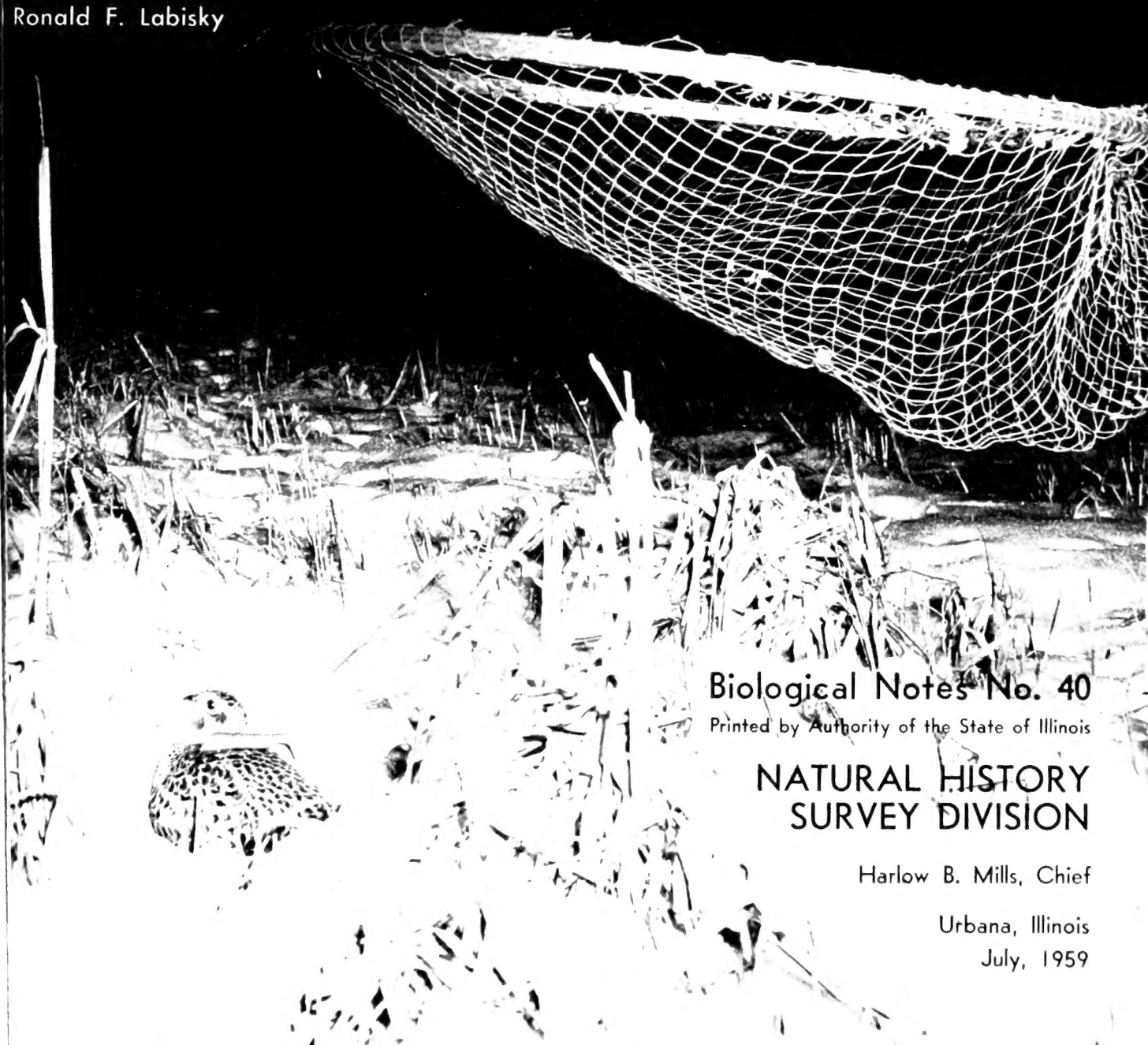
STATE OF ILLINOIS
William G. Stratton, Governor

DEPARTMENT OF REGISTRATION AND EDUCATION
Vera M. Binks, Director

NIGHT-LIGHTING:
A Technique for Capturing Birds and Mammals

Ronald F. Labisky



Biological Notes No. 40

Printed by Authority of the State of Illinois

NATURAL HISTORY SURVEY DIVISION

Harlow B. Mills, Chief

Urbana, Illinois
July, 1959

Fig. 1.—Pheasant captured during night-lighting operation being placed in burlap holding bag until it can be processed.

