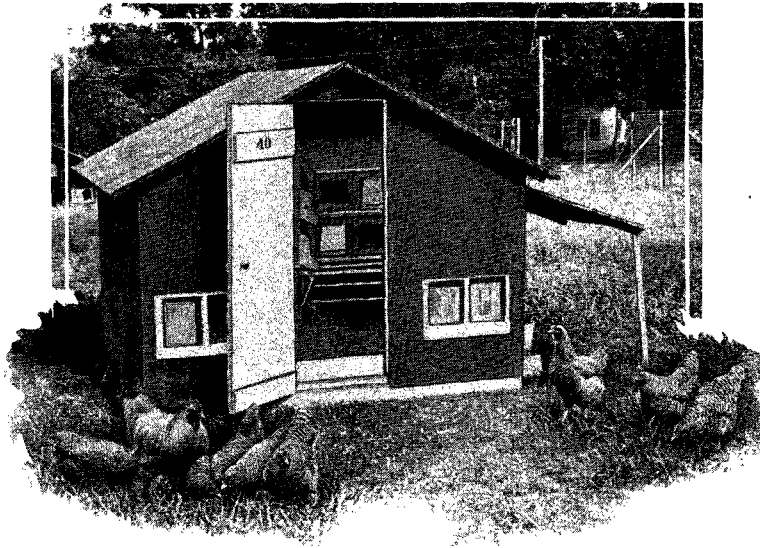


# AGRICULTURAL EXPERIMENT STATION

KANSAS STATE AGRICULTURAL COLLEGE  
MANHATTAN, KANSAS

DEPARTMENT OF POULTRY HUSBANDRY



A BREEDING PEN OF BARRED PLYMOUTH ROCKS

## POULTRY BREEDING RECORDS.<sup>1</sup>

WILLIAM A. LIPPINCOTT.

### INTRODUCTION.

Pedigree records of the larger pure-bred animals are permanently kept and given official standing by the officers of an association or society of breeders. By means of the association herd book or flock book, the exact ancestry of any animal of any breed may be traced to the foundation animals of its breed.

There are several reasons why this has not seemed feasible for poultry, but they are not important for the present purpose. The important fact is, it has not been done. Yet the poultryman who

1. Contribution No. 19 from the Department of Poultry Husbandry.

strives for improvement through breeding is in even greater need of breeding records than is the breeder of larger animals. The generations of poultry follow each other in more rapid succession, and the poultry breeder frequently deals with vastly greater numbers. A man's memory may serve him fairly efficiently in the case of a relatively small herd of cattle, but it is almost useless as a pedigree record for a large flock of chickens. This is doubly true with chicks hatched by foster mothers or in incubators, which never associate with their dams. In addition there is the very practical consideration that producers and breeders are increasingly demanding stock that is pedigreed with regard to production. Since there are no official breeding records, the individual breeder is thrown upon his own resources and must work out his own record system.

### **PURPOSE OF BREEDING RECORDS.**

The purpose of breeding records should be to answer at least four questions regarding any individual bird which has ever been mated. These are: First, who are its ancestors and what has been their breeding and productive performance? Second, who are its brothers and sisters, and, if the information is available, what have been their breeding and productive performances? Third, with what individual or individuals is it at present mated, or has it been mated in the past? And fourth, what were the results of these matings?

The first question is concerned with preceding generations, the second and third consider the individual's own generation, while the fourth looks forward into the next succeeding generation.

### **RECORD OF ANCESTRAL PAIRS.**

The service most commonly associated with breeding records is the information they make available concerning the successive matings which have finally culminated in the production of any given individual; that is, to easily and accurately trace its pedigree.

It is rather too customary in this connection to look upon a pedigree as a list of ancestral individuals. Emphasis should be given to the fact that every individual is the product of a pair of individuals, and that a pedigree is a record of ancestral—that is, parental—pairs running back through preceding generations.

In considering a given cockerel or pullet as a possible breeder, a knowledge of the breeding performance of each ancestral pair, as well as the productive performance of each ancestral female, is a matter of first importance.

Aside from the appearance of the bird, and the appearance of its brothers and sisters, its pedigree is all one has to go by, unless its parents happen to have been mated in a season previous to the one in which it was hatched. In such a case breeding or production records of older brothers and sisters may be available.

#### SIB RECORD?

It makes considerable difference in its probable value as a breeder whether a given bird is the one outstanding product of its parents, or whether it is simply one among several almost equally good brothers and sisters. Unfortunately, a single great performance at the nest, or an individual show bird of unusual excellence, may mean little in the line of breeding progress, but the chances greatly favor the bird with numerous brothers or sisters nearly or quite as good as he. A good system of records will not only show, but should also call attention to an individual's brothers and sisters.

#### RECORD OF MATINGS.

The proper pairing of birds is the foundation of the breeder's art and the basis of improvement through breeding. The breeding unit is the pair. During any given breeding season a promising male usually will be mated or paired with several females. And in successive seasons a given female may be mated with more than one male.

In order to give proper consideration to the pairing of birds during a given season, one should be in a position to give intensive study, in the case of all individuals previously bred, to the results of former matings. In order to do this there must obviously be available a list or record of all matings.

#### PROGENY RECORD.

In contemplating a pair of birds as possible parents, a consideration of their individuality, their ancestry, their sibs, and previous mates are of the greatest importance. Upon them hopes are built, but predictions are uncertain. **There is but one sure basis of judging a bird's breeding value from the standpoint of heredity, and that it is the breeding of it.** After a given pair has been mated, and progeny gotten and grown, really accurate judgments can be formed. The test of efficient mating is the character of the progeny. As suggested above, the progeny test, from the standpoint of a

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2. "Sib" is a convenient term meaning sister - brother, and is a contraction of that compound word si(ster) - b(rother). A sib record is a record of sisters and brothers.

parental pair, is a look forward into the next generation, as the study of the pedigree is a look back into past generations, and of sibs and mates a survey of the contemporary generation. This forward look gives sounder and more dependable information than the other two combined.

The fourth service which breeding records should give, therefore, is to show the progeny of any pair in a group so that they may be readily available for study.

### **BREEDING RECORDS AND BREEDING PRACTICE.**

In breeding practice the managemental unit is the pen; but as already pointed out, the breeding unit is the pair. The incubating unit is determined by the size of the incubator tray, and the time unit involved is usually one breeding season.

Except with pigeons, economic considerations generally preclude the mating of as many males as females, and one male is usually penned with several females, thus constituting a breeding pen. While pen records are considerably better than no records and give some information regarding the breeding performance of the males, providing always that but one male is used in a pen, they do not give the information necessary for the best progress, or, in some cases, even the maintenance of a high level of excellence.

From the standpoint of breeding, a pen is a group of matings or pairs, with the male a member of each pair. It will be very unusual when the progeny of certain pairs is not more or less excellent than that of other pairs, which fact the forward-looking breeder needs to discover. Some females are suitable mates for a given male, while others of as good, perhaps better, individuality and as proud a pedigree are not so suitable. The breeder's search, with the help of progeny records, is for fortunately mated pairs, and when these are discovered there is a really fairly firm foundation on which to build. A fortunate mating made one season is likely to be as fortunate a second season, barring a break in the vigor and fertility of one or both of the mates, and is both the signpost and anchor of the breeder.

