

# AGRICULTURAL EXPERIMENT STATION

KANSAS STATE COLLEGE OF AGRICULTURE  
AND APPLIED SCIENCE

MANHATTAN, KANSAS

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## CAPON PRODUCTION



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## SUMMARY

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1. Capons should be produced more extensively in the future for home use.
2. Cockerels should be caponized when six to eight weeks of age, and 12 to 18 hours of starving is sufficient before operating.
3. Good instruments, a simple stand, and a strong light are essential for satisfactory results.
4. In removing both gonads from one side, the lower one should be extracted first.
5. Death from hemorrhage is usually caused by rupture of the vena cava, the right or left iliac, the coccygeal mesenteric vein, or the posterior mesenteric artery, instead of the spermatic artery as is usually stated in the literature.
6. Approximately 50 percent of the birds will develop wind puffs. The air is released by puncturing the skin with a knife every few days for about two weeks.
7. Capons are fed and managed similarly to other young growing chickens.
8. Under favorable conditions a profit above feed cost of 50 cents to \$1 per capon should be realized.
9. Capons fatten better in pens than in batteries. The fattening period should range from 4 to 6 weeks.
10. Capons in Kansas usually return the greatest profits when hatched in March or April and sold during November and December.
11. There appears to be no justification for caponizing turkeys or guineas.
12. The history of the art of caponizing is briefly traced from the first century B. C. through to the twentieth century A. D.

# CAPON PRODUCTION <sup>1</sup>

LOYAL F. PAYNE

## THE PURPOSE OF CAPONIZING

While the art of caponizing has been practiced for centuries, capons are not generally produced by farmers. It is only occasionally that one finds capons in farm flocks, and only then when some one has become interested in producing them for market purposes. Capons could be produced more extensively for home consumption. Farmers castrate calves, pigs, and lambs in order to produce steers, barrows, and wethers which have superior meat qualities. It is just as simple and as logical to castrate cockerels to produce capons and thus retain the delectable meat qualities of the young birds.

A flock of 20 to 25 capons on every farm where poultry is featured could be utilized to advantage either for family use or for sale on the market. The bulk of surplus market poultry on the farm is usually disposed of by the first of January. This leaves only fowls from the laying and breeding flock as the principal source of table poultry until the "fryers" are ready in the early summer. It is during this period of several months when fresh-killed poultry is scarce that capons can be used for roasting to supply the family needs with the choicest of poultry meat.

Capons also make excellent Christmas presents when sent to city relatives and friends. For this purpose it is best to dress and draw the birds fully, then thoroughly chill before packing for shipment. When properly prepared, they can be shipped in midwinter from Kansas to any section of the United States. Lastly, there is a ready demand for capons in the larger city markets in the event that more are produced than can be utilized at home.

The purpose of this bulletin is to give some of the latest methods of producing capons.

## PRESENT INTEREST IN CAPON PRODUCTION

Recent communications from poultry leaders in several midwest and northeastern poultry producing states and Canada indicate that interest in capon production has remained about the same the past few years in the Middle West but has increased in the Northeast and Canada. It has also increased in Wisconsin where 4-H and Future Farmer groups have been conducting capon projects. Capons are especially well adapted for this type of work. In no section of the country, to the writer's knowledge, do large numbers of poultrymen make a business of consistently producing capons commercially. However, one occasionally finds individuals who produce several

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**Acknowledgment.**—The author gratefully acknowledges the assistance of Dr. H. M. Scott in working out the anatomy of the vascular system in the region of the gonads.

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thousand birds annually. A grower in Wisconsin has produced about 1,800 a year the past 10 or 15 years. A few producers in New Hampshire and Massachusetts raise 8,000 to 10,000 annually and one Canadian and one Pennsylvanian are reported to have sold more than 40,000 started capons last year. It should be remembered that these are exceptional cases and that generally speaking this is not an important phase of the poultry industry. Capons are usually produced more as a novelty or for restricted local trade.

The principal reasons for capon production not being more generally practiced appear to be that it is less profitable and more trouble than the production of roasters and turkeys. This situation might apply in those sections of the country where roasters bring good prices, however, Figure 13 shows that capons sell for considerably more than turkeys or roasters on the Kansas City market. Other objections are the difficulty of securing the services of experienced caponizers, the time required to keep capons before they are large enough to market, the disease hazards involved, and the large number of slips usually found in capon flocks.

#### CHARACTERISTICS OF CAPONS

The testes, or gonads, together with the two vas deferens and ejaculatory ducts, constitute the reproductive system of the cockerel. The presence of gonads inhibits body size, the accumulation of fat, and feather shape and length, while it stimulates the development of comb, wattles, and earlobes. The comb and wattles of the castrated male retain their juvenile size and fail to show the red color. (Fig. 1). The general size and shape of the head give the capon a feminine appearance. In the adult the head usually seems small in proportion to the large hackle and body of the bird. Capons are less active, more docile, have but little tendency to crow, and little



FIG. 1.—A flock of White Plymouth Rock capons.

if any inclination to fight or to disturb the pullets. Large numbers can be confined in a house or yard, and from every standpoint they are much easier to handle than cockerels.

The principal objects of caponizing are to retain the soft, palatable flesh of the young birds, to secure more economical gains in weight, and to obtain a better market price for the birds when sold. The capon readily accumulates fat over all sections of the body and between the muscle fibers, whereas it is very difficult to fatten a cock bird. While a capon will usually weigh more than a brother cockerel when mature, the difference in size has often been exaggerated. For several months following the operation capons usually average less in weight than do cockerels. At five to six months of age the weights are about equal, while beyond this age the cockerel slackens in growth while the capon continues to grow, and especially to take on fat. At eight, to ten months of age the latter may weigh 1 to 2 pounds more than the former.

Another misconception is that capons will retain indefinitely their soft palatable flesh. Experience has shown that they become tough and coarse-meat when kept much beyond 12 or 15 months of age. Most economical gains are obtained up to eight months of age, at which time birds of the larger breeds should average 8 pounds each, and this weight usually commands the highest market prices.

#### BREEDS TO CAPONIZE

The farmer who produces a small number of capons for home use will find that the breed is of little importance. It is logical for him to caponize some of the surplus cockerels of the breed available. Even Leghorns make very good 5- and 6-pound capons, which are in greater demand for small family use than larger birds. Those who produce larger numbers for commercial purposes should choose, for best results, a general purpose breed, a large breed, or make use of hybrids. The White and Barred Plymouth Rocks, Rhode Island Reds, New Hampshires, and White Wyandottes have been popular in the former group. Light Brahmas, Jersey Black and Jersey White Giants, and Orpingtons are frequently chosen as representatives of the larger breeds. First-generation crosses between Light Brahma or Rhode Island Red males and Barred or White Plymouth Rock females, Barred Rock-New Hampshire cross, and many other combinations are often preferred to standard breeds, as they usually possess more vigor, have less mortality, grow faster, and make more profitable gains.

Hybrid males are now available at low prices at commercial hatcheries.

A few years ago the writer compared approximately 50 birds of each of the following: Rhode Island Red, Barred and White Plymouth Rocks, and Jersey Black Giants. The Rhode Island Red capons averaged 8 pounds each when eight months of age, which was more than any of the other breeds weighed. (See Table 2.1) This difference might have been due to the particular strains used, as both the Barred Rock and the Giant females were under standard

weight; however, others have reported superior results using Rhode Island Reds.

It is very important that a strain be selected which, when properly fed, will give rapid growth. A quick-growing capon, like other animals, can be produced at less cost and is of better meat quality than slower-developing or stunted individuals. The yellow-skinned birds are given preference on most markets in the United States.

#### AGE AND SIZE AT WHICH TO CAPONIZE

There will be fewer slips (see Figure 11) and a lower mortality rate if cockerels are caponized when six to eight weeks of age or when they weigh from 1 to 1½ pounds each. Leghorns should be caponized when weighing ¾ to 1 pound. It is important that the above age and size be rigidly adhered to if best results are to be obtained. A common error on the part of beginners is to wait too long. The incision is smaller, the healing more rapid, and the shock to the birds is less, when the operation is performed early in life. It has been suggested, especially in Canada, that cockerels 10 to 14 days of age may be operated upon, but they find 5-week old birds more suitable for caponizing. Operating at these early ages has not been generally practiced in the United States, but is used to a limited extent where started capons are sold.

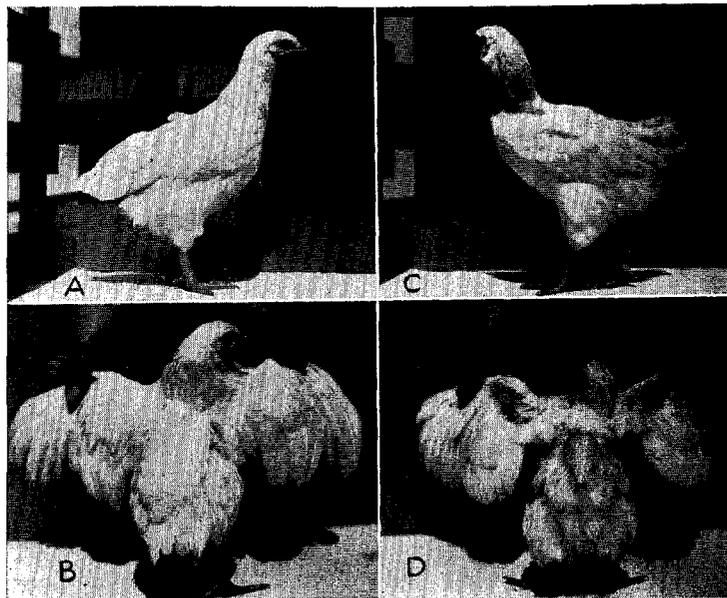


FIG. 2.—These photographs bring out the contrast between pullets (A and B) and cockerels (C and D) at eight weeks of age. The pullets have pointed tails and well-feathered backs, whereas the cockerels have short and bushy tails, with the backs and shoulders sparsely feathered. Sex identification by this method will vary according to the rate of feathering of different strains used.

