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Management of Upland  
Game Birds in Iowa

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# Management of Upland Game Birds in Iowa

A Handbook for Farmers, Sportsmen,  
Conservationists and Game Wardens



Published by  
IOWA STATE FISH AND GAME COMMISSION  
Des Moines  
1932

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## PREFACE

The day of plenty of game for everybody at any time has gone. If in Iowa there is to be any game for hunting in the future, there must be provided some plan of managing game as a crop. The simplest plan might be for Iowa to open up the state to unrestricted shooting and shoot until the present game supply is gone. But that is not desirable, and it is not game management. A second plan might be to establish enough game farms to produce an annual crop of game to distribute for hunting. But to do that would require an expenditure so large it would be prohibitive. The sound plan and the one which will be permanent, if it works at all, is to recognize the farmer as the custodian of the game, recognize that in Iowa practically all land is owned privately and that any method of producing and maintaining a game crop, to be successful, must show the farmer how he can provide food and cover for game, and must also provide recognition of the fact that the farmer is entitled to consideration for any effort he makes toward providing a supply of game. This handbook attempts to give suggestions as to how this latter idea of game management may be accomplished.

The principles of such management are equally applicable to all wild life, and improving conditions for game species improves them as well for many non-game species.

The Iowa Fish and Game Commission wishes to express its appreciation for preparation of the greater part of this handbook to Mr. Aldo Leopold.

# Management of Upland Game Birds in Iowa

## CHAPTER I. ORGANIZED GAME MANAGEMENT

There are two steps needed in carrying on game management:

- (1) The improving of cover and food conditions so that an increased game crop can have a home in which to survive;
- (2) The making of arrangements so that the landowner and farmer can prevent trespass and poaching, and can control authorized hunting in some orderly way.

### ORDERLY CONTROL OF HUNTING

If a plan of game management, recognizing the land owner as custodian of the game, is to be successful, the land owner and farmer must conserve the seed stock. To do this he must control: (1) who is permitted to hunt; (2) how many are permitted to hunt; (3) where hunting is to be done; (4) how much game may be killed.

**Methods of Control.** There are several types of control of game management areas. The one most applicable depends upon conditions.

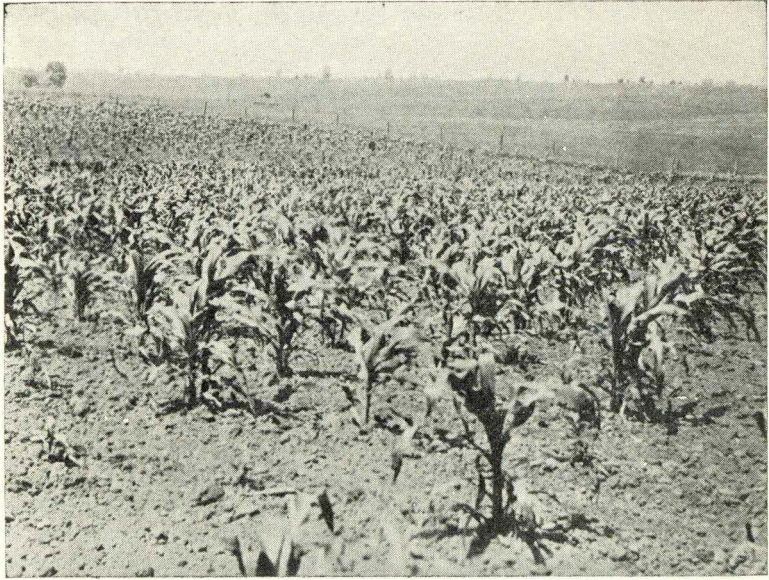
Pheasants and Hungarian partridges usually range over more than one farm, hence group control is better than individual management. Quail do not range so widely, hence a single farm is a practicable unit for quail management. However, where trespass is bad, group control is best even for quail.

Tenant communities are harder to organize than those where resident owners have a permanent interest in the land. In nearly all cases control is easier and more effective if a whole neighborhood or group of farmers acts as a unit.

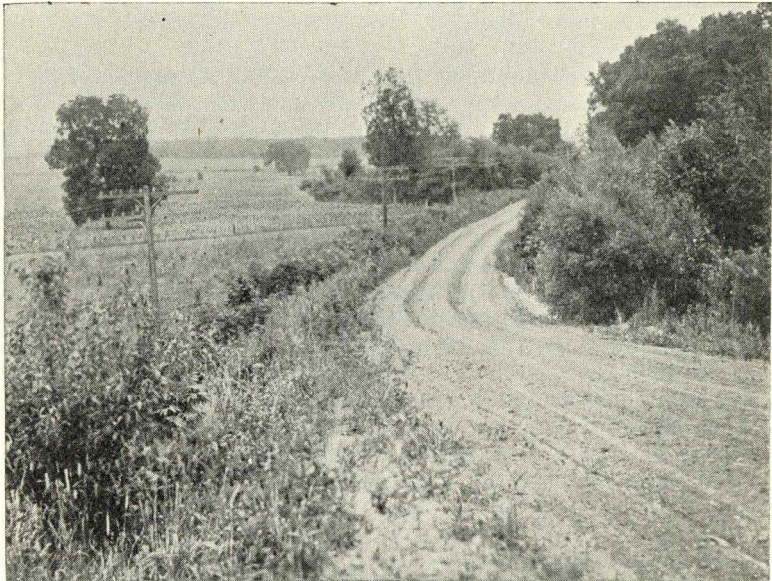
**Suggestions for Organized Control of Areas.** Existing local farm organizations may often take on game management, making it unnecessary to form new organizations. It may not be necessary to sign up every farm in the neighborhood, provided the farms which stay out do not create conditions which permit hunters to overrun the organized territory.

The simplest form of management merely limits the total number of hunters on the area at any one time. The next step is to limit both the number of hunters and the amount of game taken. From this on many more detailed plans could be worked out. The Iowa Fish and Game Commission is trying out a number of these and will be able to furnish interested groups additional detailed suggestions.

All groups or organizations should require: (1) that the hunters carry a card or other visible evidence of permission



While the average Iowa farm usually provides some food and cover for game birds, present agricultural practices leave extensive stretches of country like the above where only a minimum number of birds at best can find protection and nesting ground.



In contrast to the above picture note what might be afforded game birds if some thought were given to their management as a crop. Here is a secondary road where the brush is kept cut back but not cleaned off and where the grass and weeds are not burned except after the winter is over. Elder berries and wild blackberries are growing in abundance at the edges of the woodland. Next to the brushy roadside and woodland patches and grass fringe is corn, in the middle foreground, and small grain in the foreground. In the distance is an osage hedge. This is a real home for game birds. Two quail flushed just ahead of the camera when this picture was taken.

to hunt; (2) that the hunter leave his car at the farm issuing the permit card; (3) that the hunter check in and check out through an authorized member of the group so that the place where hunting is done and the amount of game killed can be checked and controlled.

Farms which are under game management should be posted with proper signs along roads and entrances against hunting and trespass without permission. These signs must inform the hunter as to where to apply for such permission.

#### **COMPENSATING THE FARMER FOR CARING FOR THE GAME**

As will be explained later, game management seldom requires withdrawing any valuable land from agricultural use. The necessary food and cover can usually be provided on odd corners and waste places. Game management does require, however, that farmers invest a certain amount of time, care, skill, and materials in fencing, patrol, signs, food patches, plantings, etc. If farmers are to make this investment freely they must receive some return on it, else it will not be made and there will be no game.

If the farmer is himself a sportsman, he may get this return in the form of shooting for himself or family. If he is not, he is entitled to get it from the sportsmen to whom he gives permission to hunt. If he permits no hunting, he may get it simply from the pleasure he derives from having abundant game on the place.

There are many ways for sportsmen to compensate farmers for their investments in game management. A sportsman's organization may pay a farmer's organization either by reimbursing it for improvements to the game range, or by paying a rental or lease for the hunting privilege. An individual sportsman may pay an individual farmer in the same ways. Probably the simplest way for farmers to market surplus shooting is to charge a fixed rate per man per day for hunting or per head of game killed, and personally to select the hunters.



## CHAPTER II. IMPROVING GAME COVER AND FOOD

The average Iowa farm automatically provides some food and cover for upland game, but unless proper cover and food are present at critical seasons, game will not survive. These critical seasons are winter, when snow buries most cover and food at a time when livestock has been continually reducing it; spring, when the birds must nest after all the fields have been plowed and fence rows cleaned up.

The essentials, therefore, in completing the cover and food requirements for game, are to provide wintering cover and food which snow cannot bury or stock graze out, and to provide nesting cover which will tend to keep nests out of hayfields, where they are liable to be destroyed in mowing.

### HOW TO GROW GAME COVER

Many people think game cover must be planted. Fortunately this is seldom necessary, and planting is expensive. Cover usually comes in automatically on any spot protected against grazing and fire. How quickly it comes in depends on the condition of the soil, the competition of other plants, and the presence or absence of seeds or roots. How long it takes to reach useful size depends on the kind of plant. How long it remains of useful size depends on the kind of plant and the subsequent treatment.

