DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

POULTRY DIVISION

REPORT OF THE DOMINION POULTRY HUSBANDMAN

F. C. ELFORD

FOR THE YEAR 1923

Office Building—Poultry Division

Printed by Authority of Hon. W. R. Motherwell, Minister of Agriculture
Ottawa, 1924

OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1924

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ANNUAL REPORT

POULTRY DIVISION, EXPERIMENTAL FARMS

1923

CANADIAN CONDITIONS

In a general way poultry conditions this year in Canada were normal. The spring of 1923 was cold and backward and the early hatches were very unsatisfactory. The cool summer, however, gave excellent growth, so that the percentage of matured pullets in the fall was larger than the spring hatches promised. The mild fall and winter up to the end of the year meant heavy production, so heavy that there were some stores in Ottawa that were getting sufficient new-laid eggs in December to supply their local demand. As a consequence, the prices have fallen somewhat during the close of 1923. Egg prices in general for the past two years have been on the down grade, but the 1923 drop has been very slight compared with that of 1922.

Meat prices during the spring and summer were good, but there has not been such a slaughter of poultry meat prices for years as occurred during the last two weeks of this year. On the Ottawa market, crate-fed cockerels weighing five to six pounds were being sold the week before Christmas at twenty-one to twenty-six cents. Turkeys were bringing as low as twenty-four cents, and at "turkey fairs" in the Ottawa Valley, as low as eighteen cents per pound was paid for prime turkeys.

In our last year's report it was noted that the turkey crop was increasing, and though there are no figures to show just what the production is, the indications are that the crop was much larger this year than usual. The large crop, the mild weather, and the fact that very few turkeys were exported this year, account to a great extent for the low prices.

These prices may mean that many who raise turkeys this year will not grow so many next year, because the "bottom has fallen out of the turkey market." Still cheap turkeys are not an unmixed evil, even to the producer; turkeys have been so high in the past that comparatively few could afford to eat them, even for Christmas, but the low prices this year may tend to reintroduce the turkey at the family reunions, and even though the price goes up, as it surely will, the turkey may still find a place in the holiday menu.

But is there any reason why these prices should have been so low? Weather conditions and the lack of export cannot be helped by the producer, nor can the abundant crop be helped at the time of marketing, but still, the producer was responsible to a certain extent for the unprofitable returns received this year for his turkey crop. He should not have put them all on to the market at the one time, even though it was Christmas. Take the Ottawa market as a sample; good turkeys were quite scarce up until about a week before Christmas, and what were offered brought a good price, but within a few days of Christmas they came in in such quantities that the prices went away down, (one farmer offering a large load at 15 cents per pound without a buyer) while for New Years there were none. By the Saturday noon (before New Years Day)

there was hardly a fresh turkey in Ottawa for sale, and very poor cold storage birds were bringing 35 cents a pound, dealers complaining that they could sell any number of fresh turkeys at good prices, but were unable to get them.

Similar conditions, to a greater or lesser degree, occur every year, and still comparatively few producers attempt to get their birds ready for the early trade or for the after-New Year trade, when prices are usually better. If turkey growers, instead of quitting because of the low prices received, would learn a lesson from this year's experience and give more thought as to when to market, there need not be a repetition of what was experienced this season, not only in Ottawa, but throughout the whole Dominion.

THE WORK OF THE DIVISION

CENTRAL FARM

No chicks were reared upon the central plant this year. They were brooded in the brooder house and the colony brooders until they were about two months old, when the broilers were culled out and sold and all pullets and the cockerels that were intended for breeders were taken out to the country where they were reared on free range. Because of the limited space upon the Central plant and the fact that it has had chicks and adult fowl upon it for so many years, it was thought best to give it a rest for the one season and utilize the time to cultivate and sweeten the soil. As a result, no birds were allowed on the land from the middle of June until the middle of September.

BRANCH FARMS

Good progress is being made upon the Branch Farms; the amount of experimental work conducted is increasing and the breeding work upon the whole farm system is demonstrating its value by increased production and the ability of pedigreed stock to reproduce good producers. As the breeding work continues, better houses for the purpose are being provided; the young birds are given range during the growing period, the size and stamina of the birds thus being maintained, and, in some cases, increased. By careful mating, the egg size is also increased. The work with turkeys and waterfowl has been extended throughout the system, and especially is this so with turkeys.

The work of the Branch farm is complementary to that carried on by all other poultry agencies. More and more is the Branch Farm becoming the centre for local poultry activities, and the medium through which poultry information is obtained and from which it is given out by provincial officers, and other federal men as well as our own.