### IDENTIFICATION OF SEX

It is sometimes difficult to identify correctly the sex of birds ready for caponizing. This is especially true of Brahmas, Giants, Orpingtons, and Reds. Four points of difference between the cockerels and the pullets which can usually be depended upon are the head, back, tail, and voice. The head of a male is usually broader above the eyes and deeper from crown to throat, with a slightly larger comb and wattles which usually show some red. The cockerel's beak is somewhat stouter and more arched. The back and shoulders, as a rule, are not so well covered with feathers, which, if present, are not so far advanced as in the pullet. (Fig. 2.) The tail of the cockerel is bushy and rounding, consisting of down-like feathers, while the feathers on the pullet's tail are well formed, giving a more definite point to the shape of the tail. Finally if still in doubt after considering these three characters, one should swing the bird through the air until the voice can be heard. The high-pitched voice is associated with the cockerels, while the low voice is usually that of a pullet. Sex identification is no problem where sexed cockerels are available for caponizing. It is more difficult to identify sex in turkeys at the caponizing age and identification is practically impossible in guineas.

### THE CAPONIZING OPERATION

#### PREPARATIONS OF THE BIRDS

The withholding of both feed and water 12 to 18 hours before the operation allows the intestines to empty and settle away from the gonads and upper wall of the body. When properly starved, cockerels are in less danger of puncture of the intestines when the incision is made and a much better view of the testicle is obtained. Starving the birds for a longer period is unnecessary and may retard growth. The author has fed starved birds just before operating, as they will eat much better than following the operation. However, there appeared to be a little more bleeding, and it was doubtful whether anything was gained by this practice. The shorter the starving period, however, for a young, fast-growing animal, the less stunting of growth.

The usual practice is to permit the cockerels to have their feed and water in the evening. They are cooped about dusk. No feed or water is given the next morning and they are in condition to be operated upon by 9 or 10 o'clock. Only large-boned, vigorous birds should be selected for caponizing. A weak, undersized, small-boned cockerel will not make a first-class capon.

#### EQUIPMENT FOR CAPONIZING

**Instruments.**— Four instruments and a stand are sufficient for the operation. The instruments are: A sharp knife for making the incision, a small adjustable spreader to hold the ribs apart, a probe with a hook at one end for tearing the membranes surrounding the organs, and forceps for removing the gonads. The latter are the

most important instruments in a set. (Fig. 3.) Much depends upon them as to the ease with which both organs can be removed from one side and the number of slips produced. There are many different makes of instruments on the market, but comparatively few good ones. A satisfactory set can be purchased for \$5 to \$6.

Electric removers which appeared on the market a few years ago have not increased in popularity. Experiments at one agricultural experiment station showed that the electric tools had no advantages over ordinary tools in reducing mortality or the number of slips produced and the electric tools were considerably slower to manipulate.

**Stands.**— Three types of stands are shown in figure 4. The barrel can be used for a stand where only a few birds are to be caponized; however, it is too low for convenient use. (Fig. 4A.) A

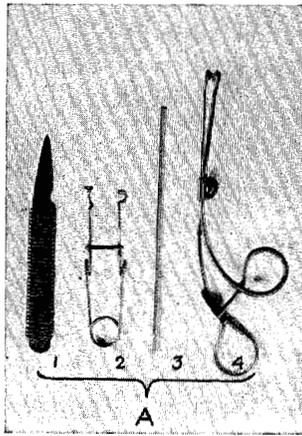


FIG. 3.—The four simple instruments that are sufficient for caponizing—a knife (1), spreader (2), tearing hook and probe (3), and forceps (4).

barrel is more satisfactory when set at an angle so as to permit the light to show more directly into the body cavity of the bird and to enable the operator to work with greater ease.

The stand in the middle (fig. 4B) is a special type designed to take apart and pack in a traveling bag. It is adjustable as to height and angle of table top which rotates on the base of a photographer's tripod. The legs and wings of the chicken are held in place by spring clamps. Such a stand, while more expensive than the other types, would be more satisfactory for one who does considerable caponizing.

The two boards fastened together with two 6-inch strap hinges (fig. 4C) make the simplest and most satisfactory table when placed on a barrel or shipping coop stood on end. The strings attached to screws on each side for fastening the birds are attached to weights on the other end. A half-hitch loop on the right side is put over the wings and a similar loop on the left holds the legs

securely. A short stick 1 inch square or a 6-inch strap hinge can be placed between the two boards to give any angle desired.

ADEQUATE LIGHT

Modified sunlight such as found in the shade of a tree or building is the most satisfactory. The light should pass over the operator's shoulder into the body cavity. On a cloudy day or in a partially darkened room, artificial light makes a fairly good substitute for natural daylight. Beginners, especially, should realize that good light is absolutely essential if the operation is to be a success.

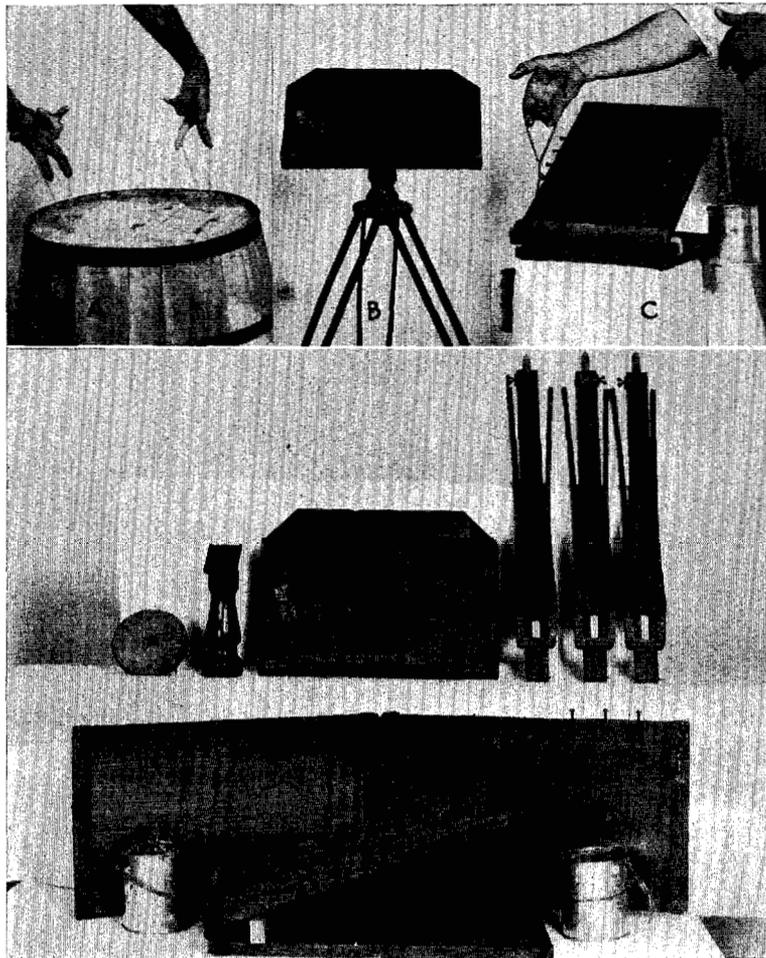


FIG. 4.—Three types of stands are shown above. A closer view of (B) and (C) is shown below. The stand (B) can be taken apart to pack conveniently. Two views of (C) are shown. This stand is made by hinging two 12- by 18-inch boards together. Screws on the sides support the weights for fastening wings and legs.

PERFORMING THE OPERATION

Caponizing is a simple operation. Anyone with a little patience and who is not affected by the sight of blood can soon learn to do it successfully. The fact that the gonads are located in the body cavity rather than being visible on the exterior, as in other farm animals, has led many people to believe the operation was difficult and dangerous. The beginner will make slow progress at first, but skill and speed will come with practice. While it is possible for one with experience to place a bird on the stand, caponize it, and re-