**Grass Cover:** Protection of any sodded area against grazing, mowing, or fire usually results in grass cover during the next growing season. In pasture, grass covers must be fenced to exclude stock during the growing season. In plowland which is grazed only during the winter, special fencing is unnecessary.

Even in pastures, grass cover may be established without fencing by covering patches of sod with piles of brush.

Grass cover may often be secured without labor of fencing by excluding stock from a sodded area already fenced. For example: an abandoned orchard already in bluegrass, fenced, and not needed for stock.

Weeds are a temporary equivalent for grass as cover.

**Brush Cover.** The quickest way to grow brush cover is to clean-cut a small area of timber and protect the stumps against grazing, so that the sprouts may grow freely. Such "coppice" or sprout growth makes cover within one or two years. Oak coppice has the special advantage of holding its dead leaves over winter. Coppice loses its game value when it reaches tree size, and must then be re-cut or else new ground must be coppiced.

Most draws and fence rows and even some pastures will come back to brush if left undisturbed. If such brush gets too large, it may be clean-cut and allowed to resprout. This improves it as cover.

A temporary equivalent for brush is fallen, untrimmed tree-tops, or unburned brushpiles.

An unpruned osage hedge is excellent brush cover. It is of greatest value when the hanging branches reach down toward the ground.

Where time does not allow waiting for natural brush to come in, willows can be planted. Plant "cuttings" about 18 inches long and one or two inches in diameter. These can be driven into the ground, but it is better to open a hole with a stick or rod, place the cutting into it and tramp it in firmly. Cut back the sprouts each spring, preferably not over two feet above the ground. This produces annually a dense "rosette" of vigorous sprouts which afford good cover. Willows thus headed back are called "pollarded willows." Willows are especially good to check erosion in gullies.

Another good way to use willows is to let them grow to sapling size, twelve to fifteen feet high, and then cut them, not quite severing the stem from the stump. A "jungle" is soon produced.

Wild plum, black locust, wild rose, hazel, or buckbrush roots may be planted instead of willow cuttings. These should not be cut back as with the willows.

A quick brush cover can be built up by cutting a tree bearing a grapevine, not cutting the vine. The treetop is soon a dense grape tangle, provided it lies in full light. It will not work in shaded woods.

A slow-growing but long-lived covert is obtained by planting evergreen trees as windbreaks or in clumps in waste corners. Evergreens must be fenced against grazing, and, if possible, against poultry. They lose their game value when the lower branches are pruned up or browsed off. Cedar and spruce are better for game than pine.

Sweet clover is a quick substitute for both grass and brush. A seeding lasts only two years, since the plant is biennial, unless two seedings are made in successive years.

*Brush cover seldom attains its full game value unless there is grass in or near it.*

#### HOW TO PROVIDE GAME FOOD

The various kinds of winter game food are valuable in proportion to their lasting qualities. There must be some left when the late winter storms hit, and what is left must be accessible in spite of snow.

**Berries and Fruit.** Wild berries and fruits will not, by themselves, winter game. They are valuable as "salad," but the game must also have weed seeds or grain. Berries and fruits should be protected wherever possible, and many of them can be planted. They are excellent for insect-eating birds also.

**Summer Berries.** These do not take the place of winter feed but a good berry crop in or near the nesting cover will breed more birds than one without, especially in dry years. This is especially true for quail and ruffed grouse. For Iowa, wild blackberry patches or a few planted mulberry trees, are the best source of berries. One of the above to every fifteen or twenty acres is desirable to make first class quail range.

**Weeds.** The valuable food-bearing weeds include ragweed, wild hemp, smartweed, pigweed, partridge pea, and false climbing buckwheat. Foxtail is good, but the seeds shell out early and are easily covered by snow.

The quickest and surest way to grow weed food is to omit the last cultivation on the outer rows of a cornfield, where it borders on cover.

Overgrazed or thin pastures often grow enough small ragweed or hemp to provide weed seeds.

Small grain stubble often grows much ragweed or foxtail as an aftermath. Simply leaving a strip of such stubble unplowed over winter adjacent to brush cover provides food for game.

To provide smartweed, omit the last cultivation in low spots of a bottomland cornfield.

Weed food-patches can be "grown-to-order" by merely plowing or harrowing the surface soil. Such plowed patches bear food-weeds for several years thereafter.

It is doubtful whether leaving weeds for game "contaminates" the soil. In the case of the weed species here mentioned, the seeds are probably present in all soils. The question of whether these weeds grow is probably not a question of the presence or absence of seeds, but of whether the physical condition of the soil favors germination and whether the competition of other plants favors survival.

**Grain Food.** In Iowa standing corn, even if husked out in fall and grazed over winter, usually offers enough waste grain and weed seed to winter game, if supplemented by artificial feeding during deep snows. If this were not true, Iowa would be gameless today.

*Weedy standing corn.* This offers an ideal combination of winter foods if there is enough of it, and if it is not all grazed out and trampled down when late winter arrives. It is also fair winter cover, except during deep snow. If some late weeds are objectionable, a strip of cover crop, such as buckwheat, may be sowed at the last plowing of corn.

*Machine-picked corn.* Corn fields that have been harvested by machine pickers are of little or no value during snow because the grain and weed seeds are crushed down to ground and hence easily covered up or frozen in.

**Legume Food.** Most woodlands, if left ungrazed, grow wild beans, peas, or trefoils of very high food value. Summer grazing eliminates these plants.

Soybeans are excellent game food, but part of the crop should be stacked to insure a supply during snow. The stacks should be opened a little with each storm. Soybeans under silage corn are good, except during snow.

Black locust trees grow good beans, but sometimes the beans are not available in sufficient quantity to be relied upon for winter game food.

Sweet clover seed is not good game food. Sweet clover is valuable mainly as cover.

**Feeding Stations.** The best artificial feeding station consists of a few cornshocks, set up in or near winter cover, and opened a little during each successive storm.

A feedlot is a good artificial feeding station, if situated near ungrazed cover. So is a strawstack, if near cover, and if new straw is constantly exposed by stock.

Sometimes it is easier to put food near cover than to put cover near food. Large brushy pastures or woods remote from standing corn are cases in point. Food can be provided in such places by plowing a small patch and seeding it to sorghum or some other grain requiring little or no cultivation. If the place is grazed, the food-patch must be fenced. To insure against the grain being all eaten up in the fall, shock half of it and open a shock with each winter storm.

*Roadsides and Railway Rights of Way* are capable of adding valuable game food and cover to that produced on farms. Officials in charge should be persuaded to let the food and cover grow in appropriate places. Cutting roadside brush every three to five years, instead of every year, makes the difference between good and poor game cover, and most roadside brush will not grow to a damaging height in that period. If roadside grass or woods must be burned, the burning should be done in March, after serving as winter cover, but before nesting begins. If roadside grass or weeds must be mowed, the mowing should be done in August, not in June or July when nesting is at its height.

## CHAPTER III. QUAIL MANAGEMENT

Even though at present quail cannot be hunted legally in Iowa, it is useful for landowners to know how to make quail thrive and increase. The pleasure of having them about, and their value as insect-destroyers, are alone sufficient to justify "quail management."

But beyond this, if through management there can be restored such an abundance of quail that the threat of quail scarcity is

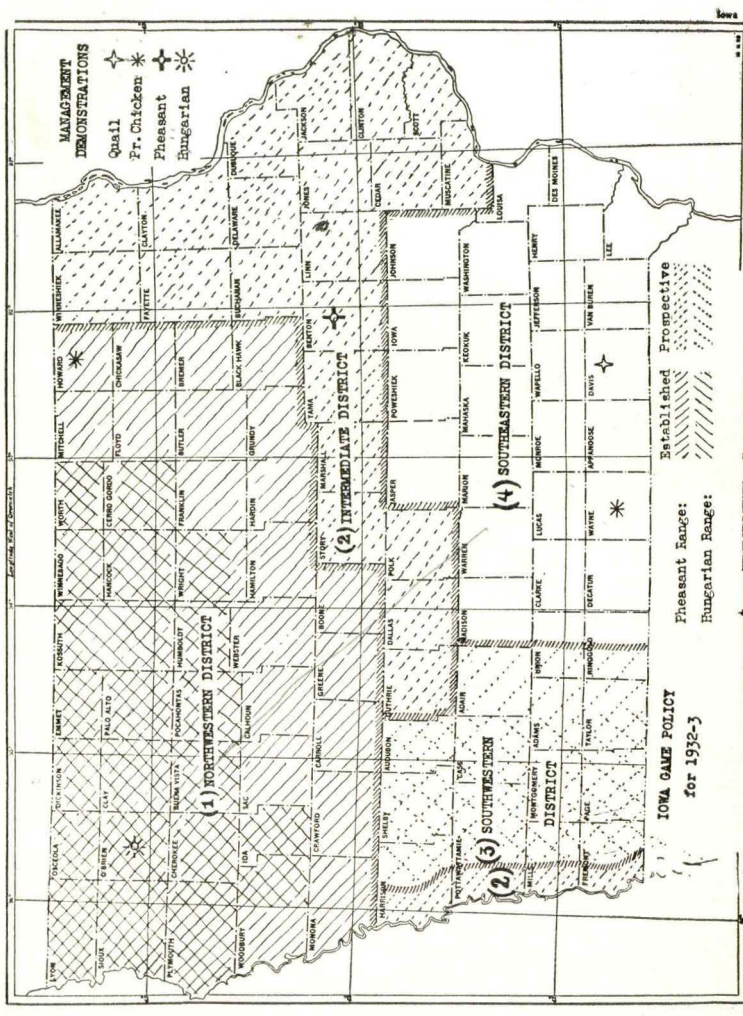


FIG. 1.

eliminated, there should be no reason why a resumption of some form of limited legal shooting cannot be hoped for. Details of a suggested plan for such shooting are outlined in a special circular issued by the Fish and Game Commission.

