

THE STATUS OF THE RING-NECKED PHEASANT IN UTAH

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The Ring-necked Pheasant (*Phasianus colchicus torquatus* Gmelin) is a native of southern Siberia, Korea, and northern China. It was first introduced into the United States about 1857; however, its successful introduction did not take place until 1881. It was introduced into Utah by the Walker family who released a number of pairs in Cottonwood Canyon, near Salt Lake City, in 1912. These birds did not spread out of Salt Lake County; and in 1922, the Utah State Department of Fish and Game, under the able direction of its commissioner, Mr. D. H. Madsen, brought in additional numbers and developed a pheasant farm at Springville, Utah. Since 1923, birds have been placed in every county in the state. The species is prolific, and reports indicate that it is becoming common in most sections of the state.

Despite the short open season each fall, the pheasant probably is now the most abundant gallinaceous game bird in northern and central Utah. Because it is becoming abundant, and because it is commonly found in agricultural areas, its presence is both encouraged and opposed. Many farmers extol the pheasant as one of the greatest benefactors in the bird world, while an equally large number condemn it as a decided enemy to agriculture. In order that mere opinion regarding its economic worth may be supplanted by a certain amount of fact, this study has been undertaken.

As a result of the extreme and contradictory points of view it was deemed necessary to collect a number of birds and carefully analyze their stomach contents. During the past year forty-five birds have been taken from various agricultural areas in Utah County. At least one was collected each month of the year. An effort was made to collect them on farms where they were reported doing much damage. Also, an effort was made to secure specimens from each of the principal agricultural crop areas.

In making this investigation the writer has received much help. He wishes to thank the following: Dr. Walter P. Cottam and Professor A. O. Garrett, for aid in determining weed seed and other plant material; Dr. Vasco M. Tanner and Mr. Wilfred Olsen, for aid in determining the animal matter; Mr. D. Elden Beck, for aid in collecting and analyzing a number of stomachs; and the Utah State Department of Fish and Game, for a permit to secure the necessary birds.

The analysis and table which follow show the results of the detailed study of the stomachs of forty-five birds. The term "stomach" here means both the crop and the gizzard. The method employed in examining the stomach contents is similar to that used by the United States Biological Survey, as explained in the Yearbook separate for 1920, no. 843.

Inasmuch as unequal numbers of pheasants were collected during the various months an average monthly summary and a total average were determined (see table, page 121). A total average for the six summer months (April to September) and one for the six winter months (October to March) were computed. The figures in the first column under "No. of Birds" represent the numbers of birds collected each month. The last horizontal column gives the yearly average. The total yearly average was made from the twelve monthly averages.

The individual analyses of the forty-five birds are recorded in the following short paragraphs, one paragraph for the stomach of each bird.

No. 11, ad. male, April 6, 1928, 5 p. m.; waste land; per cent of vegetable matter 59.5, of animal matter 40.5, of gravel 33.1.¹ Contents: wheat, 3.9%; *Chenopodium* leaves, 44.4%; *Chara* 10.2%; grass seed, trace; binding twine, 1%; beetles, 40.5% (*Sphenophorus*, Carabidae, *Calandra ochrea*); gravel, 422 pieces.

No. 12, ad. male, April 21, 1928, 11:30 a. m.; marshes and beet field; per cent of vegetable matter 91.6; of animal matter 8.4; of gravel 10.9. Contents: sprouting wheat, 1%; barley, 1%; alfalfa, 79.8%; grass, 3.8%; weed seed, 2.6% (*Polygonum*, *Plantago*, *Lepidium*); binding twine, 2.2%; rootlets, 1.2%; *Melanoplus bivittatus*, 3%; beetles, 3% (*Calandra ochrea*, *Sphenophorus*); *Formica*, .4%; cutworms and noctuid cocoon, 2%; gravel, 78 pieces.

No. 13, ad. male, May 12, 1928, 2 p. m.; pasture; per cent of vegetable matter 53.7, of animal matter 46.3, of gravel 28. Contents: grass leaves, 41%; clover 12.7%; beetles, 16.7% (*Sphenophorus*); ants, 29.6% (*Formica* 139 individuals); gravel 95 pieces.