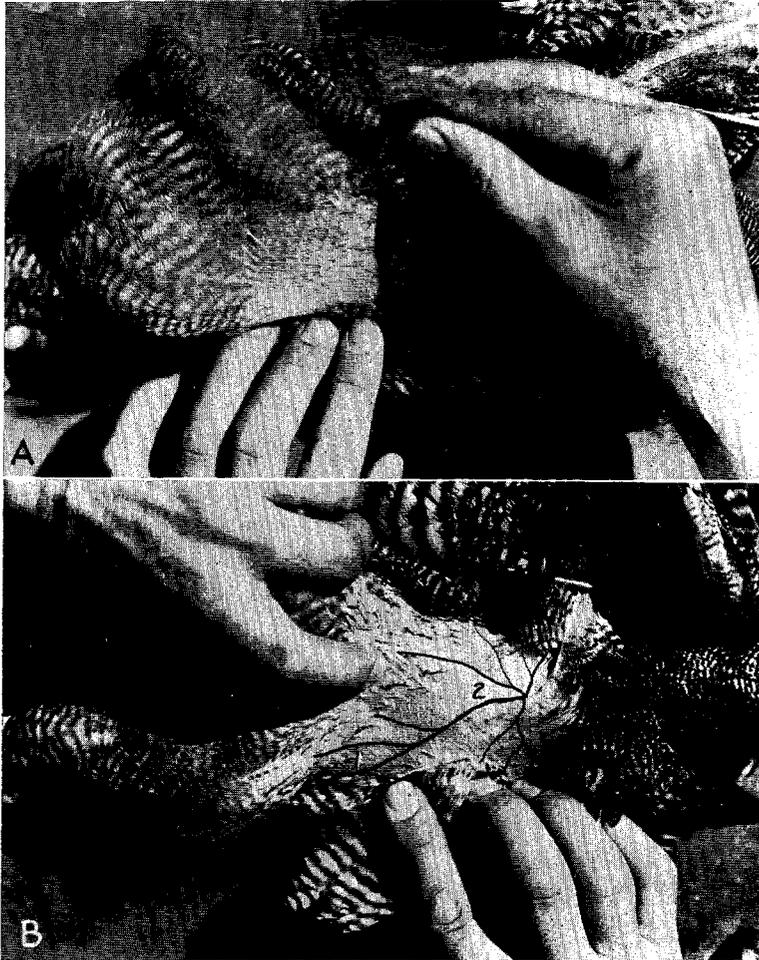


FIG. 5.—Removing the feathers in preparation for the incision (A) and locating the last rib (B). The large cutaneous vein over the thorax or pectoral muscle is shown in dark outline. The long radicle (1) enlarges as it approaches the wing (2).

move it to the coop in 30 seconds or less time, one will do well to average 40 birds per hour for a half-day or more where all of the work, except cooping, is done alone.

Two coops are required. The one holding the cockerels should be conveniently placed next to the stand and an empty coop equipped with clean litter and fresh drinking water should be near by to receive the birds after the operation.

**Fastening the Birds to the Table.**—The left side of the cockerel is placed on the table and the two wings are securely at-



FIG. 6.—(A) View showing the skin and thigh muscle being drawn toward the hip and held in place with the first finger of the left hand. The incision is begun at the point of the finger and extended downward. The opening need not be more than  $\frac{3}{4}$  to 1 inch in length. In (B) the ribs are held apart with a spreader. Note how it is put in place.

tached by placing them under a spring clamp or in the half-hitch of a cord with weight attached to the opposite end under the stand. A half-brick or a number 2½ vegetable can half full of sand gives sufficient weight to hold the wings securely without interfering with the circulation of the blood. The legs are next stretched in a direction opposite from the wings, having the right leg above the left to facilitate operating, and they are fastened to the table in a manner similar to the wings. The leg fastener should be about 11 inches from the wing fastener with a 2-inch adjustment when rigid, in order to accommodate birds of different sizes.

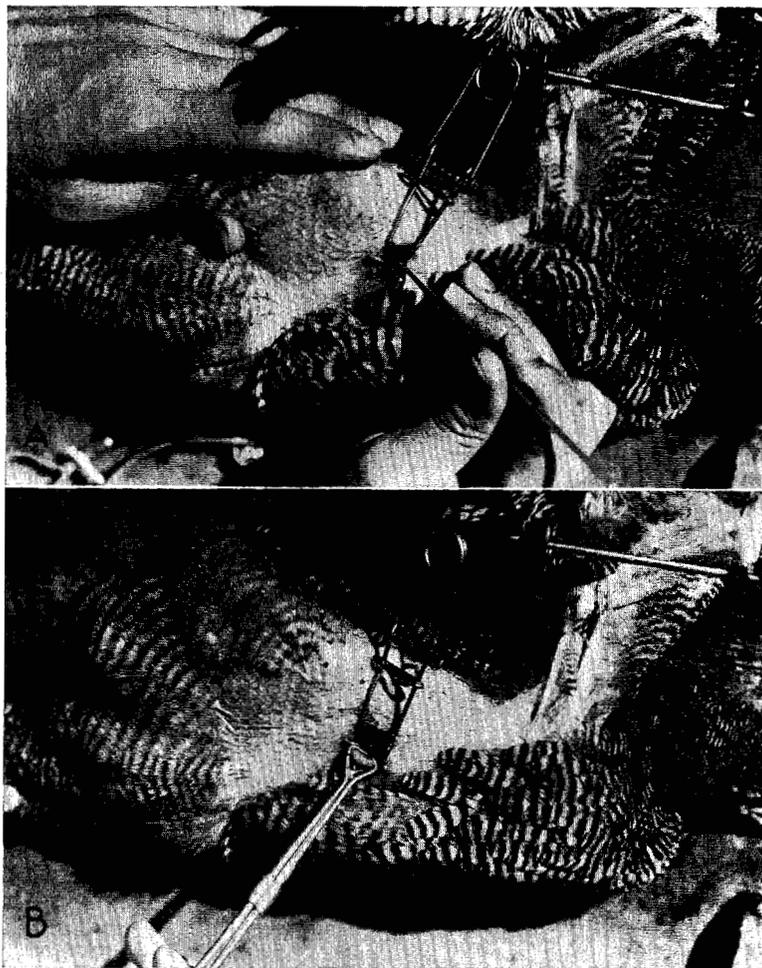


FIG. 7.—The peritoneal membranes are torn with a hook (A) and the lower gonad is removed first (B). The incision should be well down on the body to enable one easily to remove both organs from one opening.

**The Incision.**—The soft, downy feathers between the feathers on the breast and thigh are plucked. (Fig. 5A.) With the first finger of the left hand placed over the right hip locate the seventh or last rib. (Fig. 5B.) Draw the skin over the ribs toward the hip and with it the sartorius or thigh muscle. Holding the knife in the right hand, make the incision between the sixth and seventh (the last two) ribs. (Fig. 6A.) The point of the knife should enter the body cavity opposite the uncinatè process which is the small bone near the back that extends posteriorly from the fifth to the sixth rib. The incision should be made downward for a distance of  $\frac{3}{4}$  to

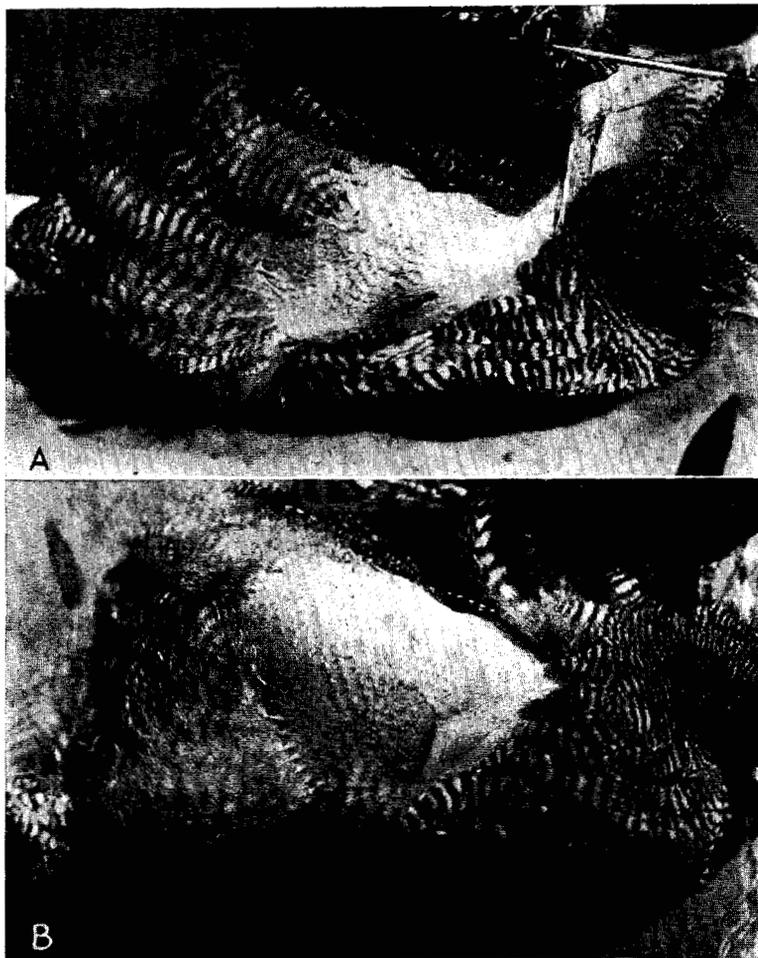


FIG. 8.—After the spreader is removed, the skin and muscles go back into place (A). The opening in the skin is now far below the incision between the ribs. A typical wind puff is shown in (B).

1 inch. If the incision is too near the back, difficulty will be experienced in removing the left gonad. After some experience the incision need not be more than  $\frac{1}{2}$  to  $\frac{3}{4}$  of an inch long. Many make the mistake of cutting a much larger opening than is necessary. This requires more time to heal and will cause wind puffs to persist. If the thigh muscle has been properly held back until after the incision is made, and if a little care is exercised not to cut the long radicle of the vein originating at the knee joint and which crosses the body diagonally from the thigh to the wing (fig. 5B-1), there will be practically no bleeding and apparently but little if any pain to the bird.

The spreader is next placed in the incision with the right hand, the handle of the spreader being directed toward the back and out of the way. (Fig. 6B.) The small hook at the end of the probing tool is next brought into use by tearing the delicate peritoneal membranes which form the abdominal air sac and surround the intestines and gonads. (Fig. 7A.) Here, experts save time by extending the point of the knife far enough into the body cavity with the original incision to cut the membranes sufficiently to allow the forceps to pass. With the membranes out of the way, the upper or right gonad which is about the size of a plump kernel of wheat is easily seen attached to the back at the anterior or forward end of the kidney. The shape varies in different birds. In some the gonad will be long and narrow while in others it may be short and blunt at one end. It is normally yellowish in color, although one occasionally appears partly yellow and partly greyish, or it may be entirely black. This unusual color appears to have no significance, as the writer has observed such birds to maturity, at which time the organs were functional and appeared normal in color.