**Quail Range.** Quail occur wherever ungrazed brush and grass lie adjacent to corn or small grain. Quail management in Iowa is largely a matter of allowing such patches of brush and grass to grow up near corn or small grain. Northwestern Iowa (District 1, Fig. 1) is not favorable for quail management.

An ideal quail range consists of an ungrazed woodlot, flanked on the south side by a strip of oak sprouts interspersed with tall

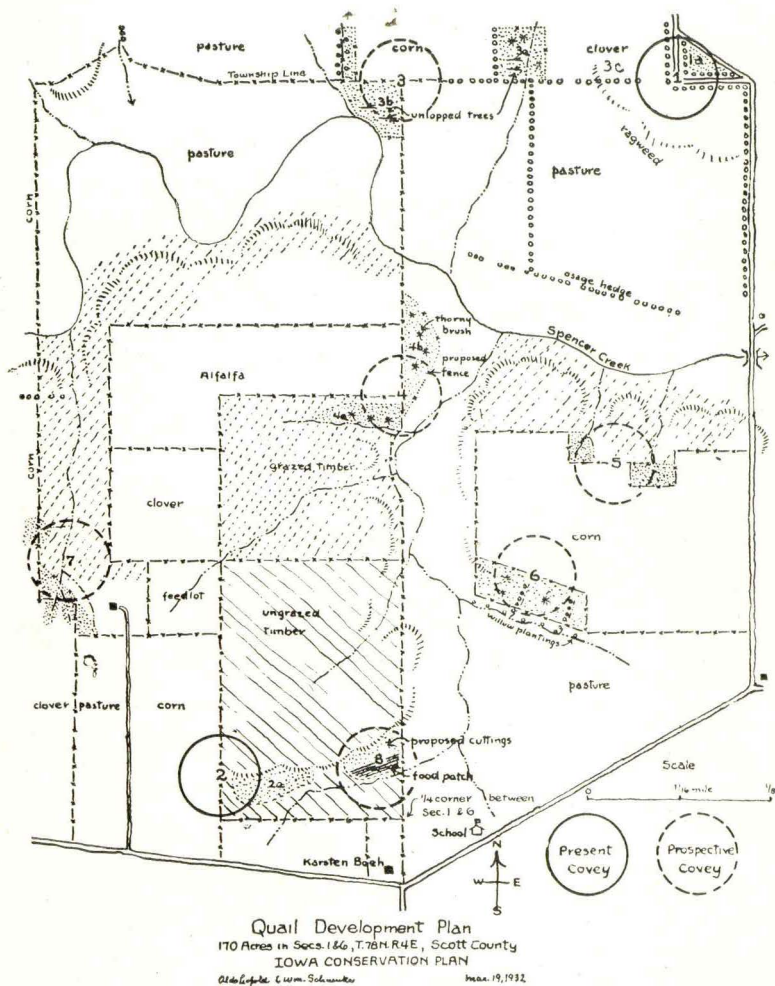


FIG. 2.

bluegrass and patches of buckbrush or briars, and this strip in turn flanked by a corn field or small grain.

The ungrazed woodlot provides refuge. The strip of grassy brush provides winter loafing ground. It should include a few hogbacks bearing low grass or weeds only, for roosting and nesting. There should be patches of briars, or a few planted mulberry trees, for summer berries. Here and there should be a low-branching thorny redhaw or osage, or a dense grape tangle, for hawk-cover during snow.

The brush strip should be separated from the corn by a fence, so as to exclude the stock which grazes the corn in winter. If there is ragweed in the corn, or in a draw winding through it, or in a pasture nearby, so much the better. Ragweed is the fall food. The waste corn is winter food.

**Possible Density of Quail Population.** The above combination of cover and food constitutes a covey range, and seldom fails to produce a covey. You can have as many coveys on a farm as you can "make" combinations of this kind, up to a maximum of one bird per acre. Each separate combination of grassy brush and corn constitutes a covey range. Thus on a 160-acre farm, if you can "make" 10 covey ranges, you may have 10 coveys of 15 birds each, or 150 quail, but on a farm of this size you could not have 20 coveys by making 20 ranges. For some unknown reason quail coveys seem not to tolerate crowding beyond an average population of a bird per acre.

**Making Covey Ranges.** This is a matter of, first, examining the farm to spot the places which come the nearest being covey ranges as they stand, and then adding to each place the particular thing which it lacks, and, second, of establishing new coverts up to the maximum in probable places.

The "makings" of a covey range are refuge cover (brush), loafing and nesting cover (grass) and food (grain and weeds).

#### BUILDING UP A FARM FOR QUAIL

The 170-acre farm pictured in Fig. 2 is taken up in detail to illustrate how quail range and number of quail can be increased. It is an actual Iowa farm on which management has started and at present has two coveys.

*Covey No. 1* makes its headquarters in an abandoned road cut at the northeast corner of the farm (see solid circle with the figure "1" in its center). The old road is flanked by an osage hedge. Its thorny branches overhang the steep south-facing bank, the top of which bears a "whisker" of bluegrass and sweet clover. Such a place is wind-proof and hawk-proof. It offers dry dusting spots even in wet weather, and sunny loafing ground for winter days. In the "triangle" of the road (marked 1a) is grass which the road crew should be asked to leave unmowed and unburned for nesting. To the east (off

the map) is standing corn. To the south is a pasture slope bearing ragweed. Such a combination is irresistible. There will be quail here as long as there are any in the country.

*Covey No. 2* makes its headquarters in the ungrazed woodlot near the southwest corner of the farm, adjacent to a feedlot where hogs are being fattened. The food supply is further strengthened by a cornfield to the west. The woodlot offers plenty of brush but no grass. This range is weak on grass, and hence might not be occupied in years of a short quail crop. It can be strengthened by cutting next winter's cordwood from the south slope marked 2a. The timber on this slope is limby, and its removal will benefit the woodlot. Here the brushpiles should be left unburned, and grass, brambles, and oak sprouts allowed to come in. Cattle must be kept out.

These two present coveys total 30 birds in 170 acres, or a bird per six acres. This is a thin stand.

#### BUILDING FOR NEW COVEYS

Go back to the center of the north side of the farm in Fig. 2. In and near the dashed circle marked "3" we can build a range for covey No. 3.

*Covey No. 3.* The corn to the north offers food, but there is now no grass whatever, and no brush save the grazed out remnant of a hedge. At the corner of the clover field, marked 3c, are a few wild plums pruned up by cattle, and also a group of big limby cottonwoods. Fell one of the cottonwoods, and let it lie unlopped. Fence off the dotted area marked 3a so the grass and clover can grow tall and the plums can spread. In the pasture at 3b is another corner, already partly isolated from grazing by the creek channel. Fence this, and fell a couple of the large scraggly willows on the creek bank. Let them lie with the grass growing up through the unlopped tops.

3a and 3b together will have a new covey next fall or the fall after, and in good years, after the growth gets good, possibly two new ones. Two small coverts, by the way, are often more effective than one large one.

Proceeding southward, we have a series of steep timbered banks facing north along the south side of Spencer Creek, which are of slight value for pasture. They are of slight winter value for quail, too, because of their north exposure and the distance from corn. They will serve as nesting ground only. An occasional unlopped treetop, in which long bluegrass can grow, would increase their value for this purpose.

Now proceed southward down the center of the farm to covey No. 4.

*Covey No. 4.* A new winter headquarters can be located in the woodlot at 4a by cutting cordwood on the bank of a side-draw, facing south. There are a few haw trees in the present



undergrowth. Preserve these carefully; when the sun has been let in they will develop brushy tops. 4a will have to be fenced, because unlike 2a, this woodlot is grazed. Let the grass grow, and leave the brushpiles unburned.

At 4b is a hogback in a pasture already bearing some haws, osage seedlings, and clumps of hazel and buckbrush. Fencing this to let the grass grow up will make a perfect nesting ground. In winter this patch will also catch the early morning sun on its east-facing bank, and thus supplement 4a as winter quarters.