NIGHT-LIGHTING:

A Technique for Capturing Birds and Mammals*

Ronald F. Labisky†

Capturing large numbers of wild birds and mammals for the purpose of marking the animals for ecological and behavioral studies is usually a difficult task. This paper describes a technique which was found effective for capturing pheasants (*Phasianus colchicus*), cover and fig. 1, and certain other animals by using bright lights at night to blind them temporarily. The idea for this technique is not original with the writer nor is it of recent origin. If records existed from prehistoric time, they would probably show that preliterate man used the light shed by burning torches in capturing wild animals for food.

The capturing of pheasants by night-lighting, also called "jack-lighting" or "shining," has been employed in practical game management since the late 1920's. Oscar Johnson (Leopold 1931:118) reported that workers in South Dakota captured about 10,000 pheasants during the winter of 1926-27, and 12,000 pheasants during the winter of 1929-30, by "shining" roosting birds with automobile headlights. More recently, workers in Idaho (Anonymous 1952), South Dakota (Smith 1954), Nebraska (Anonymous 1955), and California (Hart *et al.* 1956:137) have employed night-lighting in capturing pheasants.

In Illinois, one of the problems in pheasant research has been that of capturing and marking a large enough number of wild pheasants to permit investigations of behavior, population dynamics, and movements. While bait trapping of wild pheasants is successful in many states, it is difficult, or frequently impossible, in east-central Illinois during fall and winter; this difficulty is probably the result of an abundant year-round food supply and moderate winter weather (Robertson 1958:21). In order to facilitate the pheasant research program in east-central Illinois, a mobile, night-lighting rig was designed and outfitted. The work reported in this paper was conducted on a 23,200-acre study area in Ford and McLean counties, near Sibley, during the fall and winter of 1956-57, 1957-58, and 1958-59.

*A contribution from Illinois Federal Aid Project No. 30-R, the Illinois Department of Conservation, the United States Bureau of Sport Fisheries and Wildlife, and the Illinois Natural History Survey, co-operating.

†Assistant Wildlife Specialist, Illinois Natural History Survey; at time of study Labisky was employed by the Illinois Department of Conservation under terms of the Federal Aid in Wildlife Restoration Act and was assigned to the Illinois Natural History Survey for administrative and technical supervision.

ACKNOWLEDGMENTS

Acknowledgment is made to personnel of the Illinois Natural History Survey and the Illinois Department of Conservation for assistance in the field, especially to Louis F. James, Rexford D. Lord, Jr., Charles B. Mack, and Stuart H. Mann; to Thomas G. Scott, James S. Ayars, Carl O. Mohr, Ralph E. Yeatter, and Mrs. Frances Robbins, all of the Natural History Survey, for advice concerning presentation of the data; to Mrs. Diana R. Braverman of the Natural History Survey for editing the manuscript; and to Robert O. Ellis, David B. Cooley, Everette Edwards, Sr., and Glenn G. Poor, Sr., all of the Natural History Survey and Geological Survey garage, for assistance in designing and constructing the night-lighting equipment. The cover photograph and all other photographs were taken by William E. Clark, Natural History Survey photographer.

EQUIPMENT

The basic equipment for night-lighting consisted of a 3,000-watt, AC-DC, gasoline generator, which was mounted in the rear of a panel or carry-all truck, fig. 2, a floodlight cluster, and a hand-held spotlight. A 4-wheel drive vehicle proved to be a desirable kind for night-lighting work.

The gas line of the generator was connected directly to the main gas line of the truck. The generator was equipped with an electric starting motor powered by a 12-volt battery; the battery was placed on the floor next to the generator.

A series of five 150-watt PAR/FL projector flood lamps, which were held by Killark model SLH lampholders and mounted in a Killark model SY wiring trough, comprised the floodlight cluster. The wiring trough was mounted at the apex of a tripod made from three 3-foot lengths of 1-inch metal conduit that were welded together at the top and bolted at the bottom to a metal car-top carrier, fig. 3. The tripod, which extended about 3 feet above the cab of the truck when in use, was easily detachable and could be placed in the rear of the truck when not in use. Only about 5 minutes were

Fig. 2.—Interior of carry-all truck, showing generator bolted to floor. The exhaust pipe is at the left of the generator, and the gas line tubing is at the lower right of the generator. The equipment box at the right contains materials for marking pheasants.

required to attach the tripod to the top of the cab. The floodlights produced a semicircle of light extending about 10 yards on either side of the truck and about 15 yards forward. The individual flood lamps were adjustable so that the area of projected light could be controlled.

