

## FERTILE EGGS FROM PHEASANTS IN JANUARY BY "NIGHT-LIGHTING"<sup>1</sup>

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SEXUAL activity in the autumn and winter period of normal sexual quiescence has been induced by Bissonnette (1930-1935) in Starlings and ferrets by increasing lengths of daily exposures to electric light from incandescent bulbs after nightfall. Rowan (1925-1930) with Juncos, Crows, and Canaries, Cole (1933) with Doves, Miyazaki (1934) with Mejiros, Ivanov (1935) and Kirschbaum and Ringoen (1936) with Sparrows, Benoit (1934-35) and Parhon and Caban (1935) with Ducks, Baker and Ranson (1932) with field mice, Hill and Parkes (1933) and Marshall and Bowden (1934) with ferrets, have all induced similar sexual activation during the winter periods of sexual repose. Recently Clark, Leonard, and Bump (1936) report activation of the sex glands of Pheasants, Quail, and Partridge (Ruffed Grouse) by similar procedures. But so far Cole seems to be the only one who secured fertile eggs from such experiments on birds.<sup>2</sup>

Poultrymen generally have obtained increased autumn and winter laying with the domestic fowl as a result of "night-lighting". Recently Professor Scott of Kansas State College of Agriculture (private communication) has induced Turkeys to lay fertile eggs in January instead of in March and April, but failed to get similar responses with Guinea-Fowl (originally native of the tropics). Others have doubtless had similar experiences with other birds.

To those interested in the management and propagation of game-birds for restocking areas for hunting, it has been a cause for dissatisfaction that, in some States at least, the legal season for shooting Pheasants opens almost on the date when most birds reared from eggs laid at the normal time reach their first full plumage. This makes it necessary to release the birds grown in captivity just at

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<sup>2</sup>The following list includes the animals serving as a basis for experiments in induced sexual activity at out-of-season periods: Starling (*Sturnus v. vulgaris*), Ferret (*Putorius vulgaris*), Junco (*Junco h. hyemalis*), Crow (*Corvus brachyrhynchos*), Canary (*Serinus canarius*), Mourning Dove (*Zenaidura macroura carolinensis*), Mejiros (*Zosterops palpebrosa japonica*), Sparrow (*Passer t. domesticus*), Mallard (*Anas p. platyrhynchos*), Field Mouse (*Microtus agrestis*), Pheasant (species not mentioned), Bob-White (*Colinus v. virginianus*), Ruffed Grouse (*Bonasa umbellus*), Turkey (*Meleagris gallopavo mexicana*), Domesticated.

the time the season opens, or, if earlier, before they reach full plumage. In either case, the birds have little or no time to become accustomed to the region in which they are liberated, or to become wild enough to make good sport for the hunters.

An attempt has therefore been made to find out if Pheasants can be induced to begin laying fertile eggs in winter or earlier in the Spring, so that they may reach full plumage for liberation two weeks or more in advance of the season for hunting them.

With the consent and coöperation of Superintendent Arthur L. Clark of the Department of Fish and Game of the State of Connecticut, and of Mr. Leon F. Whitney, who has general supervision of the breeding of their wild animals, experiments were planned and were carried out at the Shade Swamp Sanctuary near Farmington, Connecticut, with this end in view. Mr. Earl E. Bailey of Trinity College assisted with the preparation and care of the lighting apparatus.

The majority of the Pheasants at the Sanctuary were housed and fed as usual during the winter, as controls. One cock Ring-necked Pheasant (*Phasianus colchicus torquatus*) and four hen Pheasants of the same species were chosen from the flock at random and kept in a pen of the usual type. This pen was lighted by a 60-watt bulb for three hours each night, from six to nine o'clock, for the first ten days, for four hours during the next ten days, and for five hours each night thereafter. Both controls and experimental birds received normal daylight each day, and the food and other care were similar for both groups of birds.

Lighting began on December 16th and was continued into the spring and summer months. Before or during the first week in January the male bird assumed an unmistakable breeding condition of head-furnishings and plumage and was giving the mating call. Copulations began and the first eggs were laid by two of the hens on January 15th. All four hens were laying before January 25th, and four eggs in a single day were recovered frequently. Laying reached the rate of about three and a half eggs in twenty-four hours from the four hens before January 28th. Over thirty eggs were laid before February 3d, and laying continued at the same rate in spite of very severe weather till March 4th, when the laying of one hen became intermittent. She continued to lay at intervals through April 15th, but laid only about thirty eggs in that time.

Some of the controls first began to lay on April 4th; many were considerably later in doing so. On April 15th over two hundred and forty eggs had been laid by the four experimental hens, and, as the poor layer gave only about thirty eggs, the others averaged about seventy eggs each between January 15th and that date (about seventy eggs in ninety-one days or less). This is well above the

average number of eggs from pheasants under natural conditions.<sup>3</sup>

Settings were made in an improvised electric incubator. Thirty-seven eggs were set on February 8th and forty-six on February 24th. Settings were made under hens on March 1st and 20th.

Trouble with the electric system caused the incubators to run very irregularly. But, of the first thirty-seven eggs set, thirty-two proved fertile and began development (86.5 per cent). Of the next forty-six, twenty could still be recognized as having developed after incubation for thirty-two days when they were broken.

Of the eggs set under the hens, two eggs were rolled out of the nest and were both fertile and developing when broken. Four young chicks hatched at thirty and thirty-three days from the first fourteen eggs, set on March 1st, and eight out of twelve eggs set on March 20th hatched at twenty-four and twenty-five days of incubation.

A most interesting situation has occurred in the case of the chicks hatched at thirty days. On April 15th, just twenty-four days after hatching, these birds were far in advance of chicks hatched at the usual twenty-three-day period of incubation so far as degree of feathering is concerned. So that, while they are delayed in hatching, they were not in rate of feathering and appear to be in advance of normal in this respect. This phenomenon is being studied further.

It has, therefore, been possible to induce Pheasants of this species to lay fertile and hatchable eggs as early as January 15th-25th by this method. By timing the beginning of night-lighting and the rate of increase of its duration, it is also possible to cause Pheasants to lay at any desired time after these dates and probably even before them. The percentage of hatchability of these early eggs, as judged by those set under hens, was quite satisfactory as compared with normals.

If no insurmountable obstacles to rearing the young Pheasants hatched from these eggs arise, the problem of securing Pheasants in full plumage for release at any desired time in the early autumn is solved by this method of approach.

#### SUMMARY

(1) A method is described by which it has been possible to induce Pheasants to begin laying between January 15th and 25th, so that young birds may be hatched early enough to allow them to develop mature plumage well in advance of the opening of the season for legal shooting of these birds in Connecticut.

(2) The fertility of the eggs laid under these conditions was satisfactory, and hatchability was good in those set under hens.

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<sup>3</sup>Up to June 10th, when 3 hens were still laying, over 340 eggs had been laid and, since one was killed before she laid over 30 eggs, the others must have laid about 310 eggs between January 15th and June 10th—an average of over 103 eggs each in about 147 days. Lately laying has become somewhat intermittent. This just about trebles the usual yearly egg production of Pheasants as they are kept in captivity.

(3) One setting of eggs was delayed in hatching to thirty to thirty-three days and another to twenty-four to twenty-five days or longer, instead of twenty-three days as is normal for this species.

(4) Rate of feathering was accelerated in birds delayed in hatching to thirty days as compared with that of Pheasants hatched at the normal period of twenty-three days.

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