No. 14, ad. male, June 30, 1928, 5 p. m.; alfalfa; per cent of vegetable matter 91, of animal matter 9; of gravel 76.7. Contents: alfalfa leaves, 40%; *Panicum capillare* leaves, 28%; weed seed, 1% (*P. capillare*); undetermined plant, 22%; beetles, 5% (Curculionidae, Carabidae); ants, 2% (*Formica*); undetermined animal matter, 2%; gravel, 408 pieces.

No. 15, ad. male, July 1, 1928, 7 p. m.; alfalfa and wheat field; per cent of vegetable matter 96.6, of animal matter 3.4, of gravel 15.9. Contents: wheat, 95% (135 kernels); weed seed, 1.6% (wild oat, *Melilotus alba*, *Hordeum jubatum*); beetles, 3% (*Sphenophorus*, *Calandra ochrea*, Carabidae); ants, .4% (*Formica*); gravel, 154 pieces.

No. 16, juv. female (1/3 grown), July 4, 1928, 6 p. m.; carrot and grain field; per cent of vegetable matter 3.6, of animal matter 96.4, of gravel 7.7. Contents: grass leaves, 3.6%; grasshoppers, 73.9% (Oedipodinae, Locustinae); beetles, 3.2%; ants, 3.4% (*Formica*); cutworms and other Lepidopterous larvae, 4.2%; undetermined animal matter, 11.7%; gravel, 44 pieces.

No. 22, ad. male, Aug. 20, 1928, 5 p. m.; harvested wheat field; per cent of vegetable matter 96, of animal matter 4, of gravel 11.3. Contents: wheat, 79%; alfalfa leaves, 15.5%; weed seed, 1.5% (mustard, *Melilotus alba*); *Melanoplus*, 4%.

No. 17, ad. female, Sept. 30, 1928, 10 a. m.; tomato field; per cent of vegetable matter 93.8, of animal matter 6.2, of gravel 17.6. Contents: tomato fruit and seeds, 33.1%; alfalfa, 2.1%; weed seeds, 23.5% (mustard 540 seeds, *Rumex*, *Polygonum*, *Carex*, Compositae); undetermined plant material, 35.1%; *Osphulella*, 6.2%; gravel, 322 pieces.

No. 18, ad. male, Sept. 22, 1928, 4 p. m.; wheat and beet field; per cent of vegetable matter 85.3; of animal matter 14.7; of gravel, 2.6. Contents: wheat, 67.3% (634 kernels); beet root, 17.7%; weed seed, .3% (*Echinochloa crusgalli*, *Aster frondosus*); grasshoppers, 14.7% (*Melanoplus bivittatus*, *Dissosteira carolina*); gravel, 89 pieces.

No. 19, ad. male, Sept. 22, 1928, 4 p. m.; wheat and beet field (taken from the same flock and at the same time and place as no. 18); per cent of vegetable matter 90.1, of animal matter 9.9, of gravel 4.2. Contents: wheat, 70.7%; corn, 1.8%; beet, 16.6%; leaf (undetermined), .4%; weed seed, .5% (*Polygonum*, *Lactuca*); undetermined plant material, .1%; grasshoppers, 9% (*Melanoplus bivittatus*, *Dissosteira carolina*); beetle, .9% (Tenebrionidae); gravel, 286 pieces.

No. 21, ad. male, Sept. 29, 1928, 8 p. m.; marshes; per cent of vegetable matter 41.9, of animal matter 58.1, of gravel 38. Contents: grass leaves, 10.7%; weed seed, 13.6% (*Polygonum*, mustard, *Rumex*); undetermined plant, 14.7%; dry plant stems, 2.9%; grasshoppers, 44% (*Melanoplus bivittatus*); undetermined animal matter, 14.1%; gravel 378 pieces.

No. 20, ad. male, Sept. 30, 1928, 10 a. m.; roadside; per cent of vegetable matter 100, of gravel 21.8. Contents: wheat, 5.4% (waste); grape seeds, 2%; tomato fruit, 1.4%; alfalfa, 1.4%; weed seeds, 23.8% (*Bromus*, *Echinochloa crusgalli*, *Chaetochloa viridis*, *Ambrosia*); undetermined plant material, 66%.