The foregoing, combined with the artificial incubation of eggs in numbers larger than can be produced by one hen, has necessitated the trapnesting of all mated females during the breeding season, so that the mother of each egg may be identified, and of marking the egg so that the identification may be preserved. It is in turn necessary to sort out the eggs of each female before hatching, and

arrange means of identifying each chick that hatches with its dam, which also identifies it with its sire through the record of matings. Each step in this series of operations must be a matter of record if the whole purpose of the record is to be served.

A further consideration in breeding practice is the fact that matings are usually made for an entire season. While the time elapsing between copulation and the appearance of a resultant fertile egg is quite short, the laying of that egg does not end the influence of the female's mate. The number of sperm ejaculated during a single copulation is enormous, and their length of life in the oviduct is a matter of weeks. If for some reason it is desired to mate a given female with more than one male during one breeding season, and at the same time be sure of the parentage of all offspring by both mates, it is necessary to leave the female unmated for a period of three weeks before introducing the second male.

Such a procedure involves the production of a larger or smaller number of infertile, and, from the standpoint of breeding, useless eggs, and a corresponding loss of valuable time during the breeding season. These considerations make the usual time unit of mating an entire breeding season.

Because of the great desirability of setting eggs soon after being laid, and the fact that favorable hatching dates are recognized, the progeny of any one pair does not appear as a single seasonal litter as in the case of swine, but are hatched periodically throughout the season. Thus full brothers and sisters of a single season may have varying hatching dates, and individuals hatched on one date are likely, because at different stages of maturity, to be more desirable as breeders the following season than those hatched at some other date. It is, therefore, highly desirable to make the dates of hatching a part of the record.

#### STEPS IN A COMPLETE BREEDING RECORD.

There are five essential steps in the yearly cycle of keeping a complete flock breeding record which will furnish the information discussed above. These are: (1) the recording of each mating made; (2) making a record of each breeding male's pedigree and progeny; (3) making a record of each breeding female's pedigree, production, and progeny; (4) marking each egg of each breeding female as it is laid, and pedigree hatching it; and (5) marking and recording the chicks at hatching in such a way as to identify them with their parents.

For any given mating the first step and the last two will be completed within a single breeding season, but the second and third obviously cannot be entirely completed until the breeding and productive life of the individual is over.

**RECORD OF MATINGS.**

In order to make a record of matings, the individual breeders must be marked. The generally approved method is by a numbered metal leg band, which may be sealed, as shown in figure 1. In the record system described in this circular a distinction is made in the numbering of leg bands used on male and female breeders, in that the numbers on the male bands are followed by the capital letter M, while the numbers on the female bands are neither preceded nor followed by a letter.

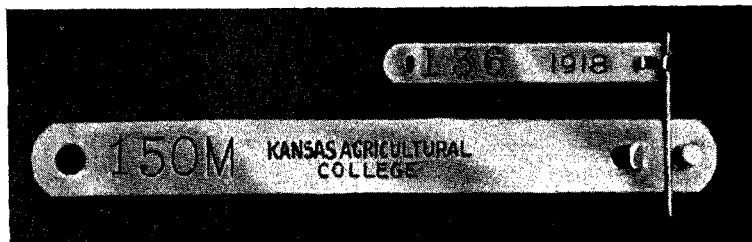


FIG. 1.—Wing band above and leg band below.

This distinction is convenient because the sex of any individual shown on the record by number is self-evident. Its further usefulness in tracing pedigrees will be indicated in a later paragraph.

It is an excellent practice to have the name of the breeder or of his farm stamped on each band, which usually may be done with slight added expense.

For convenience in reading the numbers, the leg bands should be put on so as to be upside down when the bird is standing. While a comparatively small matter, it will save time in reading band numbers when trap-nesting if the practice of putting the band on the left leg is always followed.

The mating record itself is simply a list of the birds in any given breeding pen, and is most useful for future reference. If posted in each pen it is very helpful in preventing errors, especially for the large-scale breeder dependent on employees, who do not know each individual in every pen, to do the trap-nesting during the breeding season. Fortunate is such a breeder who goes through an entire

season without having at least one female escape into another breeding pen and mate.

This is perhaps not so serious where but one breed is kept, except that if not discovered the offspring of such a hen will have a false pedigree on the record. The first requisite of breeding records is accuracy, and a false record may easily be worse than no record. A list of females posted in each breeding pen, so that the trap-nester may glance at it, as he should be required to do each time he takes a female from a nest, will lead to early discovery of escaped females.

A convenient form for keeping the record of a single mating is shown in figure 2.<sup>3</sup> It provides a space at the left for the leg-band number of the male (172M) which heads the pen, and for his mating number (115M2004). The latter is made by combining the numbers of his sire (115M) and dam (2004), and is the basis of tracing pedigrees in the record system here described. Below the leg-band number of the male heading the pen are spaces for the leg-band numbers of one or more males held in reserve as substitutes in case the male chosen proves sterile or is otherwise unsatisfactory. In figure 2 a full brother and a half brother are indicated by their mating numbers as having been reserved.

To the right are spaces for the leg-band numbers of females in the pen, followed by their mating numbers and yearly egg records. Where pullets are mated, that fact may be indicated by writing "pullet" in the egg record space, or by leaving it blank.

The number of spaces allowed for females (in this case 12) may be increased where considered desirable, though keeping the number of females mated with one male comparatively small is to be recommended. Such a practice probably increases the per cent of fertile eggs, and, even more important, leads to the breeding—that is, to the applying of the progeny test—to a larger number of males.

In the space below, headed "Notes," it usually will be found desirable to make a record of any special reasons for making the whole mating or for including certain females in the pen. When very few pens are mated this is perhaps not so necessary; but even then it is very desirable, and is increasingly so in the case of extensive breeding operations where many pens are mated each succeeding year.

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3. The conventions ♂ and ♀ are used to indicate the sexes. The arrow of Mars (♂) stands for the male; and the looking glass of Venus (♀) for the female.

The reverse side of the form shown in figure 2 is shown in figure 21, and is the first page of the "Progeny and Sib Record" of that pen. This record will be discussed in a later paragraph.

#### SIRE'S RECORD.

The sire's record should furnish at least three sorts of information; viz., (1) his ancestry (or pedigree); (2) his progeny; and (3) notes on his individuality and breeding performance.

A convenient blank form for the pedigree is shown in figure 3. If of one's own breeding, so that he was pedigree hatched, it is well to give his wing-band number (to be discussed later) as well as his leg-band number, as shown in the upper right-hand corner. Leg bands are particularly likely to wear out and be lost in the case of males. The wing-band number will always be given elsewhere in the breeding record, so that any bird losing its leg band can be certainly identified even if the breeder does not know him as an individual. It is also convenient to have the wing-band number on the sire's record, and will be found to inspire confidence in actual or prospective buyers of pedigreed breeding stock.

The breed of which a given individual is a representative should always be indicated on the pedigree of any bird sold, and it is good practice to have it on all pedigrees. Where a single variety is bred, the breed and variety will usually be printed as a part of the blank. The year date, and if possible the exact date of hatching, should be indicated as shown at the upper left-hand corner of figure 3.

The pedigree of a male used as a breeder should be completely recorded for at least four generations back if possible. In beginning a pedigree record system, unless one purchases foundation stock from some one who has kept breeding records, this is of course not possible. As the successive generations follow, however, an increasingly complete ancestral record may be given. The method of tracing a pedigree as recorded in figure 3 will be described in a later paragraph.