The left gonad, which is seldom visible, is located opposite the right gonad and a little to the posterior. (See figure 10.) The forceps which are manipulated with the right hand are used to probe for the lower gonad. When it is lifted into view the forceps are gently opened and drawn toward the operator, who is facing the bird on the stand. As the testicle drops past the upper jaw of the forceps, the lower jaw is quickly extended toward the back of the bird by dropping the wrist so as to lodge the testicle on the lower jaw as it falls past the end of the upper jaw. The jaws are then squared on the gonad and closed on the upper and lower sides of the tissues which connect the organ to the body. The forceps are gently pulled toward the operator to "take up the slack," after which they are tightly closed and locked and pulled with a twisting motion until the organ is severed from the body. (Fig. 7B.) The upper organ is next grasped with the forceps and removed in a similar manner. The spreaders are then removed, a slit is made in the web of the right foot between the outside toes for identification and the bird is removed from the operating table. The skin and thigh muscle go back into place, thus serving as a natural bandage. Over the incision between the ribs.

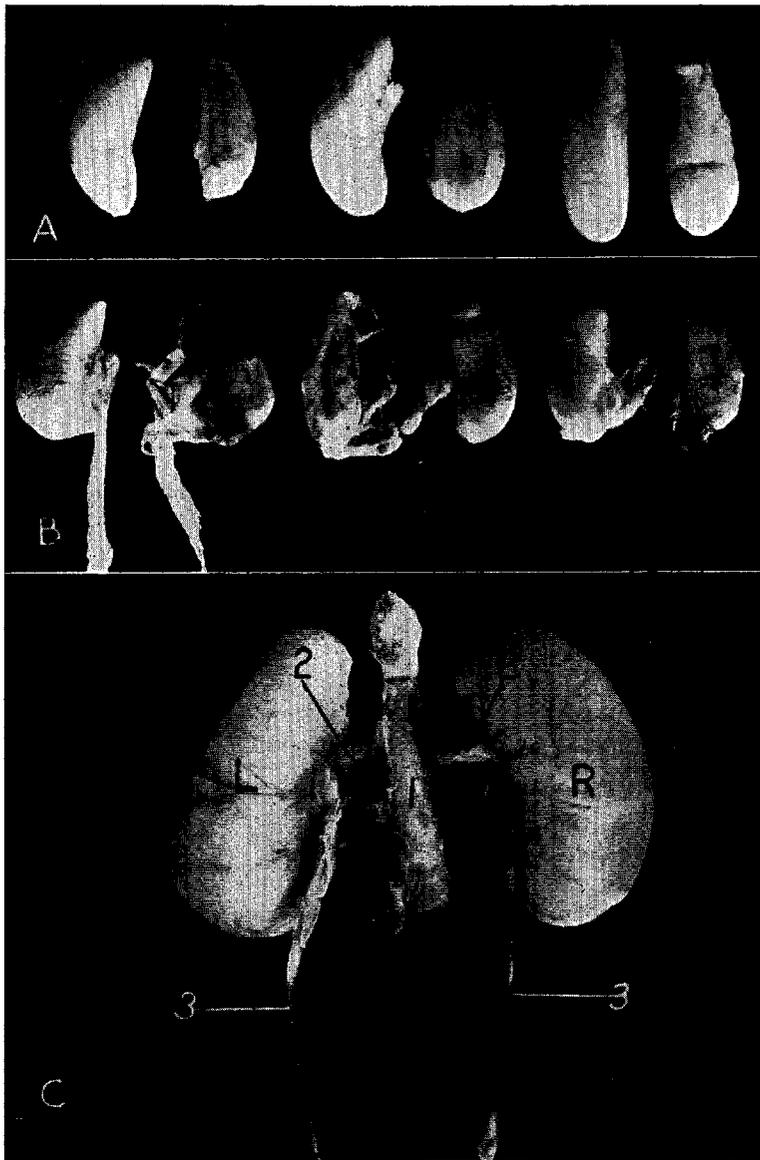


FIG. 9.—The three pairs of gonads (A) were extracted with a type of forceps which removed the testicles without the peritoneum, epididymis, or the connecting portion of the vas deferens. A large percentage of slips results from this type of operation. The complete removal of both testicles and the attached portion of the ducts is necessary (B). (C) A dorsal view of mature gonads showing the dorsal aorta (1), the spermatic arteries (2), and the vas deferens (3).

The object of marking all birds operated on is to avoid using as breeders any slips which may develop.

The beginner will have a little trouble removing the lower testicle from the right side and there will be a temptation to turn the bird over and operate from the left side. This is where a little patience is required. By working on dead birds if necessary, the technique will soon be developed, provided one has the proper forceps, after which it will be easy to complete the operation through the one incision.



FIG. 10.—A ventral view with the gonads in place. Note the lower or left testicle (1) is posterior to the upper one. The vena cava (2) is formed by the union of the right and left ilia (3). The spermatic arteries lead from the anterior portion of the dorsal aorta (4) to the gonads. The coccygeal vein (5) and the mesenteric artery (6) are occasionally ruptured when operating. The forceps are passed through the opening (7) on the right side to remove both of the gonads.

It is very important that not only all of both testicles be removed but also that the peritoneal membrane surrounding the gonads, the epididymis, and the anterior portion of the vas deferens be removed if a high percentage of capons is obtained. This is where good instruments play an important part. (Fig. 9.) Any instrument which merely ruptures the peritoneum and permits the testicle to

escape is unsatisfactory. The instrument should be designed as that the jaws will make perfect contact from corner to corner; thus every organ and tissue enclosed between the jaws is extracted. This will minimize the number of slips, which are discussed later.

The principal danger in caponizing is the rupturing of one or more of the primary blood vessels, which causes internal hemorrhage, resulting in death within a few minutes.

The testicles are located at the point where the right and left iliac veins converge into the posterior vena cava. The dorsal aorta lies below the vena cava when the bird is on the operating table. The spermatic veins and arteries leading from and to the testicles are ruptured when the gonads are removed, but it is doubtful if this is ever responsible for death, because of their small size.

It is possible to rupture with the forceps the vena cava or one of the iliaes, in which case death results quickly. The writer is of the opinion that the most frequent cause of death from hemorrhage is due to the rupturing of the coccygeal mesenteric vein or the posterior mesenteric artery or both when removing the left or lower gonad. (Fig. 10.) These blood vessels, which are rather loosely suspended in the mesentery of the body cavity, are frequently grasped in the forceps with the lower gonad, particularly when the birds are a little too far advanced in age. There are other small blood vessels occasionally ruptured, and while bleeding may appear to be profuse, vigorous birds will usually recover. When the bleeding is so rapid that it fills the body cavity and escapes onto the stand before the bird can be removed, there is little chance of recovery. Such birds are edible and their market value can be salvaged. Deaths from bleeding do not usually exceed 3 percent where one operates on vigorous birds of the proper age. The mortality among low-vitality birds, reared in bare yards and suffering from malnutrition, may reach 10 to 12 percent.

#### INFECTION

If one is reasonably careful there is very little danger of infection, even though disinfectants are not used. However, occasionally a capon will develop canker in the wound, and if allowed to remain, it may eventually grow to enormous size. It may not be discovered until the capon is dressed for consumption. This condition appears to be more prevalent among birds bothered longer than usual with wind puffs or kept under insanitary conditions where infection might be established by crowding and trampling over each other.

#### CARE OF BIRDS AFTER THE OPERATIONS

The birds should be transferred to a clean house with plenty of clean litter on the floor, where they should be confined for a week to 10 days. It is better not to have roosts in the house and the feed hoppers and water vessels should be accessible without the birds doing much flying or jumping. The same growing ration fed before

the operation can be continued. After the wind puffs have ceased to develop the capons can be given free range and managed the same as the other young stock. Some producers prefer not to install roosts in the house at any time and thus force the capons to roost on the floor covered with deep litter. This practice reduces the number of crooked keels and the injuries which occasionally develop on the keel. The injuries become filled with a fluid and may grow to large size if allowed to develop. They appear to be the result of heavy birds bruising the keel while resting it on the roost.

#### WIND PUFFS

While the incision made in the skin will scab over in a few hours, several days are required for the muscles that were severed between the ribs to close the gap. As a rule, about 50 percent of the birds operated on develop wind puffs. They are caused by the air which escapes from the body cavity through the opening between the ribs and becomes trapped between the skin and the body proper. (See Fig. 8B.) The birds quickly develop a bloated condition. The air pressure under the skin continues to develop until the bird is uncomfortable, awkward getting about, and has little or no appetite. The condition is quickly corrected by puncturing the skin with a sharp knife. This should be done every day or two on all birds that show this condition. Wind puffs usually cause trouble for 7 to 14 days after the operation. The trouble may be attributed to the sartorius muscle and membranes which act as "valves" over the wound between the ribs. That is, air which passes through the mesobronchus leads into the abdominal air sac and is forced through the opening between the ribs and under the sartorius muscle into the outer sac between the thorax and the skin. The muscles frequently fit so closely over the incision between the ribs that the air does not find its way back into the body cavity and continues to accumulate under the skin until the incision between the ribs is completely healed and the abdominal air can no longer escape.