The major electrical wiring consisted of a cable (110-volt, single phase AC cable, No. 10 wire) leading from the 110-volt, AC outlet of the generator to a 110-volt master switch box with a fuse. The switch box was mounted on the inside wall of the truck, and a short electrical cable, which terminated in a female receptacle, led from the switch box, fig. 4. The cable from the floodlight cluster terminated in a locking, heavy duty male plug and was connected with the short lead from the switch box to complete the power circuit to the floodlights. A flexible, mechanically operated control cable, running from the switch box to the ceiling of the truck cab above the driver, provided a means of switching the floodlights on or off during the trapping operations, figs. 2 and 4.

The hand-held spotlight used in this work was a Unity Model No. 742, 100,000 candle power, 12-volt automobile searchlight equipped with a male plug. To provide electrical current for the spotlight, a short electrical cable, which terminated in a female receptacle, was attached to the terminals of the 12-volt storage battery; the spotlight was plugged in to complete the circuit.

A net, used to capture pheasants, was equipped with a 10-foot handle, which was constructed of 1-inch conduit, and a hoop 30 inches in diameter. The bag of the net was made of 1-inch mesh netting and had a depth of about 15 inches. Because the net was heavy, a short

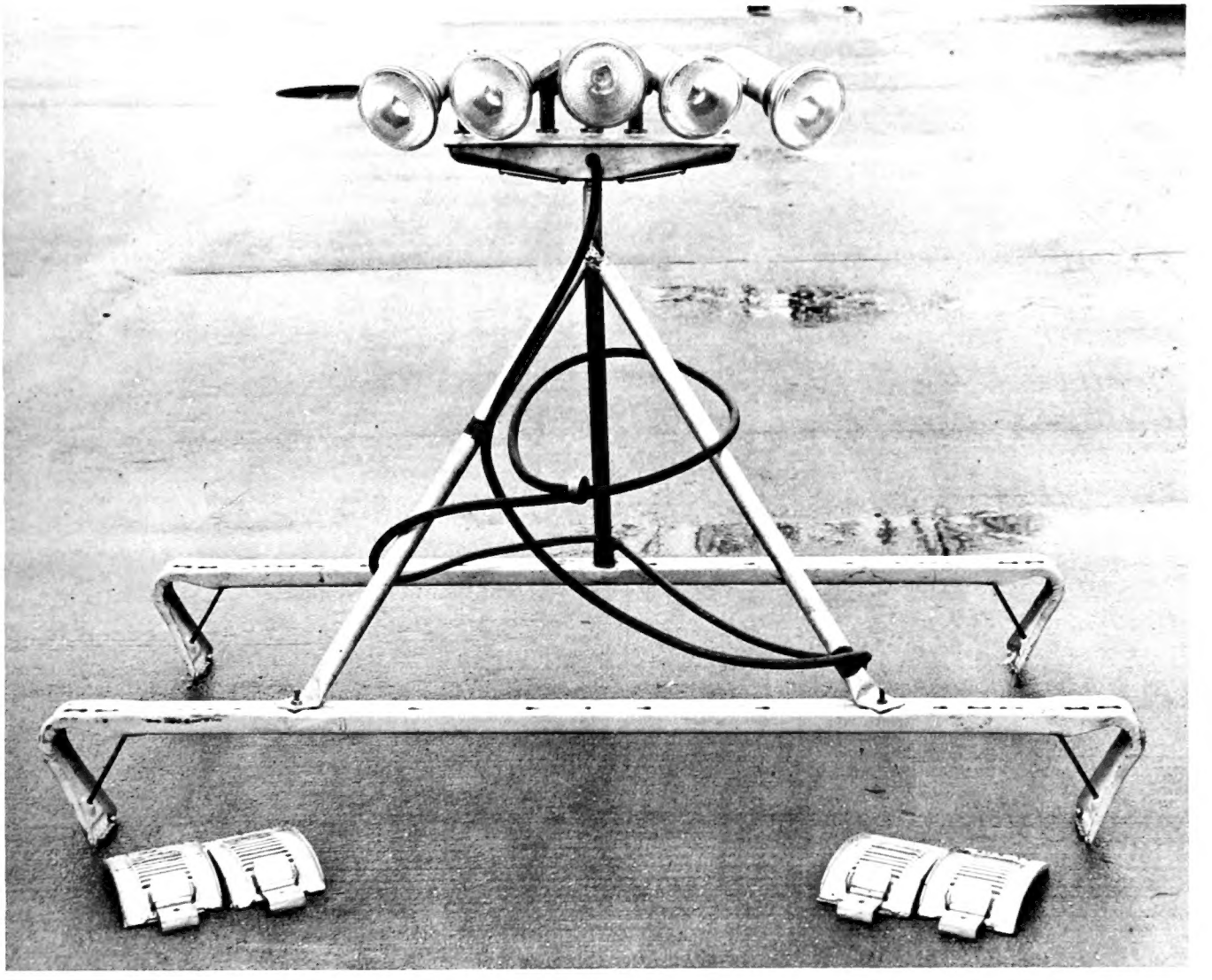


Fig. 3.—Floodlight cluster mounted at apex of tripod; support arms bolted to metal car-top carrier.

piece of pipe was welded to the front bumper of the truck so that the netter could rest the butt end of the net handle in this holder to steady the net while the truck was moving. The holder was particularly valuable in cold weather because it enabled the netter to hold the net handle in the crook of his arm and to avoid touching the metal with his hands except when the net was in use.

To give the driver good visibility, the netter rode on the right fender, where a rubber mat was mounted to provide a secure seat. A safety cable was attached across the front part of the hood of the truck; the netter could hold on to the cable with one arm to keep his balance while the truck was moving.