As previously indicated—and it cannot be too strongly emphasized—the breeding value of any individual is most accurately judged by the character of his or her progeny. In breeding for high egg production the egg records of a given male's daughters are of particular value in forming a judgment concerning that male. The importance of the records of his grand daughters by his sons must not be overlooked but the first of these will not be available until a year later than the records of the daughters of his first breeding



House No. 14 White Plymouth Rock MATING Breeding Season. 1918.

♂ ♂	MATING NUMBER	♀ ♀	MATING NUMBER	EGG RECORDS	♀ ♀	MATING NUMBER	EGG RECORDS
172 M	115M2004	2004	85M506	245, 184, 179	6050	118M1950	186
RESERVES		6012	115M2006	218	6065	115M2006	253
175M	115M2004	6026	115M2006	223	6516	118M2000	Pullet
178M	115M2006	6027	115M2005	196	6547	172M6012	Pullet
		6041	117M1994	201	6551	172M6012	Pullet
		6048	117M1994	214	6560	172M6012	Pullet

NOTES This mating is made to emphasize the blood of 115M. 6041, 6048, 6050, and 6516 represent an intercross. 6547, 6551, and 6560 are daughters of 172M 2004 is 172M's dam.

If 6041's sons are vigorous, better mate the most promising one back to his mother in 1919, if her hatching record is satisfactory this season.

Better mate 6065 to her sire in 1919 if she gives a good second year production.

FIG. 2.—Record of mating.

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LEG BAND NO. 172M  
WING BAND NO. 305  
BREED *White P. Rock*

HATCHING DATE *Feb. 27, 1916.*      **SIRE'S RECORD**

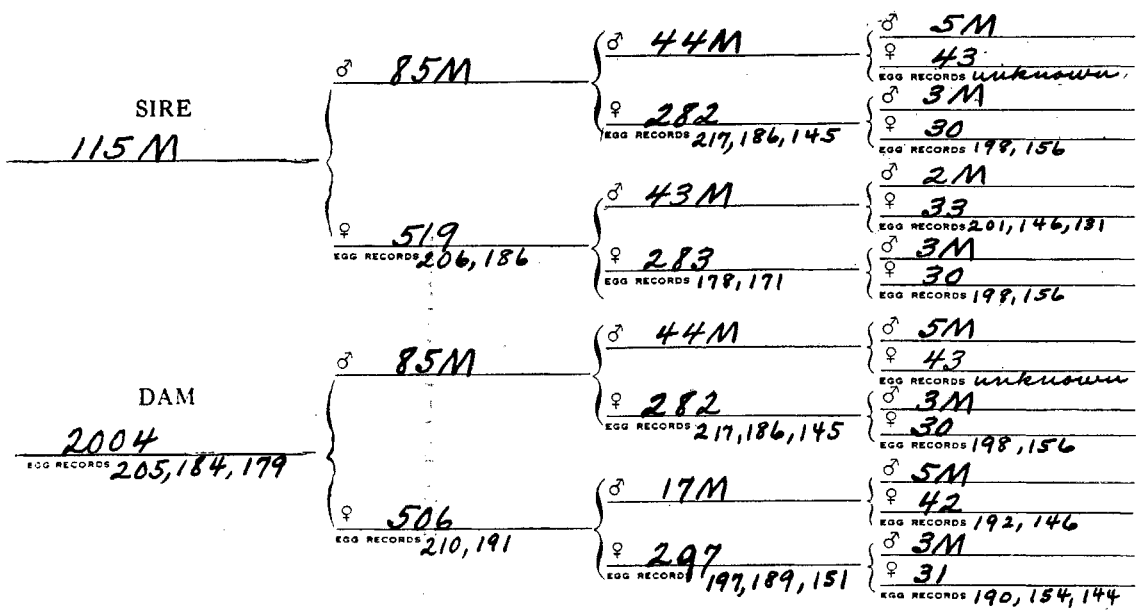


Fig. 3.—Sire's record showing pedigree.

season. It is not likely that all the sons will be mated in the breeder's own pens where a complete record of the daughters of all of them will be available.

It is a very human tendency to overemphasize the importance of a few successful daughters and underemphasize the importance of the unsuccessful ones. The sire's record should show *every daughter* (and her record) of each succeeding season that he is mated.

It is quite apparent that this record cannot be made for a sire's first daughters until after he has been mated, the daughters grown, and their records brought in, by which time the sire in question will be approaching his third breeding season. In practice, all of a given male's get in any one season will be listed in the "Progeny and Sib Record" for the pen he heads that season. When the daughters mature and are leg-banded, their numbers may be listed in numerical order in the spaces provided on the reverse side of the "Sire's Record," as shown in figure 4. The egg records of the respective daughters are entered later as they are completed.

In the space provided for "notes," brief record should be made concerning the production of the sire's sisters, the breeding performances of his brothers, the breeding performances of his sons, or other facts bearing on his value as a breeder. The usual fact that offspring out of certain females are more desirable than others should be noticed and particularly successful mates noted down. Not infrequently the space allotted for this information as shown in figure 4 will be insufficient, and must be supplemented by an additional sheet.

**DAM'S RECORD.**

The dam's record should furnish the same information concerning each female as does the sire's record, and in addition give her production record. The blank form for the purpose consist of an "Individual Egg Record" as shown in figure 5, with spaces for her ancestral records, her daughter's records, and for further notes on the reverse side as shown in figure 6. In addition it is helpful to have a system of reminder checks on the entering of the information furnished by the completed dam's record, in her sire's, dam's, sons', and daughters' records, respectively, as shown in the lower right hand corner of figure 6.

The "Individual Egg Record" gives an opportunity to see and study a whole year's production with its cycles and pauses and is

DAUGHTERS' RECORDS

NOTES

LEG BAND NO.	RECORDS	LEG BAND NO.	RECORDS	LEG BAND NO.	RECORDS	
6547	213	6619	226	7066		<i>Very like his sire in appearance and behavior. Fertility excellent season 1917. Should be mated to daughters out of daughters (6547, 6551 and 6560) if the daughters egg hatch well and the get are growthy and vigorous. Fertility during 1918 very fair but not so good as in 1917. Daughters out of 6560 appear most promising July 1918.</i>
6548	196	6620	203	7070		
6550	201	7012		7072		
6551	237	7013		7080		
6560	241	7014		7094		
6566	207	7016		7095		
6570	178	7020		7098		
6575	180	7024		7099		
6576	199	7025		8002		
6580	211	7026		8003		
6583	<i>Died before counting</i>	7027		8014		
6585	<i>156</i>	7028		8020		
6586	210	7034		8022		
6587	Sold	7035		8024		
6591	213	7040		8039		
6600	219	7042		8040		
6607	189	7050		8042		
6608	Died	7051		8049		
6610	Sold	7054		8070		
6612	114 Sold	7062		8072		
6613	206	7063		8084		
6617	191	7064		8090		

FIG. 4.—Reverse of sire's record shown in figure 3.