A satisfactory way of preventing wind puffs has not been reported, to the writer's knowledge. The placing of yarn loops in the skin to "drain" the air is not satisfactory since the incision in the skin where the yarn enters heals so quickly the exit is soon shut off. In some birds it appears that membranes interfere with the passage of air through the wound, thus preventing wind puffs. While the development of wind puffs is not a serious matter, it is a nuisance and may stunt the growth of capons or cause a spongy condition to exist under the skin in mature birds.

#### SLIPS

Slips are birds on which the operation was not successful. If any portion of the testicle, even the size of the point of a pin, is left intact at the time of the operation, regeneration will take place and eventually the bird will develop an enlarged red comb and wattles, become active, crow, fight, and take on the general characteristics

of normal males, except that it cannot reproduce unless it be in rare instances where contact between testicle and vas deferens may develop. The time required for slip characteristics to develop is in proportion to the amount of testicular material left in the body when caponized. Should a fourth to a half of one organ remain, the bird may never show capon traits; when a lesser quantity remains, the capon's appearance and traits may exist for three or four months. If only a minute portion is left, slip characteristics may not appear until the bird is seven or eight months of age. This is well illustrated in figure 11, which shows the ratio of the regenerated testicle in proportion to the size of the comb and wattles in eight-month-old birds. Thus it is explained why a producer may remove all slips from his flock when four or five months of age, only to find a month or two later that others have developed.

Slips are intermediate in their ability to fatten and in value between capons and cock birds. They should be disposed of as soon as they appear in the flock. Poultry buyers have no trouble identifying typical slips by the size and color of the comb and wattles.

#### RATIONS FOR GROWING CAPONS

Any good growing ration consisting of scratch grain and mash mixture will suffice for the young capons. Since the object is to obtain rapid growth, the ration should contain an ample amount of protein and mineral. The following ration should give good results:

ALL-PURPOSE MASH		Pounds	SCRATCH GRAIN		Pounds
Corn or kafir	}	Equal portions ground together.....	(a) 4-16 WEEKS OF AGE		
Wheat or milo					
Oats or barley		6	Cracked corn, kafir or milo.....	50	
Bran		11	Wheat	50	
Alfalfa leaf meal (a)		10	Total	100	
Meat and bone scraps		5	(b) 17 WEEKS AND AFTER		
Fish meal		5	Shelled corn, kafir or milo.....	50	
Soybean oil meal		5	Wheat, barley or oats.....	50	
Calcium carbonate		2	Total	100	
Salt		1			
Fish oil (b)		1			
Total (c)		100			

(a) When the capons have free range in the sunshine and green feed is plentiful, replace the alfalfa meal and fish oil with 11 pounds of ground oats or barley.

(b) Double amount of fish oil for birds which receive no direct sunlight.

(c) Add ½ lb. manganese sulphate per ton of mash.

#### COST OF PRODUCING CAPONS

The most economical gains are made the first seven or eight months. After this age it takes considerably more feed to put on a pound of gain. The following tests give some of the results that might be expected under both favorable and unfavorable conditions.

##### DATA FROM WHITE PLYMOUTH ROCK CAPONS

On the 18th of April 100 cockerels were caponized and observed for the development of wind puffs. The numbers recorded daily for the first week were: 17-12-6-7-10-8-12, respectively. The wind puffs were opened to release the air on different occasions during this

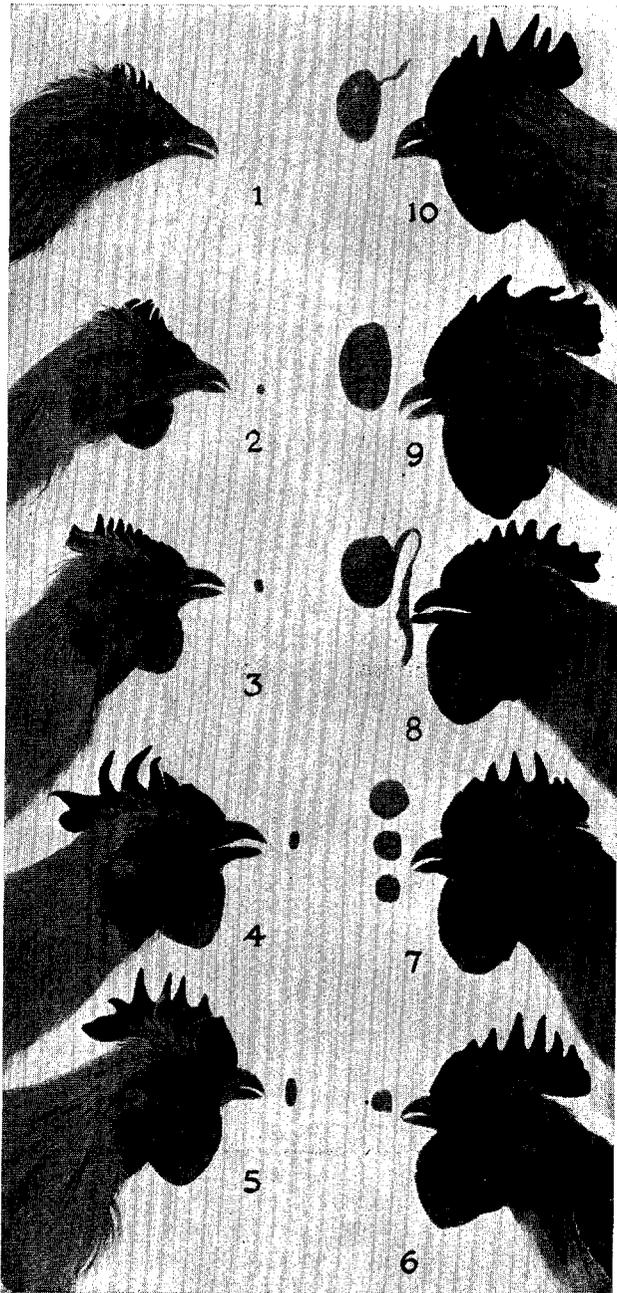


FIG. 11.—The head of a capon (1) and progressive stages of slips (2 to 9). Number 10 is that of a cock showing one gonad. The size of the regenerated testicle taken from the bodies of the slips is shown in front of each beak. Note that as the size of the regenerated organ increased, the size of the comb and wattles also increased. At eight months of age No. 2 would have been accepted as a capon, while Nos. 7, 8, and 9 never showed capon characteristics.

period. Two weeks after they were caponized 17 were found with large wind puffs, 16 with medium wind puffs; and 13 with a small amount of bloating. Those showing wind puffs represented 48.4 percent of the total number.

The birds were confined after eight weeks of age in a shed roof house 15 by 30 feet with a grass-covered, partially shaded yard 60 by 200 feet in size. These quarters had previously been occupied by adult birds for 19 years. While the house was thoroughly cleaned and disinfected and the yard adjacent to the house was plowed and sown to Sudan grass, many of the birds developed chronic coccidiosis, while others died from paralysis. The mortality was unusually high for capons and no doubt, the rate of growth was affected. As chicks the capons had been reared in brooder houses and confined to sanitary runways for the first eight weeks. In view of the recent results published by the Wooster, Ohio, Agricultural Experiment Station,<sup>2</sup> it is possible these chickens were susceptible to diseases for which they had no opportunity to develop immunity by coming in contact with the ground. The entire flock was treated with combination capsules the last of August to eradicate both round and tape worms (a practice no longer recommended). This treatment no doubt slightly checked the growth rate.

The detailed results, giving average amount of feed consumed per bird and per pound of gain, and other information are presented in Table 1. These results indicate what might be expected on many farms.

At 32 weeks of age a few of the capons weighed more than 9 pounds; several weighed 8 pounds or more; however, there was a sufficient number below these weights to bring the average of all down to 7.07 pounds. The total feed consumed per bird was 43.01 pounds, or an average of 7.22 pounds per pound of gain. Two birds were killed in caponizing and 28 others died, mostly from coccidiosis and fowl paralysis. Eleven slips developed and 10 showed blisters or enlarged growths on the keels which were filled with a thick serum-like fluid. The No. 9 slip in figure 11, when mated with a flock of hens, was able to fertilize eggs. Hens mated with slip No. 8 in the same figure did not produce fertile eggs, although the vas deferens in this particular bird were enlarged and appeared to be functional. There were eight with crooked keels.

Feed averaged about \$1.25 per hundredweight. This gave a feed cost of 53.8 cents per bird or 9 cents per pound gain. These birds were kept until 39 weeks of age for class work so that their actual market value was not obtained at the close of the experiment.

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2. Kennard, D. C., and Chamberlin, V. D. Pullet mortality. Reprint from Bimonthly Bulletin, Ohio Agr. Expt. Sta., Wooster, Ohio. 19:169. July-August, 1934.