Range No. 4 is weak in that the prospective covey will have to fly southwest across a pastured draw to reach corn. A line of osage, which will resist grazing, or of brushpiles strung across this pastured draw would act as a "street" to let the covey walk to the corn, and would thus increase the attractiveness of this covey range.

*Covey No. 5* can be located to the east of No. 4 in two fence corners at the heads of side-draws where their forks offer south exposures. These fence corners are at present pastured bare. There is a little ragweed. Fencing will bring in long bluegrass, and in time, brush. Corn lies just south of the fence. It will help make this range habitable the first year after fencing if some temporary cover in the form of unlopped treetops or brushpiles is provided.

The weak point of this covey range is its general northerly exposure. Only the south-facing sides of the east-and-west side draws at the edge of the upland are usable in winter. Similar side draws lower down the slope might also offer south-facing banks, but these banks would not get the sun.

*Covey No. 6* is to be located just southwest of No. 5 in a small pasture lying on a steep south slope, now ruined by erosion. This pasture now offers neither grass nor brush cover, but it is already fenced, and both grass and brush will grow up when grazing ceases. Its larger gullies are to be planted with black locust seedlings and willow cuttings to stop erosion. Cut back the willows, each spring, throwing the clippings into the gully to stop wash.

There are a few haws or thornapples already started in this pasture. A few osage seedlings planted on the hogbacks would hasten the restoration of brush.

Range No. 6 will hardly make a covey the first year, but it ought to be a "sure bet" by the second or third year of protection from grazing. No pasture will be lost, because the present washing and gullying has left the soil too poor to have pasture value. This steep impoverished slope, on being protected, will likely come up to brome grass, rather than bluegrass, but this is equally good for quail.

*Covey No. 7* is to be located on the west side of the farm where several steep eroding gullies are eating back into a cornfield. Fencing the heads of these gullies and planting them to wild

plum, buckbrush, locust or cut-back willows will protect the soil as well as the quail. Fencing a corner of the adjacent grazed woodlot will provide additional brush and grass. While this is in general a north-facing slope, the steep heads of the side draws offer several south-facing and west-facing banks, which, when grown to long bluegrass, plum, and buckbrush, will offer good winter shelter and good nesting cover.

Range No. 7 may not make a covey the first year, but it may be depended on for the second.

*Covey No. 8.* The east end of the draw in the ungrazed woodlot, at the south-center of the farm, offers a south-facing bank which may be treated the same as 2a. But, range 8 differs from range 2 in this respect; it is surrounded by permanent pasture, instead of corn. It is the only one of the present or prospective ranges which lacks food. Accordingly, a narrow bench along the draw should be cleared and plowed up and planted to sorghum, or some other small grain not requiring much cultivation. Shock half of this and open a new shock with each snowstorm. This food-patch will insure an eighth covey, especially if a boundary "fence" of uncut timber is left between range 8 and range 2.

To sum up: Within 2 years after rebuilding this farm for quail it should carry annually thereafter 8 coveys, instead of 2. Eight coveys at 15 each would be 120 birds on 170 acres, or 1.4 acres per bird. This will be a very fair stand.

The rotation of crops on the farm may leave certain ranges cornless during particular years, but this loss will be offset by new corn in new possible covey locations, or it can be artificially offset by food patches.

*Substitutes.* In building covey ranges, the following are substitutes for the particular foods or coverts cited in this example:

A heavy aftermath of ragweed on stubble, or a heavy growth of ragweed in pasture, or a smartweed swale, or a few corn-shocks opened from time to time, or cut of small grain left along fence rows, are substitutes for standing corn. Weedy corn carries more birds than clean. Omitting the last cultivation on the outside rows increases the available food.

There is no substitute for grass, unless it be weeds. Ungrazed grass is the element most frequently lacking in Iowa quail ranges.

An osage hedge flanked by grass or weeds, or very heavy tall grass or weeds or sweet clover, or unlopped treetops, or loose large brush piles, are substitutes for brush.

The higher the "quality" of the brush or grass or grain, the less acreage of each is required to hold a covey.

*Maintenance.* If any burning must be done on a farm where quail are to be built up, do it *after* winter weather but *before* April when pairing begins. On a good quail range there should

be left each spring in the fenced patches and in fence rows enough ungrazed bluegrass of the preceding year's growth to make it unnecessary for the quail to nest in hayfields. If they do nest in hayfields, use the flushing rod (see Chapter V).

Water is unnecessary for quail as long as dew falls or berries are available.

Predator-control is usually unnecessary in Iowa, except where deficient cover forces the birds into the open or where deficient food leaves them weak. On such ranges it is necessary to destroy any Cooper's hawks and Sharp-shinned hawks which attend the coveys during the winter or spring.

Excessive abundance of foxes may cut down the quail population, especially where rabbits and mice are short.

### INSTRUCTIONS FOR PROPAGATING QUAIL

- I. Handling quail eggs.
  - a. When taking quail eggs from an abandoned nest handle very carefully.
  - b. If eggs are to be held for setting they should be stored in a cool place. (Temperature about 65° F.) On most farms a cellar will do. Place small end down, in sand or fine grain, on a shelf. A layer of about one-half inch of sand or fine grain is sufficient.
  - c. Do not hold eggs longer than absolutely necessary for setting, and turn once a day.
- II. Hatching quail eggs.
  - a. Bantam hen may be used.
  - b. Make sure brood hen is healthy and in good, plump condition.
  - c. Use a hen free from lice. (De-louse with any good commercial powder *before placing eggs under hen*, giving special attention to head and anal region.)
  - d. Do not de-louse brood hen just before hatching.
  - e. Set hen on hen eggs or glass eggs for at least twenty-four hours before placing quail eggs under her. Eliminate any hen failing to set properly.
  - f. Set from 14 to 16 quail eggs under each hen.
  - g. Eggs should hatch in 22 or 23 days.
  - h. When chicks hatch, make sure there is no way for quail chicks to escape from the nest box. Do not disturb hen during time eggs are hatching.
- III. Hatching box.
  - a. Use a bottomless, well ventilated box.
  - b. Set nest up in an orchard or other shady place on high ground.
  - c. Use a nest of dirt with shallow lining of dead grass, etc.
  - d. If ground is dry, moisten ground surrounding nest. (Not too much.)
  - e. Make sure rats, moles, etc., cannot get to the nest.
  - f. Encourage quietness in the hatching area and check each brood hen twice daily to see that she is sitting properly. (Replace all bad hens.)
- IV. Feeding Coop.
  - a. Any good chick feeding coop of simple construction is satisfactory.
  - b. Feed and water hen at regular time every day. When being fed, the hen must be placed in feeding coop, given a mixture of whole grain and water in an earthenware dish. (Do not feed hen green stuff.)
  - c. Hen should have access to grit while feeding.

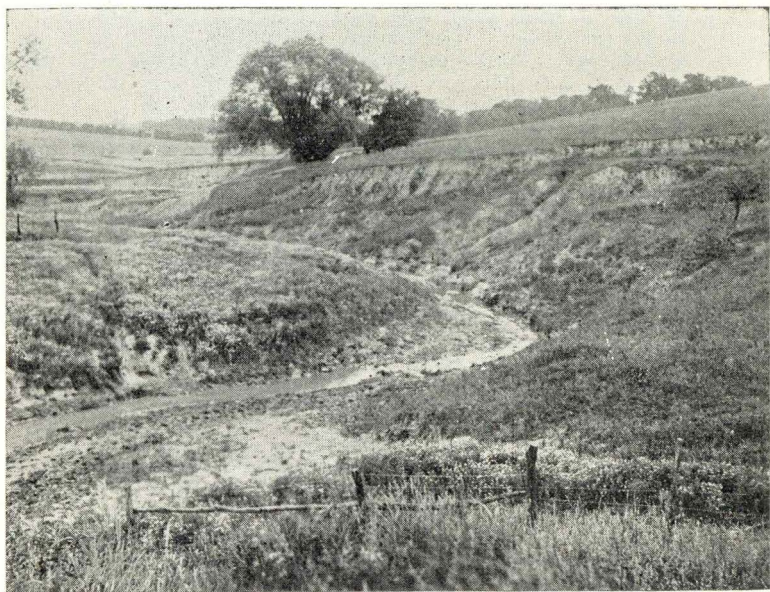
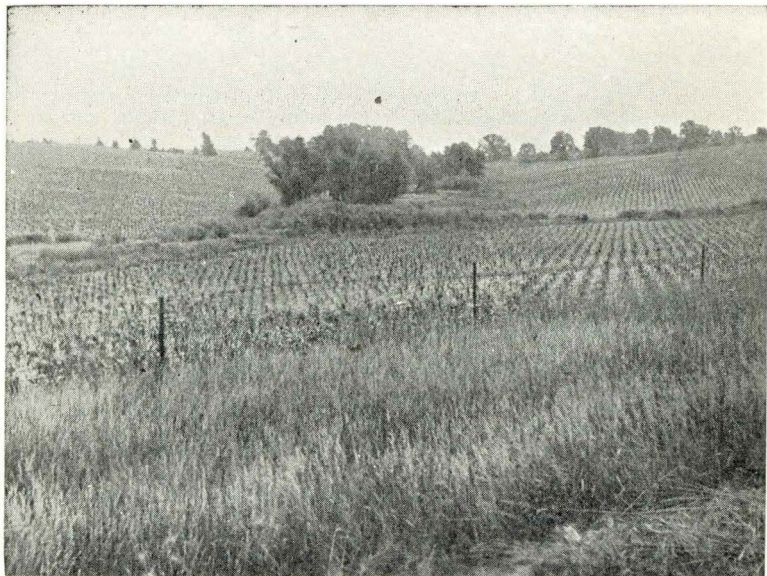
## V. Feeding young quail.