Breed *White P. Rock*      **INDIVIDUAL EGG RECORD** 1      YEARS 1916      TO 1917

HATCHING DATE *Mch. 15 1916*      LEG BAND No *6012*      WING BAND No *506*      MATING No *115M2006*

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	TOTALS	
																																MONTH	TO DATE
<i>Oct</i>																															3	3	
<i>Nov</i>																																11	14
<i>Dec</i>																																7	21
<i>Jan</i>																																17	38
<i>Feb</i>																																19	57
<i>Mch</i>																																21	78
<i>Apr</i>																																25	103
<i>May</i>																																19	122
<i>June</i>																																23	145
<i>July</i>																																21	166
<i>Aug</i>																																22	188
<i>Sept</i>																																24	212
<i>Oct</i>																															6	218	
PREVIOUS RECORDS	1ST					2ND					3RD					4TH					REMARKS	YEAR'S RECORD											
	5TH					6TH					7TH					8TH					<i>Nov. to Feb. (incl.) production 54 eggs.</i>	<i>218</i>											
MATED TO <i>172 M (1917)</i>																																	

FIG. 5.—Individual egg record, a part of the dam's record. The spaces just preceding the beginning of the laying year and just following the end of it, as well as the extra spaces for months having less than 31 days, are blotted out, with the aid of a stamp, when the record is started. This practice is useful in safeguarding against certain kinds of errors in recording.

♂ 115M	♂ 85M	♂ 44M	NOTES In 1917 this bird gave a fertility of 92% and a hatchability of 95% of fertile eggs set. Her eggs were run - being a little over two oz.
	♀ 519 EGG RECORDS 206-186	♀ 282 EGG RECORDS 217-186-145 ♂ 43M ♀ 283 EGG RECORDS 178-171 ♂ 44M ♀ 282 EGG RECORDS 217-186-145 ♂ 45M ♀ 284 EGG RECORDS 199-156	
♀ 2006 EGG RECORDS 221-197	♂ 85M	♂ 44M	
	♀ 505 EGG RECORDS 199-180	♀ 282 EGG RECORDS 217-186-145 ♂ 45M ♀ 284 EGG RECORDS 199-156	

DAUGHTERS' RECORDS						during the hatching season, sons and daughters grow up. Daughters better than sons.
Band No.	Record	Band No.	Record	Band No.	Record	
6547	213	7064				
6551	237	7080				
6560	241	7099				
6570	178	8003				
6583	inc.	8014				
6587	sold	8022				
6607	189					
6613	206					
6620	203					
7020						
7026						
7035						

Leg band Entered	Chick Index	<input checked="" type="checkbox"/>
	Sire's Record	<input checked="" type="checkbox"/>
Egg Record Entered	Dam's Record	<input checked="" type="checkbox"/>
	Sire's Record	<input checked="" type="checkbox"/>
	Dam's Record	<input checked="" type="checkbox"/>
	Son's Records	<input checked="" type="checkbox"/>
	Daughter's Records	<input checked="" type="checkbox"/>

FIG. 6.—Reverse of "Individual Egg Record" shown in figure 5. A part of the dam's record.

to be urged in place of simply keeping monthly and yearly totals. A further sheet is needed for each succeeding year's production. In practice the several years' records of each hen trapnested are filed together, forming a continuous record. The information given on the reverse side of the first blank serves for the entire record and need not be repeated. In cases where the spaces for daughters' records, and for notes on the first year's record sheet are not sufficient, use may be made of those on the backs of the second and later years' records.

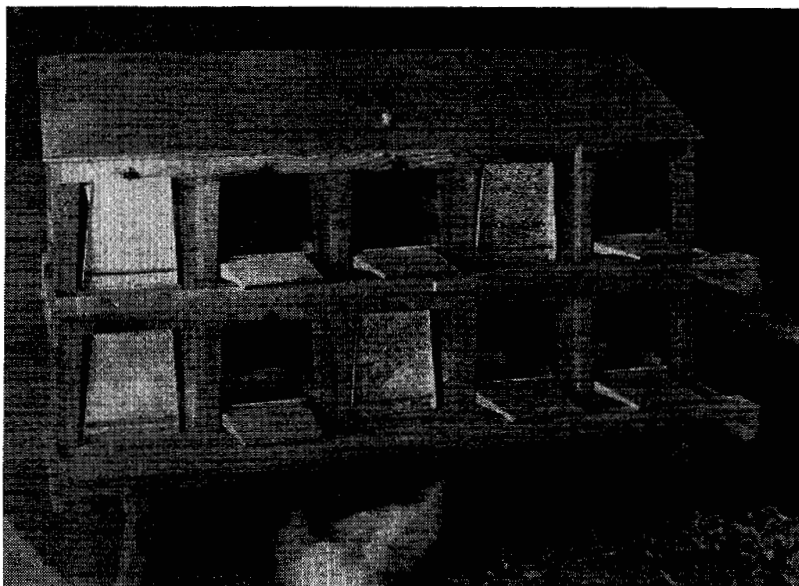


FIG. 7.—Trap nests modeled on the plan of the Purdue University nest. Door in top opens into receptacle for the eggs as taken from the nest.

#### TRAP-NESTING.

A necessary adjunct of pedigree breeding is the trap nest. While it appears to be possible to secure a reasonably accurate count of the number of eggs a given female lays by handling her each morning, no means have so far been developed of identifying an individual egg with the hen that laid it, except by making it impossible for her to leave the nest after laying until some one releases her. This gives an opportunity for the reading of her leg-band number and recording it on the egg itself.

**Daily Trap Nest Reports.**

In districts serving markets which object to figures on the shells of market eggs, it is frequently the practice to use daily trap-nest sheets. These sheets carry, in numerical order, the leg-band numbers of all hens being trapped during a given season and are hung in the pens or are carried from pen to pen by the trap-nester. The numbers may run from 1 to 300 or from 3,050 to 4,150, depending upon the range of numbers which will include all females being trapped.

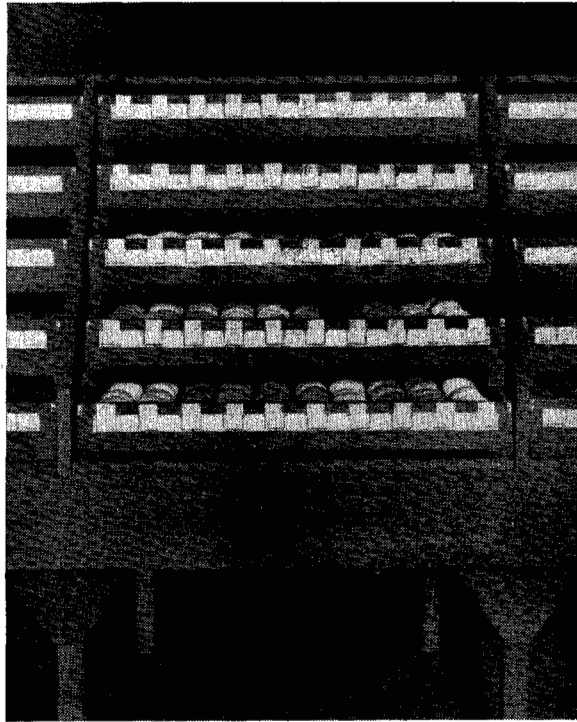


FIG. 8.—Pedigreed egg cabinet devised by Dr. H. D. Goodale. One section takes care of the eggs from 50 mated females.

When a given female, whose eggs go to market, lays, a line is drawn through her number. Nothing is written on her egg.

A new sheet (or sheets) is used each day and the individual egg records are then posted from these daily report sheets instead of from the eggs themselves.