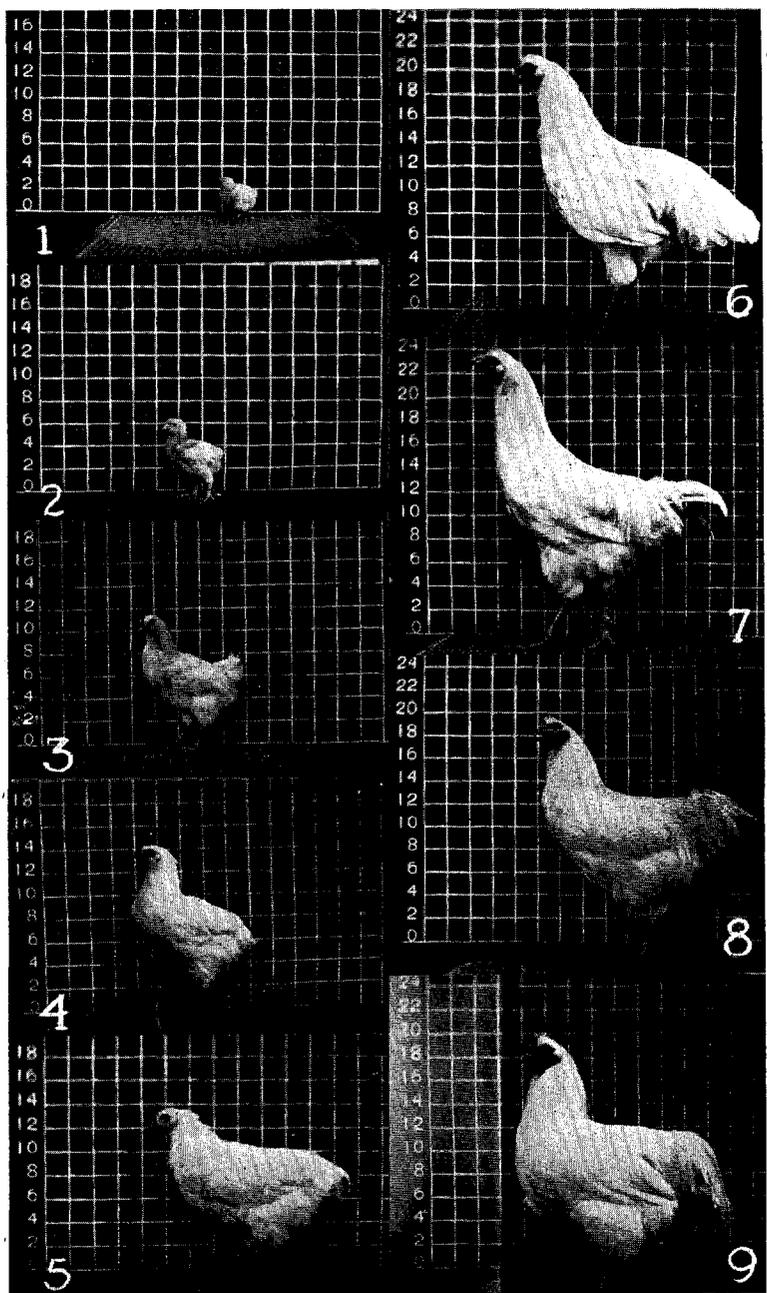


FIG. 12.—Pictures showing the rate of growth of White Plymouth Rock capons by four-week periods. These birds represented the average size of the birds in the flock from which they were selected. The average weight and feed consumed by periods are given in Table 1.

TABLE 1.—THE RESULTS RECORDED AT FOUR-WEEK INTERVALS FROM A FLOCK OF 100 WHITE PLYMOUTH ROCK CAPONS, 1933

PERIODS.	Date.	Age in weeks.	Average weight.	Average gain in 28-day periods.	Feed consumed.		Average number birds.	Number slips.	Number blisters.	Number crooked keels.
					Per bird.	Per lb. gain.				
0.....	Feb. 21.....	0	Lbs. 0.083	Lbs. 0.00	Lbs. 0.00	Lbs. 0.00	100	0	0	0
1.....	Feb. 21..... Mar. 21.....	4	.440	.36	.95	2.15	100	0	0	0
2.....	Mar. 22..... Apr. 18.....	8	1.45	1.01	3.58	3.54	100	0	0	0
3.....	Apr. 19..... May 16.....	12	2.55	1.10	5.16	4.69	95.8	0	0	0
4.....	May 17..... June 13.....	16	3.79	1.24	6.03	4.86	92.9	3	2	5
5.....	June 14..... July 11.....	20	4.85	1.06	6.31	5.95	83.7	4	4	8
6.....	July 12..... Aug. 8.....	24	5.84	.99	6.94	7.01	83.7	8	10	5
7.....	Aug. 9..... Sept. 5.....	28	6.47	.63	6.89	10.93	79.5	8	8	7
8.....	Sept. 6..... Oct. 3.....	32	7.07	.60	7.17	11.95	70.4	11	8	7
Total.....		32		6.99	43.01			11	10	8
Average.....			7.07	.87	5.37	7.22	89.5			

The birds were caponized April 19, 1933.

CAPON PRODUCTION

## DATA FROM RHODE ISLAND RED CAPONS

In an earlier test with 50 Rhode Island Red capons the results were somewhat more satisfactory. The time required to caponize the birds was one and one half hours and there were no losses from death at the time of the operation. Fifty percent developed wind puffs. The detailed results are given in Table 2.

TABLE 2.—RESULTS OBTAINED FROM 50 RHODE ISLAND RED CAPONS HATCHED APRIL 1 AND CAPONIZED JUNE, 1, 1923

DATE.	Average weight.	Average gain in 30-day periods.	Feed consumed.		Number slips.	Mortality.
			Per bird.	Per lb. gain.		
	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>	<i>Lbs.</i>		
Apr. 1.....	(a) .08	0.00	0.00	0.00	0	0
May 1.....	(a) .54	(a) .46	(a) .78	1.70	0	0
June 1.....	1.82	(a)1.28	(a)2.61	2.00	0	0
June 30.....	3.14	1.32	5.40	4.09	0	0
July 30.....	4.39	1.25	6.42	5.13	0	0
Aug. 29.....	5.73	1.34	8.66	6.46	1	0
Sept. 28.....	6.23	(b) .50	8.76	16.50	1	0
Oct. 29.....	7.37	1.14	9.60	8.50	2	1
Nov. 27.....	8.00	.63	9.10	12.70	6	0
Total or average.....	8.00	7.92	51.33	7.26	6	1

(a) Estimated figures based on results obtained elsewhere.

(b) The birds were confined to a house and small yard until August 29, at which time they were given limited range for 30 days. Apparently the additional exercise reduced the rate of gain in weight and increased the feed consumed per pound gain.

The feed consisted mostly of cracked yellow corn, a little wheat, and dry mash composed of equal parts of corn and oats ground together. To 85 pounds of this mixture 15 pounds of meat scraps were added. The capons had buttermilk and water to drink until July 24 and only water thereafter. The average cost of scratch grain per hundredweight was \$1.83, while the mash averaged \$2.59 per hundredweight, or an average for both of \$2.21. The capons were sold locally for 30 cents per pound live weight, or 35 cents dressed weight and the slips for 25 cents a pound.

The capons averaged 8 pounds each at eight months of age. They consumed a total of 2,250 pounds of feed or an average of 7.26 per pound gain. Six slips developed during the entire period and there was one death. Twenty-four were killed, dressed, and shipped to Boston by a local packer. The others were sold locally at retail. The 50 cockerels at two months of age cost \$25. Feed cost, including milk, amounted to \$52.78, and miscellaneous items such as litter and cost of marketing those shipped were \$6.41. The total cost was \$84.19 which, when subtracted from the total income of \$134.16,

left a balance of \$49.97, or approximately \$1 per bird for labor, overhead, and interest on investment.

G. E. Annin and J. G. Halpin of the University of Wisconsin report<sup>3</sup> an interesting experiment conducted in 1935 and repeated in 1936 in which they compared the rate of growth, feed consumption and profit above feed cost for capons and cockerels. At 28 weeks of age the capons averaged 7.04 pounds each on 39 pounds of feed. Their value at 22 cents per pound was \$1.54, which left an income above feed cost of 64 cents a bird.

Roasters of the same stock averaged 7.02 pounds each on approximately the same amount of feed. Their value at 18 cents per pound was \$1.21 which left an income above feed cost of 34 cents a bird. The market value above feed cost of both groups as 12 week old broilers was 25 cents a bird. These investigators concluded that there was no significant difference in growth or feed consumption between capons and cockerels to 28 weeks of age. In Kansas it is usually advisable to keep capons until 32 weeks of age in order to attain the increased size preferred on the market.

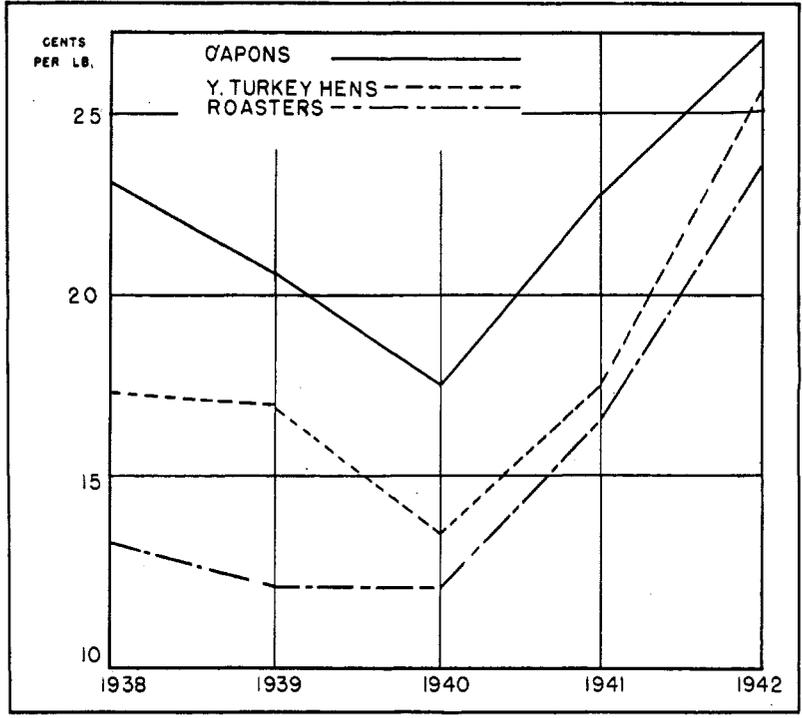


FIG. 13.—Graph showing the average annual Kansas City prices for dressed capons, young turkey hens and roasters, 1938, 1942, inc.

