Both of these were identified in the stomachs. Snout beetles or weevils (*Rhyncophora*) form a small but fairly constant element of the oriole's diet, amounting to a little more than 2 per cent for the season. In May they formed 5 per cent of the food, and then decreased to less than 2 per cent in July, but in August increased a little. All are noxious insects, and belong for the most part to the families of the curculios and the scarred snout beetles (*Otiorynchidæ*). Members of six other families of beetles were found, but not in sufficient numbers to be of economic importance, although it is interesting to note that one of the blister beetles was among the number. As most of these beetles contain a secretion that produces blisters, it would seem to us that they must be rather disagreeable as an article of food.

The predaceous beetles (*Carabidæ*) constitute an element of great interest in the food of any bird, since the number eaten is commonly taken as a criterion of the comparative usefulness of the bird. As these beetles themselves live for the most part on other insects, it is evidently desirable that they should be allowed to pursue this good work as long as possible. That they are not molested by orioles is proved by the fact that in the stomachs examined predaceous beetles averaged only one-half of 1 per cent for the season, and the greatest number taken in any month amounted to little more than 1 per cent.

Wasps (*Hymenoptera*) constitute an important element of the food in every month, varying from 20 per cent in April to about 8 per cent in July, and averaging nearly 11 per cent for the season. As these insects spend a large part of their time buzzing about flowers and leaves, it seems only natural that they should be eaten by the oriole. Ants, which also belong to the *Hymenoptera*, are eaten to some extent through the spring and summer, but are only important in April and May, when they form about 10 per cent of the food. They belong for the most part to the large black species of *Camponotus*, which live on trees and nurse plant lice.

Bugs (*Hemiptera*) of various species are favorites with the orioles, as they are with many other birds, and form about 6 per cent of the food for the season. None were found in April, about 4 per cent in May, after which they increased to nearly 10 per cent in July, but again decreased to 4 per cent in August. Many of these are stink bugs (*Pentatomidæ*), which crawl over berries and impart a disgusting flavor to them. Others belong to the family of assassin bugs (*Reduviidæ*), which feed on other insects; but the most interesting members of this order are the scale lice (*Coccidæ*) and common plant lice (*Aphides*), two of the most destructive families of insects known. They are so minute that it seems surprising that any bird should care to eat them, but scale lice were found in eight stomachs and aphids in four. Flies (*Diptera*) make up more than 4 per cent of the food in May, and no less than 7 per cent in the single stomach taken in November. The most interesting are the larvæ of the March fly (*Bibio*), of which one stomach contained about 100. These larvæ feed on roots of grass and evidently must have been obtained from the ground. Several long-legged crane flies (*Tipulidæ*), with their eggs, were also found.

Grasshoppers and locusts were eaten in June, July, and August to the extent of 1, 11, and 17 per cent, respectively. In capturing these insects it is evident that the orioles must alight on the ground, attracted no doubt by the abundant supply and the ease with which such food can be obtained, for at this season it can hardly be supposed there is a dearth of caterpillars and other insects which they usually find on the trees. Spiders also constitute a favorite food, averaging nearly 6 per cent for the season. In May they form 5 per cent

of the food, and gradually increase to nearly 12 per cent in August. Some of the stomachs taken during the breeding season in April, May, and June contained bits of snail shells, which were probably eaten for the lime they contain.

*Vegetable food of the oriole.*—For its vegetable food, the oriole prefers fruit, but also eats grain and the seeds of weeds. Six kinds of fruits were found in the stomachs. Of these, cherries, raspberries, and mulberries are or may be cultivated. Cherries were identified in two stomachs, and four others contained fruit pulp too much digested for recognition. Assuming that this pulp came from cherries, six stomachs in all contained this fruit. Raspberries or blackberries were found in eleven stomachs. As this fruit is as likely to be wild as cultivated, the record does not necessarily indicate that the bird does much damage. Mulberries were found in only three stomachs, Juneberries in nine, huckleberries in one, and elder berries in one. Next to *Rubus* fruits (blackberries and raspberries), Juneberries seem to be preferred, and it is noteworthy that several orioles shot on or near cherry trees in bearing had no cherries in their stomachs, but some seeds of *Rubus* and Juneberries.

Green corn was found in one stomach and peas in two, hardly enough to establish the bird's reputation as a pilferer of fields and gardens; and as only one observer has seen it eat peas, and none corn, it may be safely said that the harm done is trifling. No traces of sprouting oats or other grain were discovered, except in one stomach, taken in April, which contained some obscure vegetable substance that may have been sprouting peas nearly digested.

If the two stomachs taken in April and the one in November are excluded, the percentage of vegetable food for the season stands about as follows: May, 7 per cent; June, 8; July, 29; August, 12. The sudden rise in July and the falling off in August are very noticeable. Moreover, in July the vegetable food consisted entirely of fruit.

While the generally harmless character of the oriole is almost universally acknowledged, a few instances of damage to fruit have been reported. It is accused of eating berries and garden peas, and several correspondents say that it injures grapes. Even John Burroughs brands it as an enemy of the vineyard, but the harm it does in this way is probably overestimated. Mr. W. F. Webster, of Oshkosh, Wis., states that it sometimes punctures grapes to suck the juice, but adds that the bird is worth its weight in gold as an insect destroyer. The stomach examinations show that it destroys immense numbers of caterpillars, grasshoppers, bugs, and noxious beetles, and does not prey to a noticeable extent on predaceous or useful beetles. Added to these good qualities, its brilliant plumage, sprightly manners, pleasing song, and skill in nest building excite our admiration. Let the farmer continue to hold his good opinion of the oriole, and accord it the protection it so well deserves.