Aside from the advantage of having to make no marks on the eggs there is the convenience of being able to post the individual egg



records at one's leisure, say once or twice a week, instead of every day. This convenience is likely to be abused, however, unless one is systematic in his work and has a regular, definite, and fairly frequent time for bringing the individual records up to date.

#### **Accuracy in Trap-Nesting.**

The trap nest that is absolutely mistake proof has not yet been devised, though there are several that are very accurate, one of which is shown in figure 7. The number of eggs laid on the floor may be reduced to from 1.5 to 3 per cent by careful management. It is not these eggs, however, which are the greatest problem from the standpoint of pedigreeing. The hen laying on the floor or dropping an egg from the perch fails to be credited with that egg, or if it is hatched the chick goes unpedigreed on its dam's side. There is a lack of information, but no misinformation. It is the wrongly credited egg that may prove serious, leading to the recording of a spurious pedigree.

Aside from the eggs laid outside the nest, errors in trap-nesting are most likely to arise through the efforts of two hens to enter the same nest at the same time. If both are successful the trap-nester discovers the situation. It is when one hen enters while the other prevents the trap door from closing that error is most likely to go undiscovered. The first hen lays and comes out. The second hen enters and is found on the nest with an egg, which is given her number. She is released, and not infrequently fails to return to the nest that day, in which case the error may not be detected. If she does return and lay, suspicion will be aroused by the appearance of two eggs bearing her number. If on comparison marked differences between the eggs were found, one would be safe, though by no means certain, in assuming that both were not laid by the same hen. If the eggs were closely similar it would be difficult to decide whether the hen had actually laid two eggs in one day (which sometimes undoubtedly occurs), or whether there was a trapnest error. In such a situation the safe course from the standpoint of pedigree accuracy, since one cannot be sure which egg belongs to the hen credited with both, is to pedigree-hatch neither, or to record the resulting chicks as the progeny of male heading the pen out of an unknown dam.

It will be found useful, when trap-nesting, to habitually write the band numbers on the small end of the egg. This part of the shell is least frequently broken by the chick as it emerges. It is

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**FLOCK BREEDING RECORD**

Band Nos. 1 to 56

LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER
1	Standard-bred Parents unknown	15	Purchased of Koons	29	Purchased of Jones	42	Standard-bred Parents unknown
2	Standard-bred Parents unknown	16	Standard-bred Parents unknown	30	Purchased of Cornell Univ.	43	Purchased of Wilson
3	Purchased of Koons	17	Standard-bred Parents unknown	31	Standard-bred Parents unknown	44	Purchased of Harris
4	Purchased of Koons	18	Purchased of Dow State College	32	Standard-bred Parents unknown	45	Standard-bred Parents unknown
5	Purchased of Koons	19	Standard-bred Parents unknown	33	Purchased of Jones	46	Purchased of Morris

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**FLOCK BREEDING RECORD**

Band Nos. 281 to 336

LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER
281	1M28	295	3M31	309	5M43	323	1M15
282	3M30	296	3M32	310	2M33	324	1M27
283	3M30	297	3M31	311	3M30	325	1M29
284	1M29	298	1M27	312	2M31		

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**FLOCK BREEDING RECORD**

Band Nos. 505 to 560

LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER

Kansas Agricultural Experiment Station  
Poultry Department,

FLOCK BREEDING RECORD

Band Nos. 19.1.1 to 19.1.2

LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER

Kansas Agricultural Experiment Station  
Poultry Department

FLOCK BREEDING RECORD

Band Nos. 19.6.1 to 20.1.6

LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER
1961	85M505	1975	85M505	1989	84M499	2003	84M498
1962	84M500	1976	85M506	1990	85M505	2004	85M506
1963	84M499	1977	84M498	1991	86M450	2005	85M505

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Poultry Department

FLOCK BREEDING RECORD

Band Nos. 59.6.9 to 60.2.4

LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER
5969	118M1950	5983	115M2006	5997	117M1994	6011	115M2005
5970	118M1951	5984	115M2005	5998	117M1994	6012	115M2006
5971	118M1950	5985	117M1994	5999	115M2006		
5972	118M1950						

Fig. 9.—Flock breeding record for females.

in fact so seldom destroyed as to make it unnecessary to include identifying labels in the pedigree trays or sacks.

#### **IDENTIFYING WRONGLY NUMBERED EGGS.**

In order to discover, if possible, the few eggs which are credited to the wrong females during the breeding season, and which if hatched would be entered on the records as the progeny of the wrong dam, provision should be made for the inspection and comparison of all eggs that have been credited to each female and that have been saved for hatching. This should be done every time eggs are put into the incubator, and may be done most conveniently by assembling the eggs of each female, as a matter of routine, as they are brought in and recorded.

One section of a home-made cabinet for this purpose, devised by Dr. H. D. Goodale at the Massachusetts Agricultural Experiment Station, is shown in figure 8. It is a chest of trays fitted with grooves so that the eggs lie in rows, one groove being reserved for each mated female and bearing a label with her leg-band number. Each egg, after being recorded in the proper egg record, is slipped into the front end of the groove bearing its number. If there are eggs already in the groove these are rolled back and thus automatically turned. When "setting day" comes, all the eggs of each mated female are found together, and after being carefully scrutinized are put into the incubator tray together,

If on inspection the eggs in any one groove are found to be closely similar in shape, shell texture, and color (in the case of eggs from breeds showing variation in shell color), it is probable that no mistake has been made. If an egg that is noticeably different from the others in several particulars is found, it is safe to assume that an error has been made. Such an egg should be discarded, or its number changed from that of the female to that of the male heading the pen, so that it will be recorded as the offspring of the certainly known parent only.

#### **PEDIGREE HATCHING.**

In so incubating eggs that the chicks out of each hen may be identified, ordinary practice is followed until the eighteenth day of the incubation period, with two exceptions. First, it saves time later if care is taken that all eggs that have accumulated from any one hen go into the same egg tray. Second, the second testing for live eggs should be delayed until the eighteenth day. Or if preferred,

the customary fourteenth day testing may be made, and a third test made on the eighteenth day.

The reason for this is that a considerable proportion of the fertile eggs which die do so between the seventh and eighteenth, or between

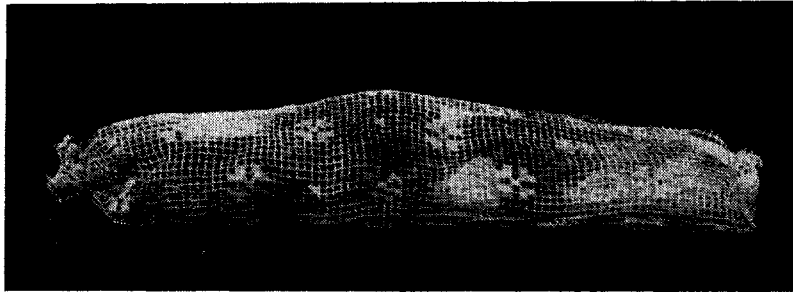


FIG. 10.—Pedigree sack with seven chicks from seven eggs set.