In capturing pheasants by night-lighting operations, researchers in South Dakota (Smith 1954:3) and Nebraska (Anonymous 1955:18) used five men in each of their trapping crews: a driver, two netters, and two men operating the spotlights. With few exceptions, we employed a two-man crew and experienced a high degree of efficiency in our trapping operations. One man drove the truck and controlled the floodlights; also he manipulated the spotlight, which he held out of the window of the truck, fig. 5. The other man netted the pheasants.

PROCEDURE AND TECHNIQUES

The procedure followed for capturing pheasants by night-lighting was to systematically cruise fields of relatively flat terrain, such as hayfields and grain stubble fields, to locate roosting pheasants. Usually night-lighting operations were begun shortly after sunset and were continued throughout the night. The roosting pheasants were observed in the arc of light produced by the floodlights. The most effective cruising speed was about

5 mph, but, once a roosting bird was sighted, speeds of 15 to 20 mph were often necessary to place the netter in a position to attempt the capture.

When a roosting pheasant was observed in the arc of the floodlights, the driver immediately switched on the hand-held spotlight, pinpointed the bird with the spotlight beam, and simultaneously switched off the floodlights. He then drove toward the bird, keeping it centered in the spotlight beam until the netter jumped from the truck and made his netting attempt. Most pheasants were captured within 25 feet of the truck. Many pheasants were captured at or within a few feet of their roosting sites, but some birds walked or ran considerable distances before holding well enough for the netter to capture them. If a pheasant flushed, it could be "knocked down" at distances up to about 200 yards by the spotlight beam if the bird was so oriented in flight that the beam of light reached its eye and temporarily blinded the bird.

When attempting to capture a pheasant, the netter usually approached from the spotlighted, or blinded, side of the bird. The net was placed over the pheasant swiftly, with the hoop parallel to the ground, to lessen the chance of injuring the bird, fig. 6. The actions of the driver and the netter had to be closely co-ordinated to obtain a high degree of efficiency in capturing pheasants by night-lighting, and, in order to attain this efficiency, much operational experience was required.

Because it was too time consuming to process each pheasant as it was trapped, the captured birds were placed in burlap holding bags until 10 or 12 had been collected, fig. 1. The birds quieted down quickly and remained in good physical condition if only one or two pheasants were placed in each holding bag. Cocks and