3. Poultry Science, Vol. 17, pages 419 to 422, September, 1938.

**MARKETING CAPONS****MARKET PRICE OF CAPONS**

Previous to 1930 the prices paid for capons and turkeys were about the same. Since then capons have usually sold for more than turkeys. The results given in Figure 13 compare the average annual prices paid in Kansas City for live capons, turkeys and roasters for the past five years.

This graph indicates that capons on the Kansas City market consistently sell for more than turkeys or roasters. While the spread in price received in 1942 is not large, it is sufficient to encourage more poultrymen to produce capons, especially when the capon-feed price ratio is favorable as it is now and is apt to be for some time, since protein feeds so essential for egg and broiler production will be hard to obtain while the war continues.

**PREPARATIONS OF CAPONS FOR MARKET**

Capons differ from other chickens in that they do not yield good results from crate fattening. They are inclined to sulk, fail to eat normally, and hence they may lose weight. More satisfactory results will be obtained by confining them to small yards or in the house they are accustomed to, and continuing to hopper feed the growing ration to which condensed buttermilk is added daily. Begin by adding only small amounts of the milk paste to the top of the feed and increase gradually as the capons consume more until 3 or 4 pounds per 100 capons are supplied daily. In the event skim milk or buttermilk is available, either can be used as a substitute for condensed milk. Soak the scratch grain in the milk 24 hours, then feed in V-shaped troughs twice daily all the birds will clean up in 30 minutes. Continue to leave the dry mash before them with either of the above practices. The fattening period should continue for four to six weeks.

**WHAT CONSTITUTES A FINISHED CAPON**

One can tell when the capons are "ripe" or ready for market by examining the accumulation of fat under the wing and on the nape of the neck. When the large or terminal end of the cutaneous vein over the thorax or pectoral muscle (see fig. 5B-2) is covered with fat so that it is invisible or only dimly visible, the birds are ready for market.

Some idea of the fatness of a live bird may also be determined by rubbing the fat on the nape of the neck (fig. 14B-1) between the thumb and first finger. The capons should be free of pin feathers when fat, although that is not always the case if they are plucked before eight or nine months of age. Figure 14A-1 illustrates how the fat is deposited along the feather tracts and under the wings of the true capon. The feather follicles on the thigh become deeply set, resembling in appearance a comfort that has been tacked. The impression one gains by rubbing the hand over the surface of a dressed bird is that of a soft, velvety, fine-textured skin. A similar

test on the cock bird (fig. 14A-10) gives the opposite impression. Here the absence of fat causes the feather follicles to protrude beyond the interspaces and when touched with the hand the surface is rough, dry, and coarse. The difference in the depth of fat on the nape of neck is also shown. The slip (Fig. 14A and B-3) is intermediate in fatness between the capon and the cock.

PLUCKING CAPONS

The present tendency is to kill and pluck capons by dry picking, scalding, or by roughing and dipping in wax. They are usually picked clean the same as other poultry.

The practice of plucking "capon style," popular some years ago, is not practiced extensively at present. (Fig. 15.) One sees many

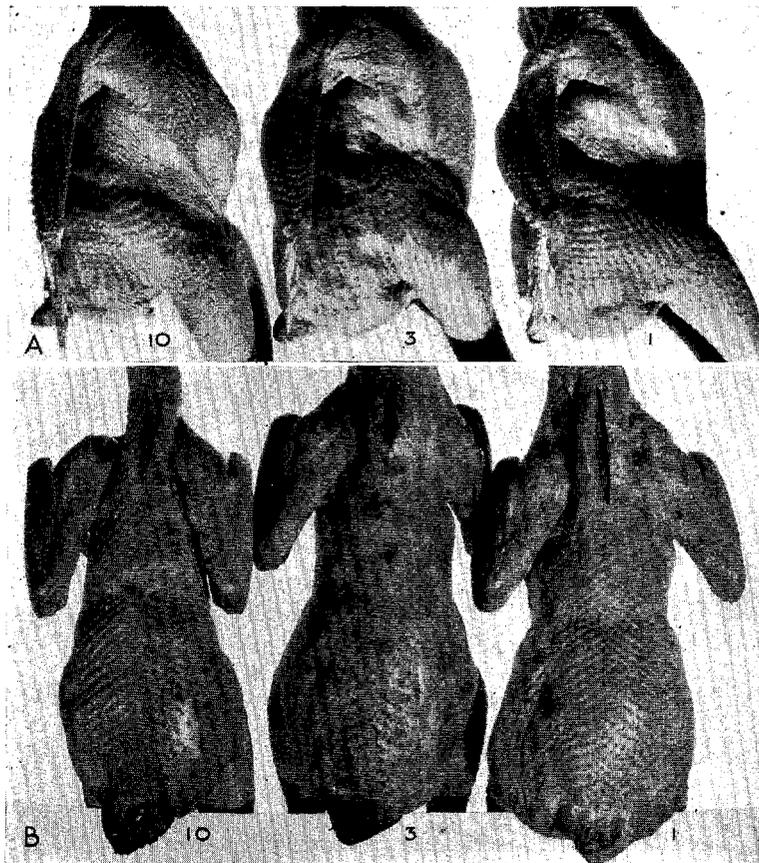


FIG. 14.—Lateral views (A) and dorsal views (B) of a capon (1), a slip (3), and a cock (10), corresponding to these numbers in figure 11. Note the deposits of fat over the body and on the nape of the capon's neck and the absence of fat in these regions on the cock. The slip is intermediate between the two.

examples of this style which vary widely from the requirements of the Boston market, said to be the best capon and soft-roaster market in the country. Birds to be plucked "capon style" should have about one third the feathers left on the neck and lower drumsticks. The saddle and all tail feathers, as well as the primary and secondary wing feathers, should be left intact. The small feathers on the under side of the wing and the first joint from the body are plucked clean, all others being left in place. This custom is probably a carryover from the early days when it was used to convince customers they were buying capons. The feathers on the hackle, saddle, and tail of the capon grow long and pointed when the birds are kept until the feathers are fully grown, and thus they aid in identification. With the present tendency to dress market poultry fully at the point of origin, most packers remove all feathers from the capons.

TIME TO MARKET CAPONS

The holiday season, beginning with Thanksgiving and ending with New Year's, is usually the best time to market capons in Kansas. Early spring-hatched chickens grow faster and attain a larger size than summer- or fall-hatched birds. When started in February, March, or April they are ready for one of the above holiday markets. Late-hatched chicks are often stunted in growth and must be held for the January to April market. While this is the proper season for capons, it remains for those who live in sections with more favorable summer growing conditions to cater to the spring market.

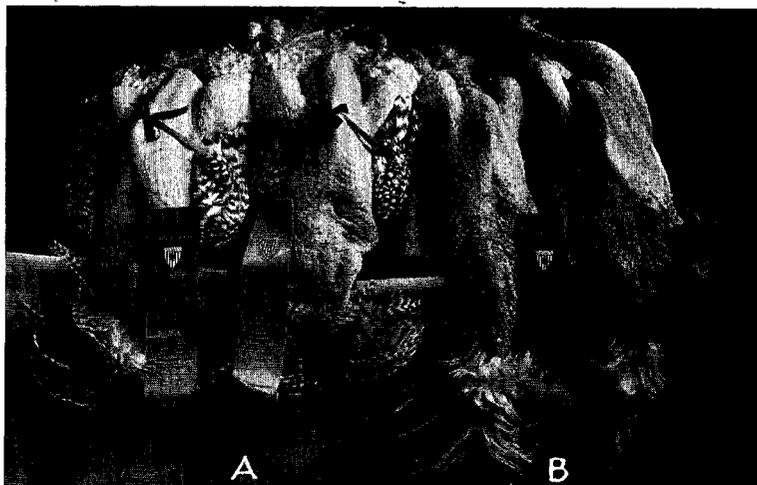


FIG. 15.—Two pairs of prize-winning capons. The two birds (A) show the capon style of dressing while the two (B) show the clean-plucked method. The Light Brahma capons on the right had a dressed weight of 10 pounds each at eight months of age. These capons were produced by E. O. Damon, South Shore, Mass. (Courtesy Massachusetts State College, Amherst.)