LIST OF STOCK

On November 30, there was a total of 7,960 hens, 99 turkeys, 48 geese and 217 ducks on the Experimental Farms system. The breeds represented, with the number of hens were: Barred Plymouth Rocks, 4,573; White Leghorns, 1,582; White Wyandottes, 1,394 and Rhode Island Reds, 414.

BREEDING

The breeding work, not only on the Central Farm, but on the whole farm system, is progressing favourably. Bred-to-lay lines of the most popular varieties are being established and a mass of data collected that will yield valuable information.

In last year's report, emphasis was placed upon the value of the male in breeding for high egg production, and an incident given showing a concrete example. This year this point is stressed again, to suggest to the man who does not trap-nest how best he can breed up his flock, and to the man who uses the trap nest we are emphasizing the value of the progeny test to ascertain the capabilities of the offspring.

THE MALE BIRD

Too much emphasis cannot be placed upon the value of the male in breeding for any desired character. At one time there may have been a doubt as to what many poultrymen were breeding for, but now it can be safely taken that most poultry breeders are after increased production. As the experimental Farms, Agricultural colleges, and certain private breeders, have had this in view for years, and have established high producing lines, there should be no difficulty in securing suitable males. The egg laying contests and registration are establishing standards that make it possible for the man who wants to improve his flock yield to know just where to secure the stock and also what he is buying.

Cockerels with good pedigree,—generations of prepotent high producers behind them—are the birds that transmit high production to their pullets, and consequently pedigreed birds should be used if they are available.

HOW TO PROCEED

In improving the production of any flock there are several ways to proceed —new breeding stock, breeding eggs, day-old chicks, or new male birds. No matter which of the first three methods is adopted, the average poultryman should secure males each year. In getting the males, care should be taken that they are secured from a reliable breeder who has been pedigreeing his birds for years, and the birds themselves selected because of the individual pedigree and standard qualifications. These birds should be purchased in the fall, and if the breeder selected is what he ought to be, it is well to go back to him each succeeding fall for the male birds.

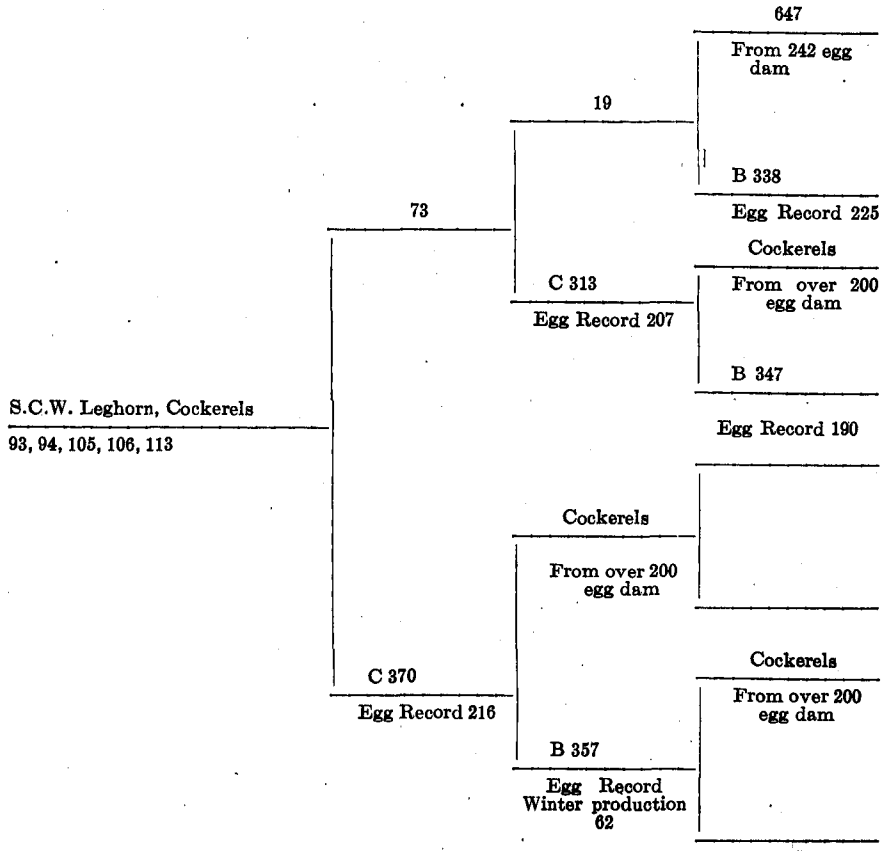
THE FEMALES

In selecting the females each year for breeding it is a good plan to mark with a leg band the pullets that do the early winter laying (they can be told by their red appearance and active manner), and when the next year's breeders are to be selected, to keep the birds that have the band, and only the best of them. These can be culled in July or August and again before the breeding season. If the poultryman lacks the necessary knowledge, a good culler might be obtained to give a demonstration.