¹The gravel was figured as a per cent of the total stomach contents. The food contents were regarded as being one hundred per cent.

No. 23, ad. female, Oct. 6, 1928, 10 a. m.; strawberry field; per cent of vegetable matter 99.6, of animal .4, of gravel 4.2. Contents: wheat, .4%; corn, 59.5%; apple fruit, .4%; weed seeds, 26.4% (*Chaetochloa viridis*, *Helianthus annuus*); undetermined plant material, 9.5%; bristle fibers of *C. viridis*, 3.4%; beetle, .4% (*Aphodius*); gravel, 179 pieces.

No. 24, ad. female, Oct. 6, 1928, 8 a. m.; tomato field; per cent of vegetable matter 100, of gravel 4.5. Contents: wheat, 85%; weed seed, 7% (*Chaetochloa viridis*, *Rumex*, *Polygonum*, *Rosa*, *Brassica*); undetermined plant material, 8%; gravel, 237 pieces.

No. 88, juv. (1/2 grown), Oct. 9, 1926, 4 p. m.; marsh and grain field; per cent of vegetable matter 96.2, of animal matter 3.8, of gravel 4.8. Contents: wheat, 84%; alfalfa, 7.7%; green grass, 1.3%; weed seed, 3.2% (*Polygonum*, *Chamesyce serpyllifolia*); Locustinae, .8%; beetles, 3% (*Calandra ochrea*, Carabidae); gravel, 53 pieces.

No. 25, ad. male, Oct. 14, 1928, 5 p. m.; raspberry and tomato field; per cent of vegetable matter 63, of animal matter 37, of gravel 9.1. Contents: field corn, 21.1%; weed seeds, 19.8% (*Helianthus annuus*); other weed seeds 9.7% (*Chaetochloa viridis*, *Carex*, *Atriplex*, *Polygonum*); undetermined plant material, 10.4%; *C. viridis* bristle fibers, 2%; *Melanoplus bivittatus*, 35.6%; wasp, 1.4% (*Psammophila*); gravel, 40 pieces.

No. 1, ad. male, Nov. 3, 1927, 3 p. m.; potato field; per cent of vegetable matter 93.5, of animal matter 6.5, of gravel 45.6. Contents: weed seed, 16.1% (*Polygonum*, undetermined seeds); undetermined plant material, 77.4%; Coleoptera, 6%; Arthropoda, .5%; gravel, 192 pieces.

No. 26, ad. male, Nov. 3, 1927, 7 a. m.; tomato field; per cent of vegetable matter 100, of gravel 23.1. Contents: wheat, 4%; weed seed, 38% (*Chaetochloa viridis*, *Melilotus alba*, *Echinochloa crusgalli*); undetermined plant material, 34%; *C. viridis* bristle fibers, 24%; gravel, 97 pieces.

No. 32, ad. male, Nov. 4, 1928, 10 a. m.; alfalfa field; per cent of vegetable matter 98.6, of animal matter 1.4, of gravel 28.6. Contents: wheat, 7.2%; cherry pits, 7.1%; alfalfa, 5.8%; weed seed, 32.8% (*Chaetochloa viridis*, *Chenopodium*); undetermined plant material, 41.4%; *C. viridis* bristle fibers, 4.3%; *Melanoplus*, 1.4%; gravel, 326 pieces.

No. 34, ad. male, Nov. 3, 1928, 6 a. m.; marshes. Because this stomach was entirely empty it was not figured in the averages.

No. 33, ad. male, Nov. 4, 1928, 7:30 p. m.; sage brush; per cent of vegetable matter 99.1, of animal matter, .9, gravel 24.1. Contents: wheat, 71.8%; *Rosa* seeds, 19.5%; *Polygonum* seeds, 1.9%; undetermined plant material, 5.9%; Locustinae, .9%; gravel, 226 pieces.