- a. Place the first day's feed in the pen, if Bantams are used.
- b. Feed consists of clabber, (sour milk), special quail starting mash. Succulent green material such as lettuce, chard, Dutch white clover or alfalfa (cut fine) may be fed in separate containers or sprinkled over the clabber and mash. Feed clabber not more than once a day unless it is entirely eaten up.
- c. Clear up the dishes at evening and wash thoroughly. (Scald in boiling water.)
- d. Continue the above feed until about the eighth week, then make a gradual change from starting mash to laying mash. Add oyster shells and charcoal to grit on about the fourth day.
- e. Start feeding German Millet and baby chick grain mixed in the mash, and rolled oats at any time. As the birds grow older, larger grains such as Kaffir corn and wheat can be added.
- f. Judge the amount to feed by the way the chicks take it. To start, two teaspoonfuls per coop will be sufficient. (Ten or twelve chicks to a coop.)
- g. It is important that all food and water equipment be kept sanitary by sterilizing as outlined above.
- h. Do not permit chicks to run with poultry.

## VI. Releasing quail.

- a. After chicks are twelve weeks old place them in a crate or box lined with cloth or burlap inside.
- b. Select a place for release where there is suitable cover and food supply. An ideal place is a thicket adjoining a stubble or weed field, or corn field.
- c. From four to six pairs should be released in each place selected.
- d. Place box or crate with birds gently on the ground in or near thicket or brush heap, with a small flap door in crate or box facing the thicket or brush heap. Pull the flap door back quietly and secure it. Go far enough away so as not to alarm them when they come from the box. They may sit in the crate or box for some time before they come out. *Do not hurry them.*
- e. Do not remove the box or crate until the following day.
- f. Under no circumstances should birds be allowed to fly from boxes or crates. This would scatter the birds, and it is doubtful if they would get together again.
- g. Scatter a little grain at or near the point of release every day or so as long as the birds come for it. All feeding should be done either in the thicket or prepared feeding shelters where hawks cannot surprise the birds easily.

By WILLIAM SCHUENKE, Superintendent of Game.  
Iowa Fish and Game Commission, Des Moines, Iowa.



Where game management and soil management go hand in hand. The upper picture shows what is happening to thousands of acres of valuable Iowa land because the heavy vegetation is removed from the draws, they are overgrazed and there is but one result. Why not encourage these draws to come back to brush and heavy grasses, thereby saving farm land, while at the same time furnishing excellent game cover, as shown in the lower picture?

## CHAPTER IV. PHEASANT MANAGEMENT

here are still many problems to be worked out relative to ability of pheasants for various conditions and sections in a. To date, pheasants are a proven success only in Dist No. 1 and probably No. 2 (see Fig. 1). Studies are under way to determine their success in other parts of the state. The following information is presented in the light of present knowledge.

### PHEASANT RANGE

Pheasants are like quail in that a successful range must include certain definite elements or "makings," but pheasants live about more freely than quail, hence it is not necessary, in quail, for each element to occur on each small parcel and.

There is one universal requirement for good pheasant range in Iowa: a liberal acreage of strong standing corn, preferably early. Fortunately in most parts of the state, there is ample corn.

The additional "makings" of pheasant range are nesting cover, winter cover, and refuge cover. Of these, nesting cover is much the most important.

**Nesting Cover.** Pheasants nest earlier than quail, well before new green growth has made much headway. Hence nesting cover of the previous year's growth must be on the ground. If it is not available, or if the amount is so meager that the birds are too easily found by natural enemies, then the new green growth of hayfields is resorted to, and many hayfields are destroyed in mowing. Hence, leaving cover for early mowing so the birds will not have to nest in hayfields is probably the most important single item of pheasant management in Iowa. Any kind of grass of the previous year's growth, not too tall and rank, is nesting cover for pheasants. Fencing off a corner of a pasture, or leaving a strip of uncut hay or unplowed weedy stubble along a fence, makes nesting cover. If the grass is sprinkled with old sweet clover stalks, weed stalks, or low trailing brush, so much the better. Dry sloping ground such as a ditch bank, the shore of a swale, or the edge of a roadcut is better than ground where water may stand during heavy rains.

In the two successful districts, pheasants occur on rich level ground wherever weeds or grass lie adjacent to corn. They also occur on corn alone without any additional weed or grass cover, but on such range they do not stand up well under mowing.

A given acreage of nesting cover will nest more pheasants if it lies in strips or patches than if it lies in a large block, but

narrow strips along fences are unsatisfactory because the posts give an undue advantage to egg-hunting crows. The strips should be at least 10-15 feet wide; the sparser the growth the wider the strip needed.

The ideal arrangement is to have on each forty acres two or three patches or strips, each sufficient for a nest, and also a small clump of brush. As far as now known, the clump of brush serves as a "crowing ground" where the cock makes his "head-quarters." Each separate patch or strip of grass serves to nest one of the hens in his "harem." There are usually 2-3 hens in each harem; hence the need of two or three separate nesting sites. A nesting range thus laid out probably holds more harems with less fighting than a range without distinctive locations for the cocks.

**Winter Cover.** Iowa pheasants survive the winter without cover other than standing corn, indicating that winter cover is not an absolute necessity. However, when sloughs or other rank growths are available, the birds concentrate there during severe weather, indicating that pheasants prefer good winter cover, and we may infer that they thrive better where it exists.

Winter cover differs from nesting cover in that the former must "be there" during snow, whereas the latter need not. Any growth rank enough to stand up during snow will serve as winter cover. Ungrazed marshes or lake shores, thickets of low willows, wild plum thickets, and patches of rank grass, weeds, or sweet clover, are all good.

Winter cover should furnish wind protection and sunny exposure, as well as hiding places. The lee side of a gravel pit, strawstack, fallen tree, or windbreak, is a good location.

This does not mean, however, that hilly districts are good winter range. They usually are not.

Lacking rank growth, any kind of growth is better than nothing. Thus a row of cut-back willows, with the grass allowed to grow through the fallen branches, along a creek or a few clumps of brush along a fencerow will winter many pheasants, especially if flanked by at least a narrow strip of uncut sweet clover or rank grass or alfalfa.

While nesting cover should be provided on every forty, wintering coverts need not be so widely distributed, provided each is large enough to hold the birds from its surrounding territory. One winter covert per square mile is often sufficient. One large winter covert per township would do a lot of good in much of the Iowa pheasant range which now has none at all.

Of course, no winter covert is effective unless food (usually corn), commensurate to the number of pheasants in its territory, is available nearby.

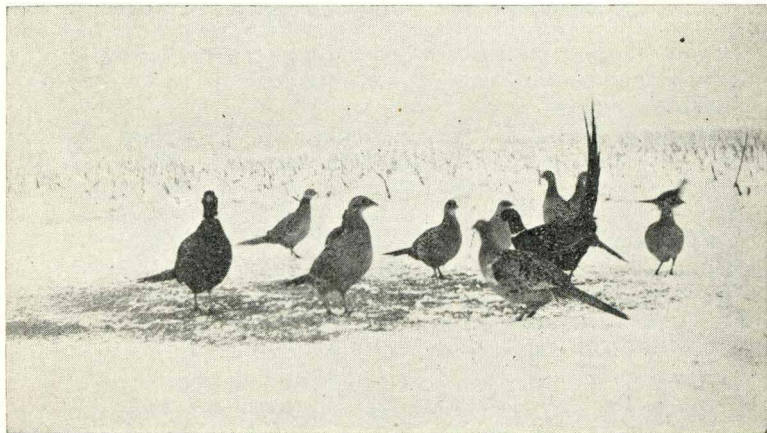
No winter covert can *nest* within its own boundaries as many birds as it can *winter*.

**Refuge Cover.** Where the number of hunters and the maximum kill per year is under control, refuge coverts are unnecessary. However, in range open to an indefinite number of hunters, each entitled to kill his legal limit, it is very desirable to provide some place which cannot be shot out, either because the cover is too dense to permit flushing, or because hunting is prohibited. Such a place serves as a reservoir of breeding stock for the ensuing year.

The ranker the growth and the larger the area, the less the percentage of pheasants which can be flushed. Large dense willow thickets, boggy or hummocky marshes with rank growth, or even woodlots with dense underbrush, all constitute refuge coverts.

#### POSSIBLE DENSITY OF PHEASANT POPULATION

The maximum density of pheasants recommended for Iowa is one per acre, or 160 birds per quarter section.