THE PROGENY TEST

The inauguration of registration for poultry has given pedigree breeding a great stimulus, and it might be well, at this time, to point out the necessity for using the progeny test on all breeders before disposing of them, as frequently where this is not done the most valuable breeder of the season is disposed of before its value is realized. Because a number of males are identical in pedigree it does not follow that they are all equally good breeders.

To illustrate this, take the case of five full brothers, S.C. White Leghorns, that were used in breeding work at the Central Farm in 1922.



These five brothers were used in the breeding season of 1922. The production of the birds to which they were mated, the number of daughters and their average production are given in the following table:—

TABLE SHOWING SUMMARY OF MATING

Cockerel Number	Number hens mated	Average production	Number daughters	Average production of daughters
93	4	213	9	180
94	11	169	37	164
105	2	220	11	184
106	3	202	5	179
113	8	228	22	168

Male No. 93 was mated to a pen averaging 213 eggs. He was selected for this mating because he was considered the best of the brothers.

Male No. 94 was mated to a pen of very ordinary high producing hens (169 eggs). Whereas, the other brothers were stud-mated to pullets except male No. 113, which was pen-mated to pullets.

In looking over the progeny records (not shown in the table) it is noted that male No. 94 not only gave a much greater number of daughters, but that with certain hens he gave a very high percentage of high-laying daughters.

In this connection, the great difference in the apparent breeding ability of the males when mated with different females might be pointed out. For instance, male No. 94 mated with E 297, a female which laid 172 eggs in her pullet year, gave daughters every one of which was capable of laying over 200 eggs in the pullet year. The same male mated to E 346, a female which laid 191 eggs in her pullet year, also gave a very high percentage of high layers; but when he was mated to E 304, a 177-egg hen, he produced six daughters, one of which died before she showed what she could do, and of the other five, not one laid 150 eggs. Again, take male No. 93: when mated to B 50/6, a 200-egg hen, he produced three daughters, every one of which was a high producer, whereas when mated to C 405, a 215-egg hen, he gave three daughters, only one of which was a high producer.

YEARLY PERCENTAGE OF FIRST YEAR'S YIELD

It is generally conceded that females past the pullet age make the most satisfactory breeders, but there is more or less controversy as to the advisability of holding females past the pullet year for eggs only.

The following table, while showing only females that have laid 150 eggs or better in their first year's production, will give a fairly accurate idea of the behaviour of females that might be held over for production purposes.

It is true that these females were held over for breeding purposes rather than for eggs, and had they been fed and handled for egg production the percentages of first year's production would have been considerably higher. However, the figures should be an indication of the least that might be expected.

It therefore resolves itself into the question of how many eggs a bird will need to produce before it can be kept at a profit, and how great a profit the poultry keeper will be satisfied with. For instance, the average production of the Leghorns for the first year was 180 eggs, for the second year it was 60·8 per cent of 180 or 109 eggs. If it takes the value of 60 eggs to cover the cost of feed for one year, the number of eggs over this required to give a profit which the poultry keeper will consider as satisfactory, will determine whether the birds should be kept over the first, second, or more years, not forgetting that an old bird takes the place of a pullet.

TABLE SHOWING AVERAGE YEARLY PRODUCTION THROUGH THE HEN'S LIFE

—	—	1st	2nd	3rd	4th	5th	6th
Leghorns—150-200 eggs	Number of birds	328	206	83	37	11	2
	Average production	171	108	95	71	90	107
	Yearly average based on 100 1st year	100	63·1	55·5	41·5	52·6	62·5
Leghorns—200 eggs	Number of birds	76	60	18	9	6	2
	Average production	217	117	119	90	78	54
	Yearly average based on 100 1st year	100	53·9	54·8	41·5	35·9	24·9
Leghorns—Total	Number of birds	404	266	101	46	17	4
	Average production	180	109	99	75	86	80
	Yearly average based on 100 1st year	100	60·8	55·1	41·7	47·9	44·7
B. Rocks—150-200 eggs	Number of birds	102	76	29	8	2	.....
	Average production	171	106	94	75	77	.....
	Yearly average based on 100 1st year	100	61·8	54·6	43·8	45·3	.....
B. Rocks—200 eggs	Number of birds	33	28	9	4	.....	.....
	Average production	216	129	117	54	.....	.....
	Yearly average based on 100 1st year	100	59·7	54·3	25·3	.....	.....
B. Rocks—Total	Number of birds	135	104	38	12	2	.....
	Average production	182	112	99	68	77	.....
	Yearly average based on 100 1st year	100	61·5	54·5	37·5	42·6	.....