### TURKEY CAPONS

Some interest has developed in turkey capons. A few of the advantages reported have been: Improvement in quality of flesh, elimination of coarseness of flesh, more economical gains, and an absence of fighting among the turkey capons during the fattening period. In short, these are similar to the advantages claimed for chicken capons. It should be remembered that the habits of chickens differ widely from those of turkeys, guineas, ducks, and geese with respect to sexual development. Cockerels begin to mate from three to six months of age and are sexually active at all seasons. The sex hormones which develop early in the male chicken appear to stimulate also the development of an excess of connective tissue and a hardening of the flesh. There is pronounced flavor of the flesh and a failure to accumulate fat. In the turkey this is not the case, since these changes come later in life. The toms as a rule are mature enough for market purposes before their inclination to mate has

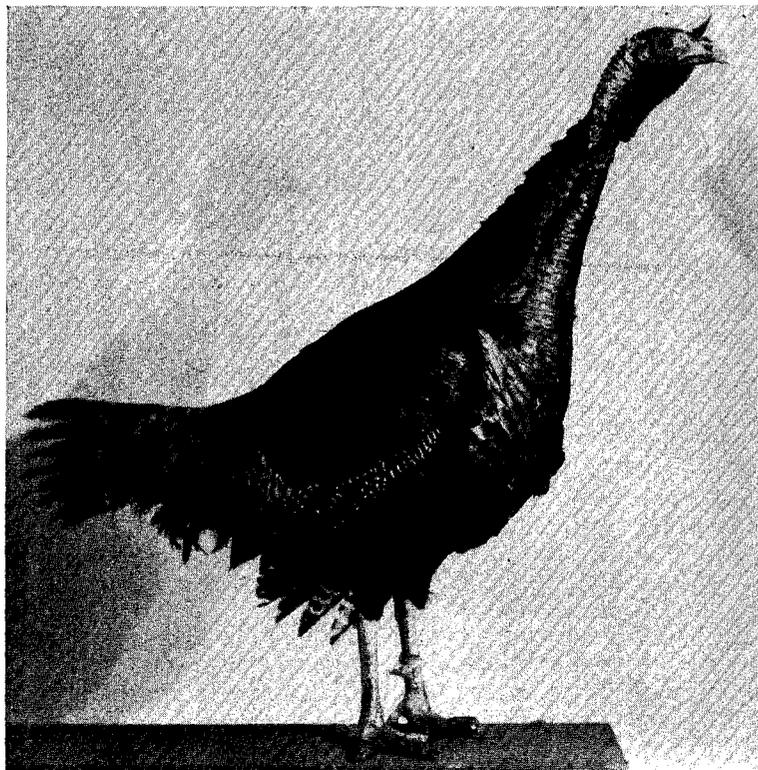


FIG. 16.—A turkey capon 18 months old. The head has a feminine appearance, partly due to the reduction in size of the caruncles and snout.

developed, hence the quality of flesh and rate of growth up to six to eight months of age do not appear to be affected by the presence of the gonads.

A small number of Bronze turkeys were caponized and observed until about one and one-half years of age at the Kansas Agricultural Experiment Station in 1928-'29. The turkey capons retained the normal male plumage, but the caruncles on the neck, head, and snout atrophied. They showed no advantage in weight up to about one year old. When dressed at approximately 18 months of age, the capons were somewhat fatter than the toms of similar age. One very noticeable difference was in the plumage during the second summer. That of the capons was sleek and well groomed at all times while the feathers on the toms were badly broken, ruffled, and missing.

It was concluded from these preliminary tests that there would be nothing gained by caponizing turkeys unless they were to be kept for more than a year. (Fig. 16.)

North Dakota Agricultural Experiment Station Bulletin 307, entitled "Turkey Capons" and published in June, 1941, concludes that there was no advantage in caponizing young tom turkeys. Up to 54 weeks of age there was no increase in weight, the capons made less efficient use of the feed, and feed consumption for both capons and toms from 10 to 26 weeks of age was practically the same.

#### GUINEA CAPONS

A small number of 12-week-old guineas were caponized at the Kansas Agricultural Experiment Station in 1933. They averaged 1.33 pounds each. The average weight of normal males and capons at 28 weeks of age was identical, being 2.87 pounds. There was no difference in the general appearance of the two groups of birds. The same conditions seem to prevail among guineas as reported for turkeys and the same conclusions are drawn.

The sex of guineas more than 16 weeks of age can be determined fairly accurately by examining the thickness of the wattles. The posterior portion or edge of the wattle on the male is thicker than that of the female. The latter is about the same thickness throughout, whereas the former shows a pronounced difference between the thickened edge and the thinner central portion of the wattle. (Fig. 17.) This difference was noticeable on the strain of guineas kept at Kansas State College.

The only satisfactory way to check on this method is to open the body cavity as in caponizing and examine the gonads. The males can be marked by slitting the web between the toes or by leg banding for later positive identification of sex.

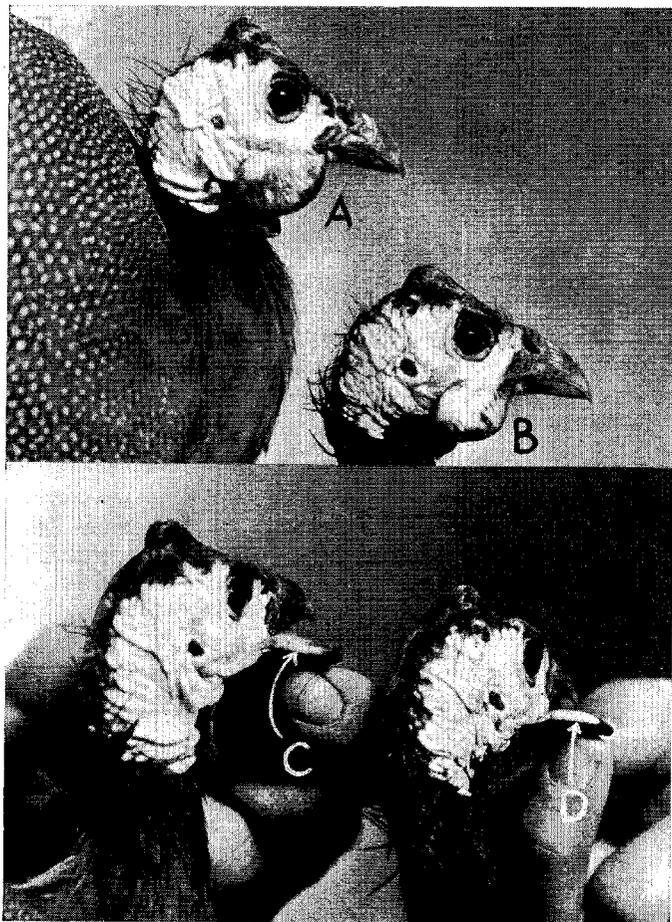


FIG. 17.—The head of a male guinea (A) and a female (B). In the view below note that the edge of the male wattle (C) is much thicker than the edge of female wattle (D). Both birds were approximately four months of age when photographed.

### A BRIEF HISTORY OF CAPON PRODUCTION

The art of caponizing dates back almost as far as the known history of poultry production. Cato and Varro in the latter's book, "Rerum Rusticarum," 37 B. C. and quoted in "Roman Farm Management," list three classes of fowl—the dunghill, Jungle fowl, and guinea fowl. They state that "the altered males are called capons." While all varieties of poultry were said to have been caponized with success, the dunghill variety was the best. The Natural History of Piny, written about 30 B. C., gives two methods of caponizing, neither of which applies today.

Gervase Markham's book, "Cheap and Good Husbandry," 1653, states that the best time to caponize is when the hen leaves her brood or just as the cockerels begin to crow. He adds that "while the art of caponizing is simple and safe, it must be taught by observation."

M. De Reaumur in his book, "The Art of Hatching and Bringing up Domestic Fowls, etc.," 1750, gives a number of interesting facts about capons. According to his statements, "a capon, duly instructed, will lead, tend, and warm the chickens trusted to his charge with as much care as the mother under whom they were hatched could do." One of the advantages of using capons, according to Reaumur, "is that he may be trusted with chickens at any time you please, he is always ready to accept of those committed to his tuition, he even seems to be prouder in proportion as their number increases whereas hens abuse the young chickens offered them when their age is a little different from that of those they have hatched and tended from the moment of their birth." Reaumur then narrates how difficult it is to train a capon to brood chicks.

While it is possible, provided one has sufficient patience, to teach a capon or even a cock to brood chicks, the difficulties involved in teaching him that that is his business are so numerous that most people prefer to use other methods.

Moubray (John Lawrence) in his "Treatise on Domestic Poultry," 1837, gives a method of caponizing similar to that used today. After removing the feathers, an incision is made 1 inch long and 1 inch from the spine, obliquely downward and forward, "The capon will carry chicks," he states, "but has no voice for calling them, which makes it necessary to bell him."

The practice of emasculating cocks when young has, according to Peter Boswell, "The Poultry Yard," 1845, prevailed from earliest antiquity, for the purpose of improving the flesh of the fowl. Boswell quotes Mascall, who described in detail how women "cut young cockerels." Judging from the description, they opened the abdomen, removed the "stones" with the forefinger of the hand, then sewed the opening in the skin up with a thread and "annointed" it with fresh butter.

The ancient Chinese method of caponizing is also given. In brief, the wings were folded back and held in place with the left

foot, the fowl being laid on its left side. The legs were held by the great toe of the right foot. The incision was made about 1 inch in length, starting about an inch below the backbone. The "stones" were removed by means of a horsehair loop passed through a bamboo or elder tube. No blood issued from the spermatic cord, nor did the animal seem to feel any pain.

And thus, the art of caponizing has passed through the ages to the present generation. There has been an improvement in the instruments used for performing the operation, resulting in greater efficiency, faster work, reduction in percentage of slips produced, and less mortality. The popularity of this practice varies widely in different countries. At present France and England probably lead in this enterprise. For many years the production of soft roasters—mostly capons—in the South Shore district of Massachusetts was unsurpassed anywhere in the United States. However, the interest there declined rapidly during World War I and this section has never regained its former popularity for the production of superior roasters. Capons are still produced extensively in parts of Canada, New England, New Jersey and in Pennsylvania. They are much less intensively grown in other Atlantic seaboard states and throughout the midwestern states.

Unfortunately, the production of capons is too often practiced by beginners with little or no experience. Capon production has not appealed to experienced poultrymen, except in isolated sections of the country, as has the production of turkeys, ducks, broilers and roasters.