Winter cover and food are two essentials in pheasant management. When snow covers the ground, feeding stations often save many birds from starvation.

Heavier stands than this often occur in concentration areas, and in such areas sometimes do damage to crops. The remedy for such damage, however, is usually better dispersion of cover (with resulting dispersion of birds) rather than fewer birds.

#### MAKING PHEASANT RANGE

As in quail, this is a matter of examining the land to find out what is lacking, and then adding that thing.

Because it deals with such large areas, and because each of the "makings" of a range need not occur on each small parcel of ground, it is much more difficult than with quail to offer a sample development which can be copied anywhere in the state.



Fig. 3 depicts a sample tract of nearly 2,000 acres to be developed for pheasants. It consists of rich black upland prairie, nearly level, farmed for corn, steers, and hogs. All the side-drainages are tiled. Neither the field division fences nor crops are shown on the map—only the farm boundaries and the present and proposed developments.

Standing corn covers such a large proportion of the area that there is an excess of food, except during deep snow. On the other hand there is now no cover whatever, except for a strip of grass along the two railroad lines, and a single ragweed swale (in black) near the southwest corner.

The land is so valuable, so level, and so intensively farmed that spots offering opportunity to develop cover are scarce and small. Hence proposed cover (see hatched and stippled areas) is primarily for nesting. New fencing needed is shown by dotted lines and crosses. Proposed coverts are of ten types as to location:

1. **Haymeadow Corners.** Six corners of swale-grass hay meadows (labelled a) are to be fenced off and left uncut and ungrazed. The winter value would be enhanced if some of these were also planted with a row of cottonwoods or willows, to be cut from time to time and left untrimmed, or to be cut back for brushy growth.

2. **Pasture Corners.** Five corners of bluegrass pasture (labelled b) to be fenced off and left ungrazed. These are primarily for nesting, but to give them some winter value, polarded or topped willows are to be added in several cases.

3. **Field Corners and Swales** (labelled c). Plowland is to be used in only three places; two where a draw leaves a small corner hard to get at with agricultural implements, and one where a wet swale runs through a field. The sacrifice of such places involves no large values. No fencing is necessary, because they are automatically protected from grazing in summer.

4. **Waste Corners or "Triangles"** (labelled d). Only one was found. It occurs where the railroad cuts off a small corner of a field. This is now in grass and needs no treatment except to induce the highway officials to cease mowing or burning.

5. **Old Orchards** (labelled e). In this region the remaining orchards are untended and grown to bluegrass. Being already fenced, they require no treatment except to be left unmowed and ungrazed. A bluegrass orchard is perfect nesting cover for either pheasants or quail. Two were found on this area.

6. **Strawstacks** (labelled f). Strawstacks are good winter feeding stations, if flanked by cover such as sweet clover, hemp or corn. Stock, of course, also needs access to them, but this can be given by placing the stack immediately adjacent to a fenced patch of sweet clover, or a fencerow. Three such developments are called for.

7. **Groves** (labelled g). Fenced groves around farmsteads

are often quite large, with trees only around the edge. By partitioning open parts of the grove and planting them to sweet clover, coverts are created with the barnyard nearby as a feeding station during winter months.

8. **Windbreaks** (labelled h). Dense young windbreaks of conifers are of little use in winter, and of no use for nesting, unless strips of grass or weeds border the windbreak or unless the windbreak contains open patches grown up to grass or weeds. Therefore, three clover plantings are called for, next to present or proposed windbreaks.

9. **Fencerows** (labelled i). Two strips of weeds or grass are called for along fencerows already bearing remnants of osage hedges or cottonwood trees.

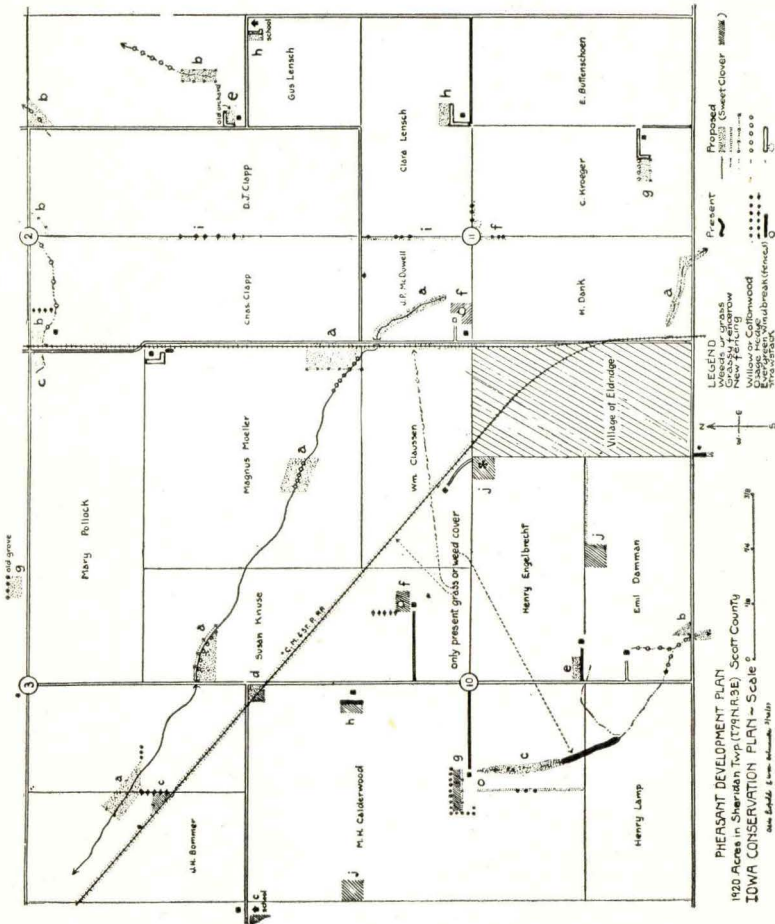


FIG. 3.

10. "Arbitrary" Coverts (labelled j). After providing for all the foregoing developments, there remained three large bare spots on the area too wide for a pheasant to fly across. In each of these it is proposed to seed a patch of sweet clover, alfalfa or clover arbitrarily cut out of some corner of a plowed field, as combined winter and nesting cover. This will not need to be fenced unless grazing is permitted on the adjoining area.

The sparing use of cover here recommended would hardly result in a stand of over one bird per two acres, of which not to exceed half, or one bird per four acres, might be safely killed. The full cost of producing a pheasant in the bag on this area might be estimated at about 20¢. The cost would be less on range offering more waste land, or more pre-existing cover.

#### PHEASANT REFUGES

Where it is impracticable to develop cover and food over the whole pheasant range, it will help to establish here and there a special refuge or "Game producing area" of the kind shown in Fig. 4. This is designed as a combination refuge, winter feeding station, winter covert, and nesting covert. There should be at least one in every township, and preferably several.

The refuge is best built around some gravel pit, slough, marshy lakeshore, ditch junction, or other parcel of idle or cheap land where some cover already exists and more can be developed. In Fig. 4 the gravel pit offers cheap land and a south-facing bank, while the willow thicket and cat-tail bogs offer cover.

The pit is first of all fenced to exclude grazing (h). The level part is planted to (a) sweet clover or alfalfa for snow cover and nesting, (b) kaffir, sorghum, corn, or other grain for food, and (c) soybeans or weedy fallow for more food. A, b, and c are rotated from year to year. Half of the grain is left standing for fall food, and the other half shocked so that a new shock can be opened with each winter storm. Without this precaution the food is likely to be eaten up before the winter "pinch period" arrives.

No refuge can *nest* as many birds as it can *winter*. In order to extend the nesting capacity as far as possible, small clumps of brush (e) are developed in corners of surrounding fields, each next to fencerow strips, for crowing ground, and small patches of uncut hay, small grain, grass, or weeds are left for nesting (f). This system of crowing ground and nesting strips should be extended into the surrounding farms as far as possible.

If the expense is not too great, a coniferous windbreak should be added along the west side of the refuge for winter cover and wind protection.