NOTE.—The most marked drop in average yield is between the first and second year; the variation in the succeeding years is so slight that if it is worth keeping a hen for her second year, it may be for several years longer, providing she lives.

CHICK FEEDS AND FEEDING

Faulty methods of feeding, and unsuitable feeds, are undoubtedly responsible for a large percentage of the mortality among artificially hatched chicks during the brooder period. To obtain information on this subject, a series of experiments was carried on in 1920, comparing the results obtained by feeding meat, eggs, milk, and greens (both singly and in combination) with a basal ration. Details of these experiments were given in the Annual Report of the Dominion Poultry Husbandman for the year ending March 31, 1921.

This year, further experiments were conducted, covering various feeds and methods of feeding, and a special series was undertaken with certain feeds considered to be high or low in vitamine content. The feeds used in this experiment that are considered to be high in vitamines are tomatoes, yeast, raw liver, cod liver oil, and egg yolk, while rice was taken as one low in vitamines.

STOCK AND HOUSING

Except where otherwise stated, the stock consisted of White Leghorn chicks, hatched in the Mammoth Buckeye Incubator and housed in the pipe brooder house. The experiments lasted three weeks; the chicks were weighed at the beginning and at the end of each week during the experiment, and the daily mortality was noted.

The feeds, etc., under experiment included skim-milk, sweet and sour; whole milk, sweet and sour; water; canned tomatoes; yeast, both dry and in cakes; rice, both dry and boiled; curds; raw liver; egg yolk; and cod liver oil.

The details of each experiment are given separately, together with mortality tables and remarks in connection therewith.

SKIM-MILK VS. WHOLE MILK VS. WATER

Five pens of one hundred chicks each were used, all fed exactly alike, except that whereas sour skim-milk was given in pen No. 1, sweet skim-milk, sweet whole milk, sour whole milk, and water respectively, were substituted for it in pens 3, 4, 5 and 6.

TABLE SHOWING RESULTS OF SKIM-MILK, WHOLE MILK AND WATER ON BROODER CHICKS

Pen	Drink	Number at beginning	Number at end	Mortality	Average gain per chick
					oz.
1	Sour skim-milk	100	92	8	2·68
3	Sweet skim-milk	100	87	13	2·81
4	Sweet whole milk	100	96	4	2·77
5	Sour whole milk	100	91	9	2·72
6	Water	50	46	4	2·34

Remarks.—The lowest mortality was recorded in pen No. 4 with sweet whole milk, and the highest in pen No. 3, with sweet skim milk. The chicks in pen No. 3, however, made the greatest gain in weight, while those in No. 6, given water, made the least.

These results only serve to verify those obtained in a similar experiment conducted in 1921, and for purposes of comparison a summary of the two experiments is included herewith.

SUMMARY OF TWO DRINK EXPERIMENTS WITH BROODER CHICKS

——	Sour Skim-milk		Sweet Whole milk		Water	
	Mortality Percentage	Gain per chick	Mortality percentage	Gain per chick	Mortality percentage	Gain per chick
		ozs.		ozs.		ozs.
1921	40	2·23	21·3	2·2	51·3	1·57
1923	8	2·68	4·0	2·77	8·0	2·34
Average	24	2·45	12·65	2·48	29·65	1·95

FEEDING CANNED TOMATOES

Six hundred and sixty-four Leghorn and Barred Rock chicks hatched on April 21, were used for this experiment, being divided into two equal lots of three hundred and thirty-two each. Both lots were fed a standard ration, and lot B received canned tomatoes in addition.

The following table gives the total mortality and average gain per chick for each lot:—

TABLE SHOWING RESULTS OF FEEDING CANNED TOMATOES TO BROODER CHICKS

Lot A—Standard Ration				Lot B—Standard Ration and Canned Tomatoes			
Number at beginning	Mortality	Number at end	Gain per chick	Number at beginning	Mortality	Number at end	Gain per chick
			ozs.				ozs.
332	43	289	2·67	332	45	287	2·74

Remarks.—As will be noticed there was practically no difference between the two lots, the slightly lower mortality in lot A being off-set by the increased gain in lot B.

CANNED TOMATOES VS. YEAST

Two pens, each containing one hundred chicks were used for the experiment. Both lots were fed a standard ration, but with canned tomatoes added in one case and yeast in the other.