No. 35, ad. male, Nov. 3, 1928, 7:30 a. m.; grain field; per cent of vegetable matter, 99.4, of animal matter .6, of gravel 35.4. Contents: wheat, 94.3%; weed seed, 5.1% (*Polygonum*, *Atriplex*); Locustinae, .6%; gravel, 574 pieces.

No. 36, ad. male, Nov. 3, 1928, 7:30 a. m.; grain field; per cent of vegetable matter 100, of gravel 46.7. Contents: wheat, 92.4%; weed seed, 7.6% (*Polygonum*, *Atriplex*); gravel, 473 pieces.

No. 37, ad. male, Nov. 4, 1928, 7:30 a. m.; grain field; per cent of vegetable matter 100, of gravel 28. Contents: wheat, 98.7%; *Polygonum*, 1.3%; gravel, 210 pieces.

No. 38, ad. male, Nov. 4, 1928, 7:30 a. m.; grain field; per cent of vegetable matter 100, of gravel 47.3. Contents: wheat, 94.7%; weed seed, 5.3% (*Polygonum*, *Rumex*).

No. 39, ad. male, Nov. 4, 1928, 7:30 a. m.; grain field; per cent of vegetable matter 100, of gravel 38.1. Contents: wheat, 97.4%; weed seed, 2.6% (*Polygonum*, *Rumex*, *Atriplex*); gravel, 549 pieces.

No. 40, ad. male, Nov. 5, 1928, 7:30 a. m.; grain field; per cent of vegetable matter 97.3, of animal matter 2.7, of gravel 36.7. Contents: wheat, 27%, weed seed, 70.3% (*Polygonum*, *Rumex*, undetermined seeds); Locustinae, 1.4%; Coleoptera, 1.3%; gravel, 157 pieces.

No. 41, ad. male, Nov. 5, 1928, 8 a. m.; beet field; per cent of vegetable matter 100, of gravel 9.7. Contents: wheat, 21%; canning peas, 69.4%; *Chaetochloa viridis* seeds, 1.8%; *Polygonum* seeds, 2%; *Rosa* seeds, 4%; undetermined seeds, 1.8%.

No. 42, ad. male, Nov. 5, 1928, 9 a. m.; grain field; per cent of vegetable matter 100, of gravel 14.8. Contents: wheat, 89.1%; green grass, 1.7%; weed seeds, 7.5% (*Rosa*, mustard); rootlets of sprouting wheat, 1.7%; gravel, 165 pieces.

No. 43, ad. male, Nov. 6, 1928, 8 a. m.; grain field; per cent of vegetable matter 100, of gravel, 27.6. Contents: wheat, 32.3%; weed seeds, 5.7% (*Rosa*, *Echinochloa crusgalli*, *Polygonum*); undetermined plant material, 62%; gravel, 198 pieces.

No. 44, ad. male, Nov. 6, 1928, 10 a. m.; alfalfa field; per cent of vegetable matter 100, of gravel 30.9. Contents: grass, 44.6%; buds of a shrub (?), 2.7%; seeds of a legume, 27.7%; *Rosa* seeds, 12.5%; undetermined weed seeds, 12.5%; gravel, 160 pieces.

No. 31, ad. male, Nov. 6, 1928, 4:30 p. m.; grain field; per cent of vegetable matter 91.3, of animal matter 8.7, of gravel 3.4. Contents: wheat, 49.7% (579 kernels); grass, 7%; weed seed, 28.4% (*Helianthus annuus*, Plantain, *Trifolium pratense*, *T. repens*, *Polygonum*, *Chenopodium*); undetermined plant material, 9.3%; bark of tree or shrub, 2.5%; rootlets, .7%; *Melanoplus atlantis*, 8%; *Gryllus assimilis*, .6%; snail, .1%; feather, trace; gravel, 109 pieces.

No. 27, ad. male, Nov. 7, 1928, 10 a. m.; marshes; per cent of vegetable matter 98.1, of animal matter 1.9, of gravel 27.1. Contents: weed seed, 89.1% (*Atriplex*, *Trifolium repens*); undetermined plant material, 9%; Locustinae, 1%; Carabidae, .9%; gravel, 281 pieces.