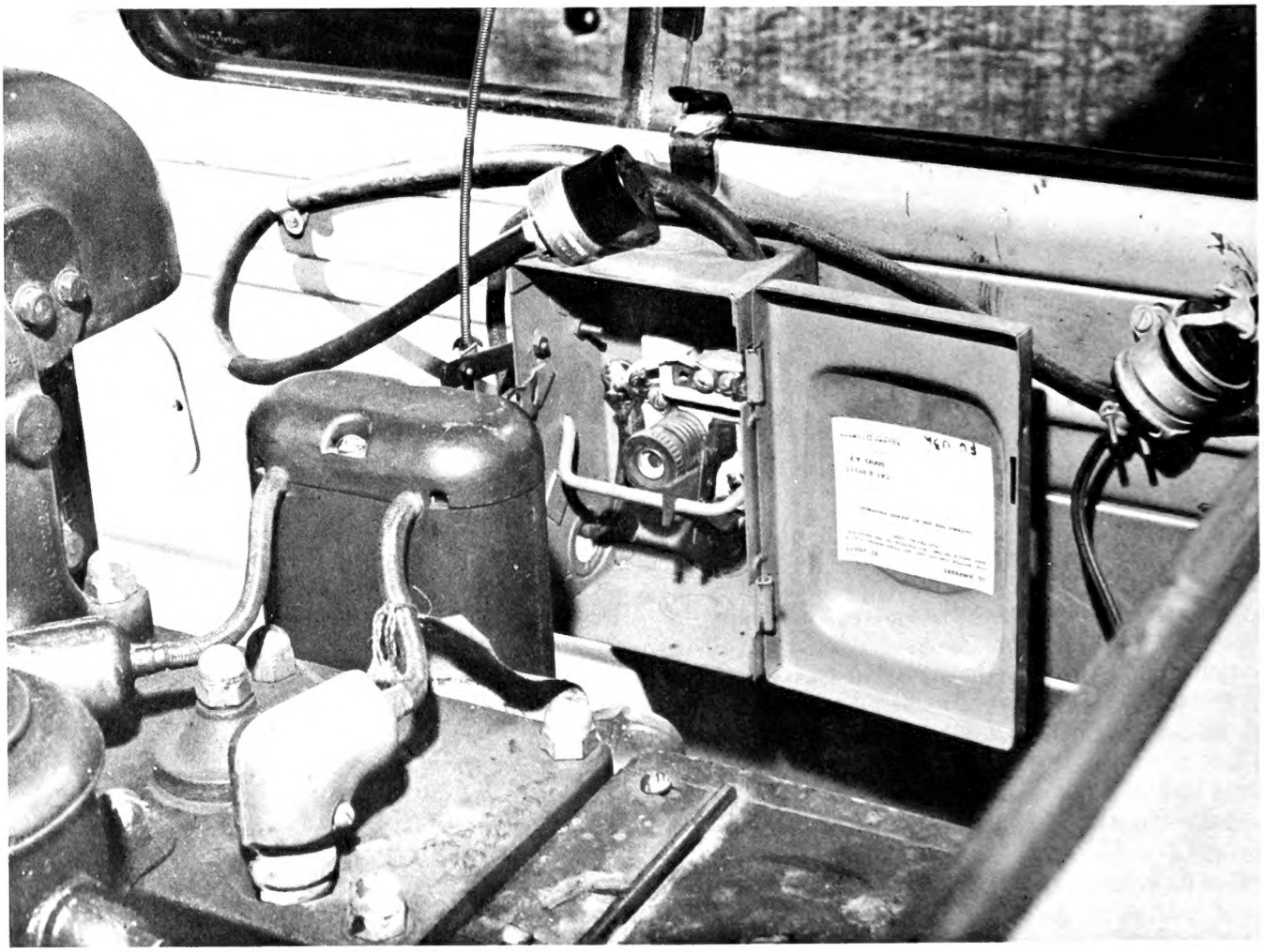


Fig. 4. — The 110-volt switch box, with fuse, mounted on the wall of the truck alongside the generator. The electrical cable that enters the switch box at the lower left corner is the lead from the 110-volt power outlet of the generator. The electrical cable that leaves the switch box at the upper right corner terminates in a female receptacle that connects with a cable from the floodlight cluster. The flexible control cable is shown attached to the circuit-breaker arm of the switch box. The receptacle and plug for the hand-held spotlight are shown connected at the far right.

Fig. 5.—Night-lighting rig in operation in a grain stubble field. The electrical wiring system shown on this rig is an early design, less refined than the system that is described in this paper.

Fig. 6.—Capture of a marked hen pheasant (under net). Another hen, near the captured hen, flushed.

hens were held separately because cocks generally fought the holding bags more than did hens. In cold weather, the birds adapted themselves more quickly to holding bags than in warm weather. Pheasants were seldom kept in holding bags longer than 1 hour before being processed and released.