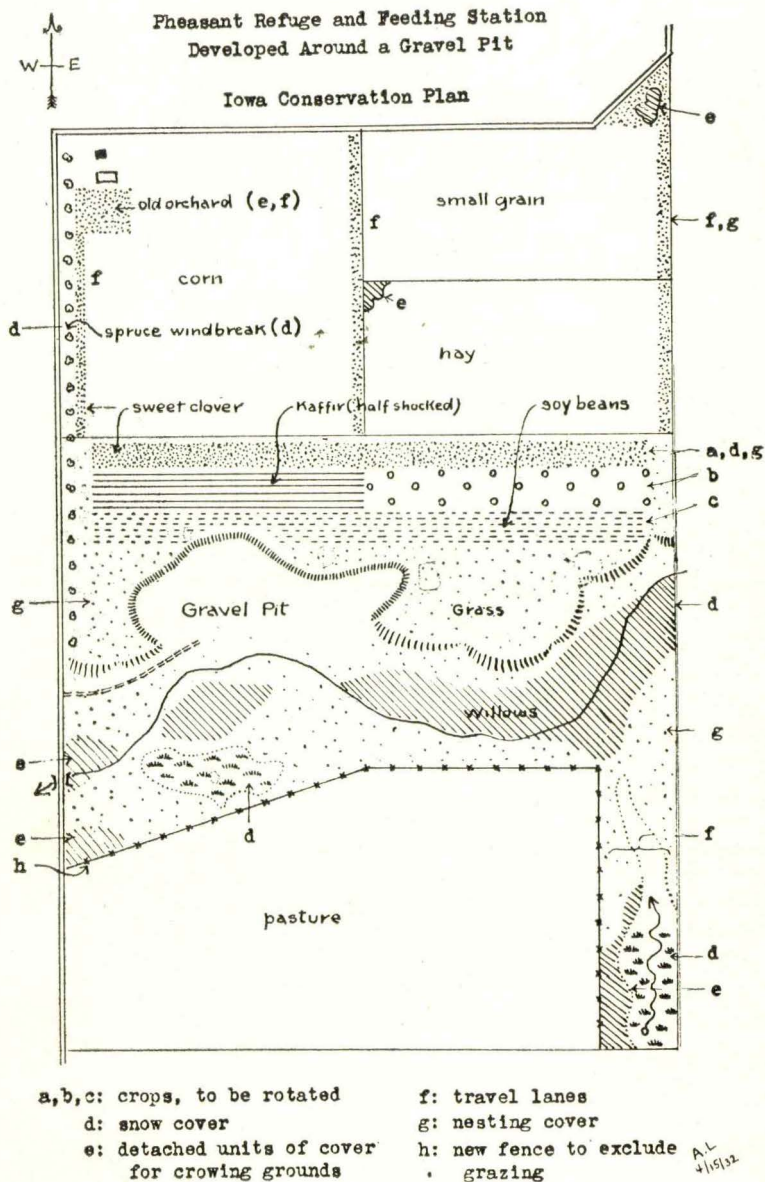


FIG. 4.

### PLANTING PHEASANTS

Planting pheasants is unnecessary and unprofitable where wild seed or breeding stock is already present. Most Iowa pheasant range needs additional cover, rather than planting of stock.

*Planting in any event is of little or no use unless preceded by the development of the range.* It is literally impossible to build up a shootable pheasant population by planting alone where cover or food are deficient.

Where planting is to be done, freshly trapped wild birds are preferable to pen-raised birds and pen-raised birds should not come from ground polluted by poultry.

On range of doubtful suitability large repeated plantings stand a better chance than small, scattered, or intermittent ones.

Releases should, if possible, be made by penning the birds for several days on the covert they are to occupy, and then quietly opening the door before dawn, so that they can leak out slowly and without alarm.

Planting is of little use where poaching is prevalent, especially on range without refuge coverts. Experience in other states, however, indicates that poaching tends to decrease when a whole farm community begins to invest time and effort in the systematic practice of game management.

### DRIFT AND SCATTERING

When a good range becomes overpopulated, the excess birds *drift* to surrounding localities. Such natural spread is especially noticeable in pheasants, and is the best and surest way of stocking new range.

When pheasants are planted on unsuitable range, or range poorly provided with food and cover, they *scatter* indefinitely. Overshooting, or any shooting in the absence of refuge cover, also induces scattering.

Drift and scattering are, thus, quite different things. The best and only insurance against scattering is food, cover, protection against poaching, and moderation in shooting.

## INSTRUCTIONS FOR PROPAGATING RINGNECK PHEASANTS

1. Turn eggs on receipt of shipment and once each day until ready for setting.  
Set as soon as possible, as the fresher the eggs the better the hatch.  
Put them in cool place until ready for setting.  
Set from sixteen to eighteen eggs, according to size of hen, but small hen or bantam is best.  
Eggs should hatch in twenty-two to twenty-four days.
2. Protect hatching boxes and rearing area from rats, cats, dogs, etc., preferably by means of vermin-proof enclosure.
3. Pheasants must not be reared on ground frequented by *turkeys* or *chickens*.
4. Make sure brood hen is healthy, in good, plump condition and not lousy. (De-louse by using any good commercial powder *before placing eggs under hen*, giving special attention to head and anal regions.)
5. Set hen on hen eggs or glass eggs for at least twenty-four hours before placing pheasant eggs under her. Any hen failing to set properly to be eliminated at once.
6. Construct nest in protected, well-drained spot where it cannot be flooded or disturbed. Use a bottomless box, well ventilated, and a nest of dirt with shallow lining of grass, straw, etc. Place nest *level* above ground level. If very dry, moisten ground surrounding nest enough to permit very moderate absorption of moisture by dirt used in the nest. Make sure no rats can get to the nests.
7. If the hen does not have free access to an exercising coop, remove her daily (at same approximate hour) to an exercising and feeding pen where she is supplied with mixed scratch feed, *greens* and water, as well as grit and charcoal.
8. Encourage quietness in the hatching area and check each brood hen twice daily to see that she is setting properly. Replace all bad hens.
9. Keep nest clean. Remove manure, broken eggs and stones and reconstruct nests (during daily exercise period) if necessary.
10. At the end of the 23-24 day incubation period leave the hen in the exercising pen no longer than she will feed and drink. Previously she may be left off from ten to thirty minutes, depending on weather.
11. If weather has been very dry, slightly moisten eggs on the twenty-second or twenty-third day.
12. If hens are good, quiet brooders, leave chicks in nest until hatched and dried. If hen is restless, remove chicks to warm brooding box as soon as hatched.  
Check up on lice at least two times during incubation, dusting if necessary.
13. Locate rearing field on a clean lawn, in an orchard or on a hayfield, cutting grass or hay off in immediate vicinity of rearing coops.  
Brood coops should be *at least* 30 feet apart (all directions).
14. Move coops (any good hen brooding coop which has just been disinfected) daily, spading under all manure on the old coop spot. Birds should have a dry place to roost at night.
15. Feed and water young birds four times daily for the first ten days.
  - a. Never leave feed or water down more than half hour. Remove excess food: (prevent dampness).
  - b. Feed on a clean board: (never on ground).

- c. Feed custard: (Baked custard as for eating, but without sweetness) or hard-boiled egg (finely grated) and plenty of green stuff, (chopped) ground lettuce, alfalfa, etc., plus some charcoal, fine limestone grit and oyster shell.
16. After first ten days, feed any standard commercial chick feed as recommended for chickens, but always have plenty of green food available.
  17. Do not tame your pheasants. Encourage them to be wild.
  18. If pheasants are reared under wire, release at twelve weeks. If reared without wire, permit them to go wild by dispensing with feed and by *not* permitting them with poultry. Instructions for releasing the birds are given under "Planting Pheasants" above.

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Washington, D. C.

## CHAPTER V. HUNGARIAN PARTRIDGE MANAGEMENT

Hungarian partridges are not yet a proven success except in the northwest corner of the state (the double-hatched counties in District 1 of Fig. 1).

There has never been any open season on Hungarian partridge in Iowa, and it is doubtful whether their present numbers could stand up under shooting. On the other hand, it is equally doubtful whether the birds will increase any further without the improvement of cover and food conditions. The one sure way to get legal partridge shooting in Iowa is to build up an abundant stand through management.

Within their established range, Hungarians usually occur on the same kind of land as pheasants, except that they have little use for heavy marsh cover, timber, or large areas of dense brush.

Rough hilly land, or poor soil, or districts long on timber or pasture, or short on grain, will not hold Hungarian partridges.

Hungarians are intermediate between pheasants and quail in their freedom of movement, therefore the "makings" of a range should be more uniformly distributed over each farm than is necessary for pheasants.

**Need of Nesting Cover.** Partridges need standing corn, which is usually present, and nesting cover, which is often absent. The thinness of the stands now prevalent in northwestern Iowa may probably be ascribed to the scarcity of nesting cover. Hence, building up a good population of Hungarian partridges consists first of all in providing ample nesting ground.

Partridges mate very early and are ready to nest before the new green growth has made much headway. On range which offers no cover, therefore, they must nest in places subject to a maximum of damage, either by predatory animals and birds or by mowing.

Bluegrass of the preceding year's growth, with scattering dead stalks of sweet clover or weeds, is ideal for nesting partridges. Nests are often built under a thistle in a grain field, but where thistles are hoed out by hand, this usually means the destruction of the nest.

The best location for nesting cover is along the edge of a slough, ditch bank, sodded draw, or other postless strip of grass. A fencerow is good, *providing it be at least 10 or 15 feet wide*. Very narrow fencerows, or very narrow strips of any kind, give natural enemies an undue advantage.

Nesting cover should occur on every forty; the more widely distributed the better. Strips and patches are more economical than solid blocks.



**Winter Cover.** Hungarians have less need of winter cover than either pheasants or quail. They are reputed, however, to seek protection from wind. Long grass or weeds on the lee side of a ditch bank is recommended for winter cover.