No. 28, ad. male, Nov. 7, 1928, 5 p. m.; corn field; per cent of vegetable matter 99.5, of animal matter .5, of gravel (?). Contents: field corn, 90% (109 kernels); grass, .5%; weed seed, 8.6% (*Amaranthus retroflexus*, *Chaetochloa viridis*—1376 seeds); *C. viridis* bristle fibers, .4%; insects, .5% (Elateridae, pupa case of insect).

No. 29, ad. male, Nov. 8, 1928, 5 p. m.; wheat field; (the crop only was obtained) per cent of vegetable matter 100. Contents: wheat, 100%.

No. 2, ad. male, Dec. 17, 1927, 1 p. m.; harvested and snow-covered beet field; per cent of vegetable matter 100, of animal matter trace, of gravel 15. Contents: beet root, 97.4%; beet leaves, 1.9%; weed seed, .7% (*Rumex crispus*, *Trifolium pratense*); four horse (?) hairs, trace; gravel, 1108 pieces.

No. 30, ad. male, Dec. 27, 1928, 9 a. m.; per cent of vegetable matter 97.7, of animal 2.3, of gravel 31. Contents: waste barley, 74.6%; green plant material, 12.3% (*Lemna minor*, *Cicuta*, grass); *Rosa* seeds, 5.8%; *Polygonum* seeds, .4%; rootlets, 4.6%; *Melanoplus* (shell), 1.3%; pupae and larvae of Lepidoptera, 1%; gravel, 632 pieces.

No. 3, ad. male, Jan. 7, 1928, 9:30 a. m.; grain field; per cent of vegetable matter 100, of animal trace, gravel 21. Contents: wheat, 92.3%; weed seed, 7.7% (*Polygonum*, *Chenopodium*, *Amaranthus retroflexus*); Carabidae, trace; gravel, 493 pieces.

No. 4, ad. male, Jan. 21, 1928, 3:30 p. m.; marshes; per cent of vegetable matter 98, of animal 2, of gravel 9.8. Contents: grass, .3%; *Salsola pestifer* seeds, 72.4% (3870 seeds); other weed seeds, 8% (*Lactuca*—1157 seeds, *Rumex*, *Polygonum*, *Carex*, *Melilotus alba*, wild barley—total of 5228 seeds); undetermined plant material, 17.3%; *Melanoplus* (shell), 2%; gravel, 876 pieces.

No. 5, ad. male, Feb. 11, 1928, 4 p. m.; barley field; per cent of vegetable matter 97.1, of animal matter 2.9, of gravel 27.6. Contents: barley, 96.1%; weed seed, 1% (*Echinochloa crusgalli*, *Persicaria lapathifolia*, mustard, *Iva axillaris*); Coleoptera larvae, .2%; ants, .4% (*Formica*); undetermined insect pupae, 2.3%; gravel, 247 pieces.

No. 6, ad. male, Feb. 22, 1928, 8 a. m.; grain field; per cent of vegetable matter 88.5, of animal 11.5, of gravel 18.2. Contents: wheat, 14.7%; *Chara*, 1.5%; weed seed, 2.3% (*Echinochloa crusgalli*, *Melilotus alba*, *Atriplex*); undetermined plant material, 53.8%; dry alfalfa and grain straw, 16.2%; droppings of small rodent, 11.5%; gravel, 229 pieces.

No. 7, ad. male, Mar. 17, 1928, 6:45 a. m.; orchard; per cent of vegetable matter 100, of gravel 31.2. Contents: oats, 2%; *Lemna minor*, 3.8%; weed seed, 15.1% (*Atriplex*, *Persicaria lapathifolia*, *Lepidium*); undetermined plant material 77.1%; rootlets, 2%; gravel, 176 pieces.

No. 8, ad. male, Mar. 18, 1928, 7:30 a. m.; alfalfa field; per cent of vegetable matter 100, of gravel 56. Contents: weed seed, 25% (*Atriplex*, *Vicia americana*, *Chenopodium*, *Lepidium*, *Echinochloa crusgalli*); alfalfa seed, trace; undetermined plant material, 75%; gravel, 285 pieces.