The captured pheasants were processed in the rear of the truck, fig. 7. The processing procedure for each bird included (1) measuring the depth of the bursa (mm.) to determine age, (2) measuring the length of the spur-tarsus (mm.) of cocks, (3) weighing, (4) measuring the length of the replacement of the most recently molted wing primary (mm.), (5) attaching an aluminum butt-end band to a tarsus, and (6) attaching a plastic back-tag marker, fig. 8. To facilitate handling and to avoid injury to the birds, we placed each pheasant headfirst into a large woolen sock for all processing steps with the exception of attaching the back-tag marker.

FINDINGS AND DISCUSSION

Individual pheasants were more susceptible to capture by night-lighting than larger groups of roosting pheasants; if a single member of a larger group flushed, it seemed to stimulate the entire roosting group to flush. However, many of the pheasants that flushed flew only short distances before alighting, usually within the same field, where a second attempt could be made to capture them.

The pheasants were easier to trap after they had been roosting 3 to 4 hours than they were shortly after the onset of the roosting period; trapping was most efficient after midnight. Constant night-lighting within any one field usually caused the pheasants in the area to become skittish; trapping then became less efficient.

Strong winds generally caused the roosting pheasants to flush rather wildly; this was true particularly

Fig. 7. — Processing a captured pheasant inside the carry-all truck. The generator is behind the biologist at the left.

of large flocks. Wind caused the vegetation to wave, making it difficult to locate pheasants when they began to run or walk from the roosting sites. Fog, rain, heavy dew, or frost caused the pheasants to hold tight to the roosting sites and made them more susceptible to capture by night-lighting. Pheasants were most susceptible to capture by night-lighting on cold, cloudy nights following rain. Snow caused the birds to be flighty.

Pheasants were skittish and difficult to capture on bright, moonlight nights when the vegetation was dry. But if the vegetation was wet or frosty, moonlight seemed to have little effect on the flightiness of roosting pheasants.

There were never nights, regardless of the weather or the behavior of the pheasants, in which night-lighting did not yield a sufficient capture of pheasants to make the operation worth while. There was, however, considerable variation in the ease with which pheasants were captured under different nighttime conditions. Sometimes slight alterations in technique were necessary to increase trapping efficiency.

About one of every three unmarked pheasants that were flushed during night-lighting operations in 1956-57, 1957-58, and 1958-59 was captured, table 1. There were, of course, seasonal and year-to-year variations in the proportions of pheasants captured to those flushed.

Although the total pheasant population of the study area was smaller after each hunting season than before, the number of pheasants per unit of cover that was examined was greater after the season than before. Fall plowing reduced the amount of roosting cover, and by the beginning of winter the pheasant population had become concentrated in the remaining cover. In general, the percentage of pheasants captured varied inversely with the number of pheasants that were flushed per unit of cover examined; the trapping effort that was expended per bird was greater if few birds were flushed than if many birds were flushed. Proportionately larger num-

Fig. 8. — Attaching a bell-shaped, plastic back-tag to a pheasant. The material used in this marker is Elastic U. S. Nauga-hyde, a durable, cloth-backed, vinyl resin plastic.

bers of flushed pheasants were captured each fall (before the hunting season) than in the following winter (after the hunting season), table 1.

An average of 6.7 minutes per pheasant was required to capture the 1,334 pheasants taken during 1956-57, 1957-58, and 1958-59, table 1. The average time per pheasant was less in seasons and years in which pheasant populations were high than in periods in which the populations were low—only slightly less before the hunting season in each year than after.

An average of 5.6 minutes was required to process each pheasant that was captured.

For the 1,334 pheasants handled in the night-lighting operations, the mortality rate attributed to these operations was 2.4 per cent. Data reported by Leopold *et al.* (1943:390) indicate that 5 per cent of the birds caught during the bait trapping operations on the University of Wisconsin Arboretum were killed in the traps; most of the losses were caused by dogs. Other Wisconsin studies of bait trapping showed a 7 per cent average mortality among trapped pheasants (Buss 1946:123). The mortality rate among about 10,000 pheasants captured in stationary, baited traps in Wood County, Ohio, over a period of 7 years, was 2.5 per cent (Leedy & Hicks 1945:118).