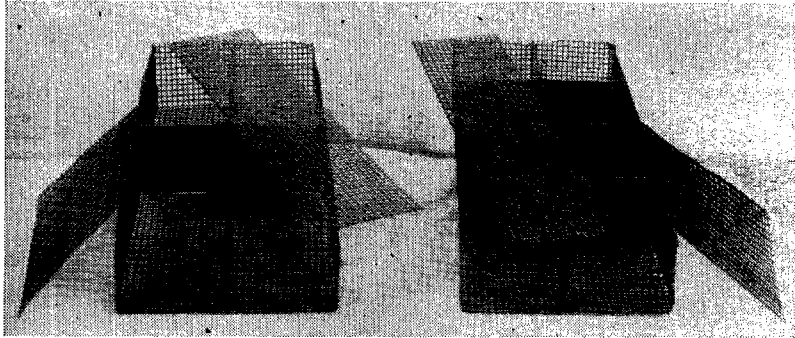
the fourteenth and eighteenth days (shown by Payne<sup>4</sup> to be about 35 per cent and 19 per cent, respectively). No dead eggs should be left to be carried through the pedigree hatching process.



FIG. 11.—Egg tray full of pedigreed chicks in sacks.

On the eighteenth day the eggs of each mated female are all put in a separate sack, small tray, or wire basket (figs. 10, 11, 12 and 13), so arranged that the chicks cannot escape after hatching and can be identified with their mother by the numbers on the shells.

4. Payne, L. F. Distribution of mortality during the period of incubation. *Journal of American Association of Instructors and Investigators in Poultry Husbandry.* 6:9-12. 1917.

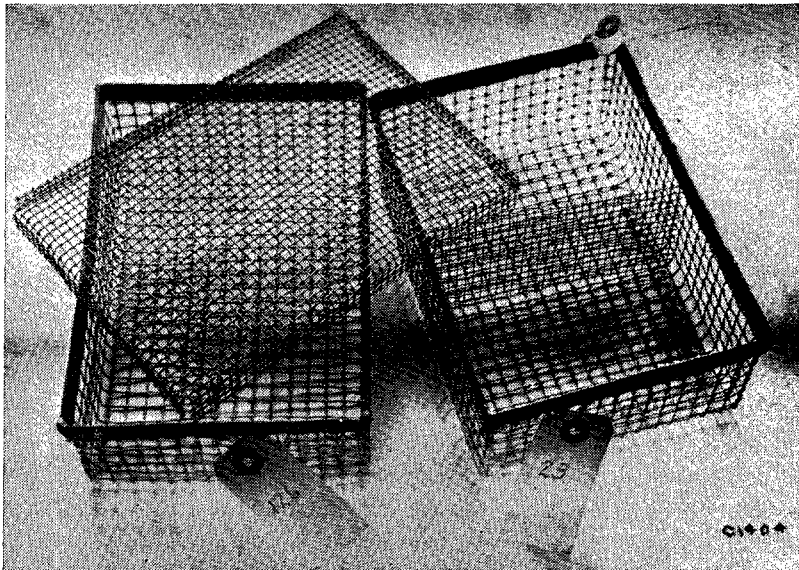


*Courtesy Hollywood Farms.*

FIG. 12.—Home-made pedigree baskets.

#### HATCHING RECORD.

The record of a given female's performance as a breeder is quite incomplete unless it includes her hatching record. So much emphasis has been given to a hen's ability as a producer of eggs that the question of her ability as a reproducer of chicks has been largely overlooked. A first requisite of an individual's success as a breeder



*Courtesy Maine Agricultural Experiment Station.*

FIG. 13.—Another style of pedigree basket.

is that it shall be an efficient reproducer. Sterility or a tendency toward sterility on the part of a male will usually be noticed because it affects the hatching record of a whole breeding pen. But low hatching power of the eggs of an individual female, and, conversely, exceptionally high hatching power of another individual female in the same pen, are likely to go unnoticed unless the relationship between the number of eggs set from each individual and the number of chicks hatched during an entire season is a matter of record. Whether the eggs failing to hatch do so because of actual infertility or to a failure of the fertile eggs to hatch should also be recorded. The hatching per cent of a given pen may frequently be considerably increased by the removal of a few hens which are producing numerous unhatchable eggs. What is more important, the likelihood of making poor hatchability of eggs an inherent quality of one's flock may be very much lessened.

A convenient blank form for keeping such a record is shown in figure 14 and is largely self-explanatory. On March 7, for instance, seven eggs from hen 6003 mated with 180M were set. One of them was infertile, none were taken out the first test as dead, but one was dead at the second test, and another failed to get out of the shell; there were no cripples, and four vigorous chicks were hatched on March 28. The calculations of this hen's hatching performance for the season are given at the bottom of the page.

#### **MARKING AND RECORDING THE CHICKS.**

After the hatch is over, the next step is to mark the chicks. This is done by a small numbered band placed on the leg or in the wing. Usually when leg banding is practiced, the band is later changed from the leg to the wing, where it remains during the life of the bird. If left on the leg it must be loosened from time to time as the chick grows, or it causes lameness, soon followed by deformity. In a comparatively short time the small band is outgrown and must be replaced by a larger one, which with some breeds must in turn be replaced by a still larger leg band. Considerable labor is saved during the busy hatching and rearing season if at the time a band is first loosened it is taken from the leg and slipped through an incision made in the skin of the web of the wing (figure 15), where it remains permanently.

The labor of changing the bands from the leg to the wing, a considerable item where large numbers of chicks are handled, is saved if the bands are placed in the wing at hatching time, as is being

done in figure 16. The band in place is shown in figure 17, and on a mature bird in figure 18. In either case a small per cent of bands are lost, and therewith the identity of the chicks.

INDIVIDUAL HATCHING RECORD Season of 1918  
KANSAS AGRICULTURAL EXPERIMENT STATION

Mated with 180 M		Legband 6003								
Date Set	Numbers Set	Infertiles	Dead Germs (1)	Dead Germs (2)	Dead in Shell	Cripples	Vigorous Chicks	Date Hatched	Remarks	
2/14	3		1		1		1	3/7	Eggs a	
2/21	6				1	1	4	3/14	triple	
2/28	5		1	1			3	3/21	thin shells	
3/7	7	1		1	1		4	3/28		
3/14	4		1				3	4/4		
3/21	5				1		4	4/11		
3/28	4	1	1				2	4/18		
4/4	5				2		3	4/25		
4/11	5			1			4	5/2		
4/18	3		1				2	5/9		
4/25	6	1			2		3	5/16		
Total Number of Eggs Set							53			
Number of Infertiles							3			
Number of Fertiles							50			
Per Cent Fertility							94.3			
Number of Fertiles Not Hatched							16			
Number of Fertiles Hatched							34			
Per Cent of Fertiles Hatched							68.0			
Per Cent of Total Eggs Hatched							64.2			

FIG. 14.—Individual hatching record—a part of the dam's record.





FIG. 15.—Wing band in place on partly grown chick.



FIG. 16.—Making the incision for a wing band in the wing of a newly hatched chick.

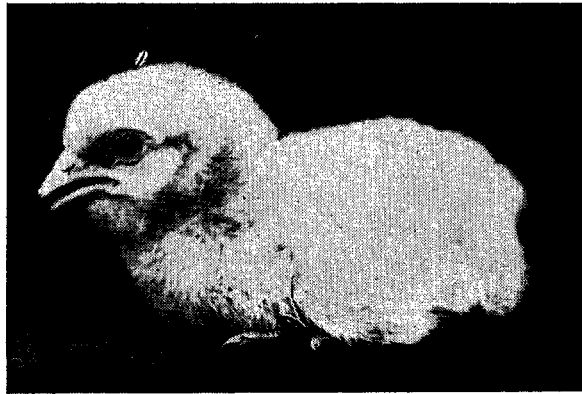


FIG. 17.—Wing band in place on a newly hatched chick.