No. 9, ad. male, Mar. 31, 1928, 6:45 a. m.; waste grain land; per cent of vegetable matter 98.7, of animal matter 1.3, of gravel 30.5. Contents: wheat (some sprouting), 83%; cherry pits, 8.7%; grass, 2.5%; weed seed, 4.5% (*Chenopodium, Ranunculus*); undetermined animal matter, 1.3%; gravel, 277 pieces.

No. 10, ad. male, Mar. 31, 1928, 7:30 p. m.; alfalfa field; per cent of vegetable matter 98.3, of animal matter 1.7, of gravel 8.3. Contents: wheat, 12%; apple fruit and seeds, 2.7%; alfalfa, 68%; grass, 8.8%; *Equisetum*, .3%; weed seed, 8% (*Vicia americana, Polygonum*); undetermined plant material, 3%; rootlets, 2.7%; *Coccinellidae*, .5%; cutworms and other larvae, 1.2%; gravel, 638 pieces.

SUMMARY OF FOOD OF RING-NECKED PHEASANT: AVERAGES FOR MONTHS, SEASON AND YEAR

No. of Birds	Month	% of Veg.	% of Grain	% Fruit and Veg.	% Green Plant	Weed Seed	Misc. and Undet.	% Animal	% Orthoptera	% Coleoptera	% Hymenoptera	Misc. and Undet.	% of Gravel	No. of Gravel
2	April	75.5	1.9	....	69.5	1.3	2.7	24.5	2.5	21.7	.2	....	22	225
1	May	53.7	....	....	53.7	....	....	46.3	....	16.7	29.6	....	23	95
1	June	91	....	....	63	1	22	9	....	5	2	....	2	76.7
2	July	50.1	47.5	....	1.8	.8	....	49.9	36.9	3.1	1.9	7.9	11.8	99
1	Aug.	96	79	....	15.6	1.5	....	4	4	....	....	....	11.2	....
5	Sept.	82.2	29	14.2	2.9	12.3	25.7	17.8	14.8	.2	....	2.8	16.8	256
12	6 Months Summer Average	74.6	26.2	2.3	35.2	2.8	8.4	25.2	9.7	7.6	5.6	2.1	27.7	217
4	Oct.	89.7	62.5	.1	2.3	16.5	8.3	10.3	9.1	.8	.4	.1	5.7	127
19	Nov.	98.7	57.7	.8	3.1	21.6	15.8	1.3	.3	.5	....	.1	25.9	207
2	Dec.	98.8	37.3	48.7	7.1	3.5	2.3	1.2	.7	....	....	.5	23	870
2	Jan.	99	46.1	....	.2	44	8.6	1	1	....	....	....	15.4	685
2	Feb.	92.8	55.4	....	.7	1.6	35	7.2	....	....	.2	7	45.8	238
4	Mar.	99.2	24.2	2.8	20.8	11.4	40	1.5	....	.3	....	1.3	31.5	344
33	6 Months Winter Average	96	47.2	8.6	5.7	16.4	18.2	3.8	1.9	.3	.1	1.5	24.5	412
45	Year Average	85.5	36.7	5.5	20.4	9.5	13.4	14.5	5.8	4.1	2.8	1.8	26.2	323

From the individual stomach analyses it is observed that fifteen stomachs contained 100% vegetable material. All but one of these (no. 20) were collected during the winter months when it was difficult to obtain animal matter. Of the forty-five stomachs examined, thirty-seven contained over 90% vegetable material. Only one (no. 16, a juvenal, 1/3 grown) contained over 90% animal matter. Only seven of the forty-five stomachs contained more than 10% animal matter. These were largely summer birds.

The food contents indicate that the pheasant is an omnivorous feeder, with grain its favorite food. Thirty-three birds had eaten one or more kinds of grain. Of these, twenty-nine were collected in or near grain fields. The grain eaten comprised 36.7% of the total stomach contents. Of this, 79.7% was wheat, 10% was corn, 10% was barley, and .3% was oats. Of these birds, twenty-eight had eaten wheat; four, corn; three, barley; and one, oats. The grain eaten was chiefly waste material; however, some sprouting grain was taken. A small amount of sprouting grain was taken throughout the growing season.