We captured other birds, in addition to pheasants, by night-lighting. Species that were very susceptible to capture by night-lighting included sora rails *(Porzana carolina)*, Virginia rails *(Rallus limicola)*, barn owls *(Tyto alba)*, vesper sparrows *(Pooecetes gramineus)*, and grasshopper sparrows *(Ammodramus savannarum)*. Meadowlarks *(Sturnella* spp.*)*, screech owls *(Otus asio)*, and stubble quail *(Coturnix coturnix)* were only moderately susceptible to capture by night-lighting. Mourning doves *(Zenaidura macroura)*, marsh hawks *(Circus cyaneus)*, and short-eared owls *(Asio flammeus)* did not seem to be affected by the lights and could not be captured by night-lighting.

About 50 cottontail rabbits *(Sylvilagus floridanus)* were captured coincidentally with the trapping of pheasants by night-lighting during 1957-58 and 1958-59. The rabbits were most susceptible to capture by night-light-

Table 1.—Data relative to capturing pheasants by night-lighting and to processing the captured birds during the prehunting season (October and early November) and posthunting season (December and January) periods of 1956-57, 1957-58, and 1958-59 on a 23,200-acre study area in Ford and McLean counties, Illinois.

Trapping Period	Pheasant Density (Birds/Square Mile)	Number of Pheasants Captured*	Average Capture Time (Minutes/Bird)	Capture: Flush Ratio† (Per Cent Captured)	Number of Pheasants Processed	Average Processing Time (Minutes/Bird)
1956-57						
Preseason	(150)**	267	7.0	36.7	258	5.3
Postseason	60	189	8.5	35.6	171	5.6
Total or Average	....	456	7.6	36.3	429	5.4
1957-58						
Preseason	115	220	7.4	47.2	216	6.0
Postseason	80	127	10.0	42.2	127	5.3
Total or Average	....	347	8.3	45.3	343	5.7
1958-59						
Preseason	(175)**	354	4.8	50.2	354	6.3
Postseason	(100)**	177	5.0	15.8	177	4.4
Total or Average	....	531	4.8	29.9	531	5.6
All Years						
Preseason	....	841	6.2	43.7	828	5.9
Postseason	....	493	7.6	26.2	475	5.0
Total or Average	....	1,334	6.7	35.3	1,303	5.6

* Includes marked pheasants that were recaptured.
† The ratio of unmarked pheasants flushed to unmarked pheasants captured.
** Numbers of birds in parentheses are estimates based on rough counts.

ing when the ground and vegetation were saturated with rain or snow water, but even under these conditions the rabbits were not easily captured. It was almost impossible to capture cottontails when the weather was clear and the vegetation dry.

The night-lighting rig was found to be useful for observing and studying the behavior of animals during nighttime. This study technique is particularly valuable when many animals have been marked for individual recognition. Observing animals with bright lights during nighttime has promise as a method of obtaining prehunt sex ratios of pheasants, but the validity of sex ratios that have been obtained by this method has not yet been determined.

LITERATURE CITED

Anonymous
1952. Pheasants in the spotlight. Idaho Wildlife Rev. 4(5):3.
1955. Ring-neck research for better hunting. Part 1: Tagging and banding to keep track of the birds. Outdoor Nebr. 33(4):18-20.

Buss, Irven O.
1946. Wisconsin pheasant populations. Wis. Cons. Dept. Pub. 326, A-46. 184 pp.

Hart, Chester M., Ben Glading, and Harold T. Harper
1956. The pheasant in California. Pp. 90-158 *in* Pheasants in North America (Durward L. Allen, Ed.). Stackpole Company, Harrisburg, Pennsylvania; Wildlife Management Institute, Washington, D. C. 490 pp.

Leedy, Daniel L., and Lawrence E. Hicks
1945. The pheasants in Ohio. Pp. 57-130 *in* The ring-necked pheasant and its management in North America (W. L. McAtee, Ed.). American Wildlife Institute, Washington, D. C. 320 pp.

Leopold, Aldo
1931. Report on a game survey of the North Central states. Sporting Arms and Ammunition Manufacturers' Institute, Madison, Wisconsin. 299 pp.

Leopold, Aldo, Theodore M. Sperry, William S. Feeney, and John A. Catenhusen
1943. Population turnover on a Wisconsin pheasant refuge. Jour. Wildlife Mgt. 7(4):383-94.

Robertson, William B., Jr.
1958. Investigations of ring-necked pheasants in Illinois. Ill. Dept. Cons. Tech. Bul. 1. 137 pp.

Smith, Eldon H.
1954. Spotlighting for better pheasant management. South Dakota Cons. Digest 21(4):2-4.