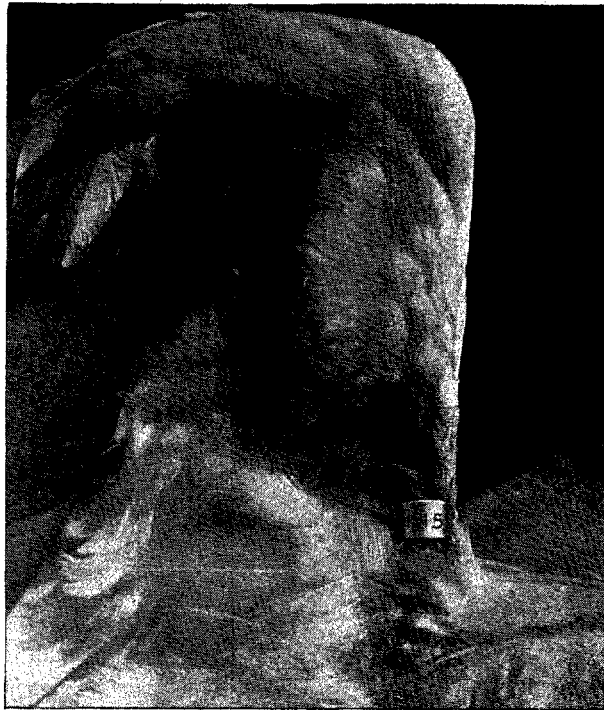


FIG. 18.—Wing band as it appears on a mature bird.

It has not been determined by careful experiment dealing with large numbers, whether early or late wing-banding is the more efficient. As the result of experience in marking many thousands of chicks by both methods at the Kansas Agricultural Experiment Sta-

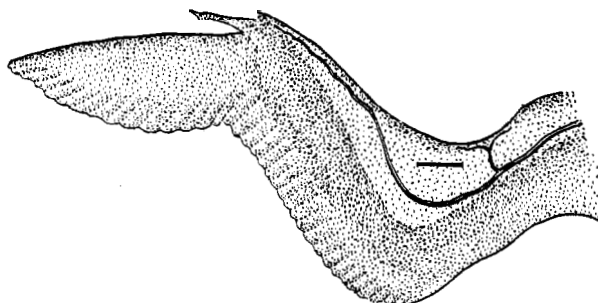


FIG. 19.—Sketch of wing, showing where the incision should be made.



FIG. 20.—A wing band, improperly placed, which has slipped around the wrist joint of the wing of a three-weeks-old chick

tion, the practice of first putting the chick band on the leg was discontinued. The chicks are now wing-banded as they are taken from the pedigree sacks. If properly done, the insertion of the wing bands causes little discomfort, almost no bleeding, and the bands need no

Breed W. P. Rock

PROGENY AND SIB RECORD

Sire No. 172M Breeding Season 1918

DAM NO 2004		DAM NO 6012		DAM NO 6026		DAM NO 6027		DAM NO 6041		DAM NO 6048	
LEG BAND NO	WING BAND NO	LEG BAND NO	WING BAND NO	LEG BAND NO	WING BAND NO	LEG BAND NO	WING BAND NO	LEG BAND NO	WING BAND NO	LEG BAND NO	WING BAND NO
7012	1401	Dead	735	8042	641	Sold	1216	Sold	637	7028	978
Sold	1402	8014	736	Sold	642	7034	1217	7070	638	Dead	979
8020	1605	Sold	737	7072	1423	Dead	1218	7040	639	7014	980
7094	1606	7035	1376	7063	1424	Dead	1419	212M	640	Sold	1397
8039	1607	7026	1377	Dead	1425	7027	1420	Sold	1284	214M	1398
7024	2184	7099	1642	8040	1426	210M	1421	Sold	1285	7042	2022
208M	2185	7064	1643	7054	2269	7013	1422	7098	2084	7095	2023
Dead	2382	7080	1644	Dead	2270	Sold	1958	7066	2085		
Sold	2383	7020	1645	8024	2340	8002	1959	Sold	2086		
8049	2384	8003	2278	230M	2341	216M	1960				
		Dead	2279	Sold	2342	Sold	2293				
		8022	2280			8070	2294				
						Dead	2295				

FIG. 21.—Progeny and sib record appearing on the reverse side of the mating record (figure 2).

further attention. If not properly placed (figure 19) they may slip around the wrist joint of the wing, as shown in figure 20, where as the wing grows they cause great discomfort, and ultimately a deformity of the wing.

The wing bands are numbered serially. Owing to their small size it is undesirable to have the figures run up into many places. This may be avoided by having the numbers begin with 1 each season, and having the year date appear on each band in small numerals, as shown in figure 1. In this way no confusion arises through using the same series of numbers season after season.

At the time the chick is banded the number on the band should be recorded with its mating number. If the chicks are recorded by matings in the Progeny and Sib Record, the first page of which is the reverse side of the Mating Record (figure 21), it is necessary only to record the wing-band number in the column of the proper dam.

It will save time at a very busy season, however, if use is made of a blank form as shown in figure 22, called the "Chick Index," and the wing-band numbers entered serially in advance. It is then necessary only to enter the mating number of each chick as it is banded, opposite the number of the wing band it has been given. The bands are used serially, having previously been strung in order. At some later and less busy season, after the stock is mature enough for leg-banding, the Progeny and Sib Record may be made up from the Chick Index.

Two forms of the Chick Index are shown in figures 22 and 23. The first is more compact and saves space. The second makes allowance for entering brief but often very valuable notes, made from time to time during the progress of rearing.

#### **LEG-BANDING.**

While the wing band furnishes an accurate means of identifying individuals, it is not a quick and convenient one. The wing band is small, and on the adult bird is hidden among the contour feathers of the wing. To lay back these feathers so that the number may be read when trap-nesting takes so much time as to be impractical. On this account birds are marked a second time with leg bands, as described on page 6.

There are numerous methods of numbering these adult bands, several of which are perhaps equally good. With any method it should be a cardinal principle that numbers are never duplicated. Some

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Poultry Department

### CHICK INDEX

NUMBERS 1375 TO 1411  
DATE HATCHED Apr. 12, 1918.  
NUMBERS 1412 TO 1430  
DATE HATCHED Apr. 19, 1918.