Twenty-three birds had eaten green plant material as follows: eleven, grass; eight, alfalfa and clover; four, aquatic plants (*Lemna, Cicuta, Chara*); one, buds of a shrub; one, beet leaves; and two, *Chenopodium* leaves.

Nine stomachs contained the following fruits and vegetables: three contained

sugar beets; two, tomatoes; one, peas; two, cherry pits; two, apples; and one, grape seeds (two seeds). The cherry pits and apples were eaten out of season; therefore this food was of no economic worth. Ten birds were collected in or very close to beet fields and only three contained beet root in their stomachs. Bird no. 2, collected December 17, when there were thirteen inches of snow on the ground, had 97.4% beet root in its crop and gizzard. This was taken from a harvested beet field. A number of places were observed where the birds had dug through the snow and pecked out a frozen beet. Nos. 18 and 19 were taken in a ripened beet field in September and contained 17.7% and 16.6%, respectively, beet root in their stomachs. Pheasants have been observed pecking at the young beets in the spring and summer. It is evident, therefore, that they do some damage in this regard.

Five birds were taken in or near tomato fields and two contained tomato seeds or macerated fruit in their stomachs. Five birds were also collected in or near berry patches but showed no trace of berries in their stomachs.

Forty-one of the forty-five pheasants had eaten weed seeds. Thirty-six species of weed seeds were found, comprising 9.5% of the yearly average of food eaten. *Polygonum* (smartweed), green foxtail, clover, wild rose, dock, and barnyard grass were most often found. *Atriplex*, mustard, sunflower, Russian thistle, and ragweed were slightly less common. These are listed in the order of abundance. *Polygonum* was found in twenty-two stomachs. One stomach, no. 4, which was taken in January, contained 5228 seeds of weeds, 3870 of which were of Russian thistle.

Fourteen and five-tenths per cent of the total yearly food average consisted of animal matter, including about forty species of insects. This varied from just a mere trace in some stomachs to 96.4% in no. 16. All but one (no. 20, taken September 30) of the summer birds contained some animal matter. Of the insects taken, grasshoppers, snout beetles, ground beetles, and ants of the genus *Formica* were most abundant. Seventeen stomachs contained grasshoppers, sixteen contained beetles, and six contained ants.

Forty-five grasshoppers representing seven species were found in the seventeen stomachs. Thirty-two specimens of beetles were counted, representing thirteen species. Snout beetles were most often encountered. Ants of the genus *Formica* were found in six stomachs, one containing 139 individuals. Eight cutworms and three undetermined lepidopterous larvae were found in six stomachs. Some of the unexpected miscellaneous material consisted of rodent droppings, binding twine, horse hair (?), feathers, and bark.

Since only two juveniles (no. 16, 1/3 grown, taken in July, and no. 88, 1/2 grown, taken in October) were collected, the data are insufficient to permit of drawing definite conclusions regarding their food. No. 16 contained 96.4% insect food, while no. 88 contained 96.2% vegetable material. This seems to indicate that the young also are omnivorous, with slightly the greater leaning toward animal food.

There was a wide variation in the amount and number of gravel grains eaten. There seemed to be little correlation between the amount of food in the stomach and the amount of gravel contained. There was also a wide variation in the size of the gravel pieces.

Except during the coldest weather those stomachs collected at mid-day contained little food material, while those taken in the morning or evening were full or being filled. This suggests that pheasants usually feed during the early morning or late afternoon.

The above facts show that both praise and blame are due the bird on the basis of its feeding habits. At no time of the year is it predominately insectivorous. Its chief value, aside from its aesthetic worth, undoubtedly consists in its being a game bird. It does service in destroying obnoxious weed seeds and destructive insects. Its injury to agriculture consists in its destruction of vegetables, sprouting grain, and a few beneficial insects.

The pheasant is essentially a bird of the swamps, moist thickets, and brushy lands. It seems that in Utah only those farms next to its favored habitat are damaged to any appreciable extent, and even there it renders considerable service. In general, it appears that as long as the pheasants are held within reasonable numbers they will render at least as much service to agriculture as they do harm.

Brigham Young University, Provo, Utah, March 16, 1929.