**Winter Food.** Standing corn provides sufficient food except during periods of deep snow, when artificial feeding must be resorted to. The refuge and feeding station described under pheasants would also be suitable for Hungarians, except that the brush cover is not so necessary.

**Possible Density of Hungarian Population.** By providing nesting ground and ample food, Hungarian stands can be built up to about 1 bird per acre. This means 160 birds, or ten coveys per quarter section.

## CHAPTER VI. PRAIRIE CHICKENS AND RUFFED GROUSE MANAGEMENT

There is no prospect of increasing either of Iowa's remaining species of grouse to a degree which would warrant shooting. The immediate problem is to prevent their extermination.

Closed seasons alone have failed to halt their progressive decline. What they need is management, in the sense of deliberate and skillful provision of food, cover, and protection.

It is hoped that the Iowa landowner who enjoys the enviable distinction of having a remnant of these birds on his place will follow these directions for their protection and increase.

**Cycles.** All grouse become scarce every ten years. These periods of scarcity alternate with periods of comparative abundance.

Iowa grouse, especially in the north, may show a period of scarcity beginning about 1935 or 1936. This should not be regarded as a reason for the landowner abandoning his efforts to increase them, but rather as a reason for redoubled efforts to conserve the slender remaining stock. They will come back if the seed is preserved, and if a favorable range is provided.

### PRAIRIE CHICKENS

**Cover and Food.** Prairie chickens, like other upland game birds, need ungrazed uncut grass adjacent to corn, but the grass should lie in larger blocks. Unlike other game birds, chickens tolerate crowding of the nests. Hence it is unnecessary to disperse the cover in small strips and patches, as is advocated for pheasants, Hungarians, and quail.

The decline of prairie chickens since the prohibition of shooting in 1916 may be ascribed entirely to the plowing, cutting, or burning of the remaining large blocks of grass.

Native prairie grass (also known as "native bluestem" or "ramrod") is best, but any kind of medium-tall grass or weeds is good. An inter-mixture of ragweed or patches of low willows is good. A patch of from 10 to 20 acres of grass, or several patches of not less than 5 acres each and not more than half a mile apart, is recommended as large enough to headquarter a flock of chickens. Chicken cover need not necessarily consist of valuable farm land. Peat land, sloughs, ditch-junctions, or land covered with boulders may be used.

The best foods for holding or attracting chickens are buckwheat, ragweed, corn, and soybeans. Buckwheat in the shock is more accessible in winter than uncut buckwheat. Ear corn, standing or in shocks, is better than shelled. Prairie chickens will not open a cornshock, the outside ears of which have been exhausted. The shocks must be opened from time to time, or else fresh ears should be added to the outside of the shock.

Chickens fly freely to their feeding place, hence any food within a mile or two of the grassland headquarters is available.

Prairie chickens resort to buds during periods of food shortage. As emergency insurance, it is desirable to have a few *isolated* cottonwoods or aspens within flying distance of the grassland headquarters.

**Attracting Migratory Chickens.** Considerable numbers of chickens migrate into northern Iowa each winter. These northern birds often stay and breed where they are offered suitable nesting range.

The attractiveness of a given farm, on which cover and food for chickens have been provided, is much enhanced if the whole neighborhood follows suit. The chicken moves even more freely than the pheasant, and likes a large area of suitable range.

**Booming Grounds.** In any attempt to increase an existing flock, first of all locate the booming ground, which remains fixed in location over long periods. The booming ground is usually a grassy knoll or an open bump in a slough. Protect this booming ground from any radical change in condition by plow, fire, or grazing. If the booming ground is in a plowed field, it is probably an ancestral location used before the land was broken. Letting it come up to *low* grass would probably improve it.

In the light of present information the booming ground should not be in the nesting cover. An ideal set-up is a booming ground with one 40-acre and several 5-acre grass patches lying around it, within a half-mile radius.

**Overhead Wires.** The more telephone and telegraph wires or power lines that cross a chicken range, the less likely it is to be permanently inhabited by the birds, which suffer serious mortality by flying into wires. As between two alternative localities for managing chickens, choose the one with the fewest wires.

*Pheasants* should not be allowed to become very abundant on range to be developed for chickens. In this respect, the southern Iowa chicken ranges have an advantage over the northern ones.

#### RUFFED GROUSE

The ruffed grouse or "native pheasant" needs ungrazed timber and thickets of ungrazed coppice or brush. The gradual disappearance of this species from most of Iowa is due almost entirely to the pasturing of woodlots. The present remnants are found only in ungrazed woods and brush patches.

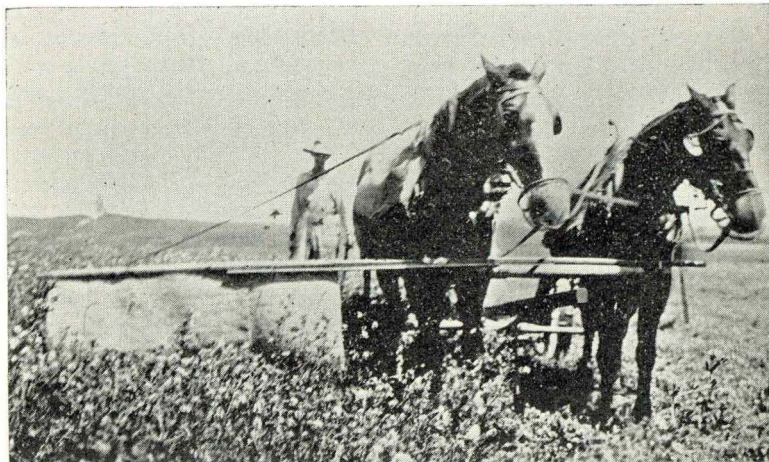
Any landowner having a remnant of these birds on his property will do well to see that at least part of his timber remains ungrazed and unburned. Cuttings do no harm—in fact the dense growths of oak sprouts which follow cuttings, and which retain their dead leaves over winter, are a favorite range.

The sprout thicket should, if possible, lie adjacent to hazelbrush, the catkins of which are "budded" in winter; as likewise are aspen and hornbeam buds. There should also be briars nearby for summer berries, wild grapes for fall and winter food, and white clover for "greens."

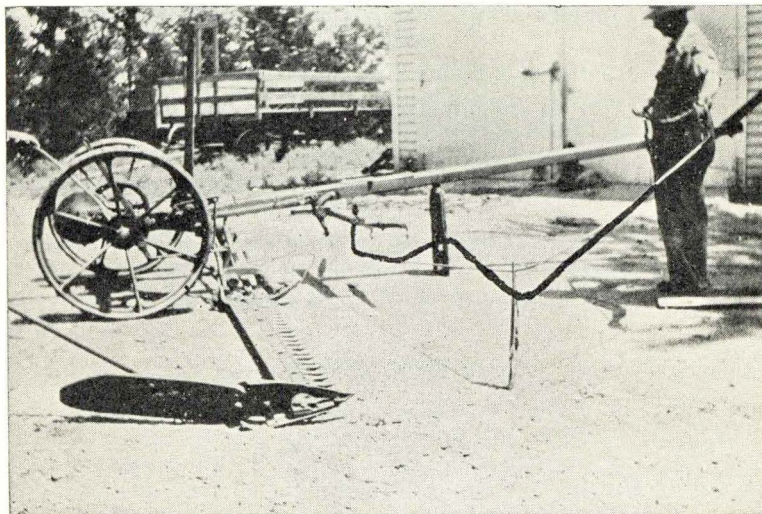
Units of less than 40 acres of ruffed grouse range are probably insufficient, even though they contain the right cover and food. Thickets on limestone bluffs seem to be particularly attractive.

## CHAPTER VII. THE USE OF THE FLUSHING ROD

A surprisingly large number of all our game birds nest in hay fields and damage to eggs, parent birds and young is con-



This device is a cane pole extended out from the neckyoke with a burlap sack fastened to it and weighted slightly to hold it down. The outer end is supported by a strap running up to the hame on the collar.



This device is a one-half inch iron rod bolted through the double-tree and bent as shown in the picture. The forward bend at the double-tree is to carry the bar farther ahead of the sickle so that the hay will straighten up and fall properly after passing under the rod. The point of the V extends out as far as the end of the sickle. The end being held by the man is fastened to the hame of the harness. The weight of the bar holds it down, and Mr. Raymond Petticoard, who has worked one of this type on his farm, reports that it operates nearly 100 per cent efficiently.

siderable. The chances are that with ample nesting cover provided elsewhere damage at mowing time will be reduced. However, the use of a simple device to flush nesting birds, and the raising of the sickle bar when such birds are flushed will save a large proportion of game birds.

A device of this kind is the flushing rod. It consists of a light rod of some sort attached to the mower or harness of the horse and which, in passing over the hay ahead of the cutting bar, rustles the hay so that the bird flushes. This gives time to raise the sickle bar and not only save the nest but also leave a small patch of uncut hay to protect the nest.

Two of the simplest devices which have been used in Iowa to date are illustrated in the accompanying photographs.

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