WING BAND NO	MATING NUMBER	LEG BAND NO	WING BAND NO	MATING NUMBER	LEG BAND NO	WING BAND NO	MATING NUMBER	LEG BAND NO	WING BAND NO	MATING NUMBER	LEG BAND NO
1375	180M 6140	7019	1389	180M 6023	215M	1403	172M 6065	Die- appeared	1417	190M 6220	235M
1376	172M 6012	7035	1390	184M 6049	Died	1404	172M 6065	7050	1418	190M 6220	7068
1377	172M 6012	7026	1391	184M 6049	7071	1405	172M 6065	7016	1419	172M 6027	Died
1378	184M 6213	Died	1392	184M 6049	Sold	1406	172M 6065	203M	1420	172M 6027	7027
1379	184M 6213	Sold	1393	184M 6049	7011	1407	172M 6065	Sold	1421	172M 6027	210M
1380	180M 6005	7065	1394	184M 6350	224M	1408	172M 6560	Died	1422	172M 6027	7013
1381	180M 6005	209M	1395	184M 6350	7022	1409	172M 6560	7062	1423	172M 6026	7072
1382	172M 6547	8072	1396	184M 6350	Died	1410	172M 6560	7051	1424	172M 6026	7063
1383	172M 6547	8090	1397	172M 6048	Sold	1411	172M 6560	7025	1425	172M 6026	Died
1384	172M 6041	Sold	1398	172M 6048	214M	1412	180M 6003	7017	1426	172M 6026	8040
1385	172M 6041	Sold	1399	180M 6382	7028	1413	180M 6003	Not Banded	1427	184M 6047	8016
1386	180M 6023	7055	1400	180M 6382	220M	1414	180M 6003	7023	1428	184M 6047	Sold
1387	180M 6023	7092	1401	172M 2004	7012	1415	190M 6220	250M	1429	190M 6289	7073
1388	180M 6023	Died	1402	172M 2004	Sold	1416	190M 6220	7096	1430	190M 6289	241M

FIG. 22.—Compact form of chick index.

leg-band manufacturers recognize this fact to the extent of refusing to sell duplicate bands to a breeder, thereby rendering a valuable but not always appreciated service to beginners.

Some breeders prefer to make the wing-band and leg-band numbers correspond. While such a practice is convenient in some ways, in the long run it is of doubtful value. Unless the method of numbering leg bands suggested above for wing bands, or its equivalent, is resorted to so as to keep the size of the numbers comparatively small, in a few years they will become too large to find space on the wing band.

While such a scheme works very well for wing bands whose numbers are copied on the records a very few times, and in such a way that the year date need appear but once on a page containing many wing-band numbers, the situation is very different with leg-band numbers. Those of the females must be written on the eggs many times, during the breeding season at least, and many more times on pedigrees. In either case the numbers under such a method are needlessly cumbersome and unwieldy.

On the other hand, if the wing bands were to be numbered in series continuing from year to year as suggested for the leg bands, the breeder would be forced to one of two alternatives. He must either waste many leg bands or do his own leg-band numbering. In the best-bred flocks under the most approved methods of management, a larger or smaller number of pedigreed chicks die or are discarded as unfit for survival. Each dead or discarded chick carries a number which cannot be used for adult birds. If ready-numbered leg bands are used, the ones carrying these numbers must be thrown away. If one makes it a practice to buy blank bands and number them himself, a service which can be economically performed by some one else, there are wasted numbers which force the size of the numbers up with undue rapidity, hastening the day when a letter must be used on the female leg bands and changed from time to time in the interest of shorter and less unwieldy numbers. Thus when the number 9,999 was reached, if it seemed undesirable to extend the numbers to another place, as would be necessary with 10,000, a new start could be made with A1. A hen with this number mated with 906M would appear thus—906MA1—in the mating numbers of her chicks. It will be obvious that if the wing-band and leg-band numbers agree, the columns in the "Chick Index" headed "Leg Band No." are unnecessary.

With the scheme of numbering used in this circular, when the

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### CHICK INDEX

NUMBERS 1401 TO 1411  
DATE HATCHED *Apr. 12, 1918.*  
NUMBERS 1412 TO 1414  
DATE HATCHED *Apr. 19, 1918.*

Wing Band No.	Mating Number	Leg Band No.	Notes
1401	172M2004	7012	
1402	172M2004		♂ Sold to Geo. Hemphill
1403	172M6065		Disappeared on free range
1404	172M6065	7050	
1405	172M6065	7016	
1406	172M6065	203M	July 15, Most promising chl. of his age at 9 mo. <sup>Save for</sup> own feeding
1407	172M6065		♂ Sold to John Everhardy
1408	172M6560		Died at 2 mo.
1409	172M6560	7062	
1410	172M6560	7051	Sept. 16, Coming into laying at 5 mo.
1411	172M6560	7025	
1412	180M6003	7017	
1413	180M6003		♀ Weak, not legbanded
1414	180M6003	7023	

FIG. 23.—Chick index with notes.



pullets are put in the laying house in the fall and the best cockerels are reserved as possible breeders, the leg-band numbers given must be recorded opposite the respective wing-band numbers. The cockerels destined for sale as breeders, and this also applies to any pullets to be sold, should not be leg-banded. Purchasers will wish to use their own leg bands, and the identity of the birds may be determined by the wing bands.

### TRACING PEDIGREES.

Where a sire's record is kept for every male used as a breeder, and individual egg records are used for all females trap-nested, it is unnecessary to keep a separate flock breeding record corresponding to the official herdbooks of other pure-bred live stock. Such a record is automatically kept by the two records named above. Each chick hatched has its mating number, which makes known its sire and dam. The sire's record (figure 2) shows the sire's mating number, which makes known the chick's paternal grandsire and granddam. The dam's egg record (figure 5) shows her mating number. The mating numbers of the grandparents will be shown on their respective records and the numbers of the eight great-grandparents learned. The mating numbers of these individuals in turn will appear on their records, and so the ancestry may be traced back to the foundation breeders of the flock, or to those individuals which were the first recorded.

For the sake of making clear the use of the mating number in writing pedigrees, without unduly increasing the number of illustrations, as would be necessary to show all the sires' records and egg records of the individuals involved, pages from a "Flock Breeding Record" are shown in figures 9 and 24, from which the pedigree in the "Sire's Record" shown in figure 3 may be traced. It should be clearly understood, however, that these figures are for convenience of illustration only and are not essential to keeping a complete breeding record unless one is not keeping egg records. In this case the "Flock Breeding Record" would be necessary for the females.

### POULTRY BREEDING RECORD BLANKS.

In order to encourage the keeping of poultry breeding records, copies of the blanks shown in this circular will be furnished without cost to Kansas breeders who will indicate the numbers of females to be trap-nested and pens to be mated. Address: Department of Poultry Husbandry, Kansas State Agricultural College, Manhattan, Kansas.

Kansas Agricultural Experiment Station  
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**FLOCK BREEDING RECORD**

Band Nos. 1M.....to..56M..

LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER
1M	Purchased of Wm. of Wisc.	15M	1M16	29M	5M43	43M	2M33
2M	Purchased of Langford	16M	3M27	30M	5M44	44M	5M43
3M	Purchased of Langford	17M	5M42	31M	3M27	45M	1M15
4M	Purchased of Kelly	18M	1M16	32M	1M45		
5M	Purchased of Wisc.	19M					

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**FLOCK BREEDING RECORD**

Band Nos. 57M..to..112M

LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER
		77M	43M283	85M	44M282	99M	45M284
						100M	45M284

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**FLOCK BREEDING RECORD**

Band Nos. 113M..to..180M

LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER	LEG BAND NUMBER	MATING NUMBER
113M	84M500	127M	99M613	141M	85M520	169M	84M500
114M	85M505	128M	100M621	142M	85M521	170M	100M1079
115M	85M519	129M	84M501	143M	84M500	171M	99M1802
116M	85M519	130M	84M500	144M	84M501	172M	115M2004

Fig. 24.—Flock breeding record for males.