TABLE SHOWING RESULTS OF FEEDING CANNED TOMATOES AND YEAST TO BROODER CHICKS

Pen 6—Canned Tomatoes				Pen 7—Yeast			
Number at beginning	Number at end	Mortality	Average gain per chick	Number at beginning	Number at end	Mortality	Average gain per chick
			oz.				oz.
100	88	12	2·68	100	93	7	2·54

Remarks.—While the birds in pen No. 7 receiving yeast, had the lowest mortality, those in pen No. 6, made better gains. The difference between the two was so slight, however, that no definite conclusions can be drawn.

RICE VS. YEAST VS. CANNED TOMATOES

Three pens, each containing fifty chicks were used, pen No. 8 receiving only rice (dry and boiled), pen No. 9, rice and yeast, and pen No. 10, rice and canned tomatoes.

TABLE SHOWING EFFECTS OF FEEDING RICE, YEAST AND CANNED TOMATOES TO BROODER CHICKS

—	Number at beginning	Mortality 1st week	Mortality 2nd week	Mortality 3rd week	Total Mortality	Number at end	Average gain per chick
							ozs.
Pen 8— Rice	50	8	6	2	16	34	1·1
Pen 9— Yeast	50	8	10	.....	18	32	1·29
Pen 10— Tomatoes	50	7	3	4	14	36	1·26

Remarks.—While the chicks in pen No. 9 fed yeast in addition to the basal ration, made the best gains, they also had the highest mortality, the lowest mortality being among those receiving canned tomatoes.

The exceptionally heavy mortality in this experiment, was due in some measure to the fact that, owing to difficulty in obtaining the necessary rations, the chicks received their first feed one day later than those in all the other experiments.

A similar experiment to the foregoing, was undertaken later with older chicks, details of which are given under the heading of "Vitamine feeds for chicks."

GREEN FEED AND CURDS VS. A STANDARD RATION

This experiment was conducted with one hundred chicks divided into two equal lots both by weight and numbers, one lot receiving only green feed and curds, while the other was fed a standard ration.

TABLE SHOWING RESULTS OF FEEDING GREEN FEED AND CURDS AS AGAINST A STANDARD RATION

Pen 11—Green Feed and Curds				Pen 12—Standard Ration			
Number at beginning	Number at end	Mortality	Average gain per per chick	Number at beginning	Number at end	Mortality	Average gain per chick
			ozs.				ozs.
50.....	15	35	2·1	50	34	16	2·04

Remarks.—The chicks receiving greens and curds made a little better gain, but the mortality among them was exceedingly high.

VITAMINE FEEDS FOR CHICKS

Increasing attention is being given by practical poultrymen, to the question of the vitamine content of feeds for growing chicks. For the purpose of obtaining information regarding the value of certain feeds from this standpoint, an experiment was undertaken during the summer.

For this purpose, eighty chicks used in the preceding experiments were separated into four equal lots when they attained the age of six weeks. The experiment lasted six weeks, but was divided into two periods of three weeks each.

During the first period the chicks in pen A were fed a standard ration, and were used as a control throughout; pen B received only rice (dry and boiled) with water to drink; pen C was fed rice, with the addition of yeast; while in pen D, canned tomatoes were added instead of yeast. The following table gives the results obtained for this first period.

TABLE OF VITAMINE FEEDS EXPERIMENT—FIRST PERIOD OF THREE WEEKS

Pen and rations	Number at beginning	Number at end	Average weight at beginning	Average weight at end	Total mortality	Average gain per chick	Condition of Chicks
			ozs.	lbs. ozs.		ozs.	
Pen A— Standard ration.....	20	20	7·2	1— ·0	.....	8·8	Good.
Pen B— Rice.....	20	15	6·8	—6·8	5	.....	Mostly thin, some leg weakness.
Pen C— Rice and yeast	20	18	6·4	—7·1	2	0·7	Chicks active but poor.
Pen D— Rice and tomatoes.....	20	12	6·6	—5·7	8	0·9	Very poor, much le weakness.

Remarks.—At the end of this period, practically all the chicks, with the exception of those in the control pen, were in very poor condition. In order to test certain feeds considered rich in vitamine content (especially raw liver,

cod-liver oil, and egg yolk), these three feeds were added to the ration given in pens B, C. and D. In pen B, the raw liver was kept constantly before the birds, those in pen C being given one-half ounce of cod-liver oil per day, and those in Pen D receiving one-half egg yolk each per day.

In the following table will be found the detailed results for the second period.

TABLE OF VITAMINE FEEDS EXPERIMENT—SECOND PERIOD OF THREE WEEKS

Pen	Ration	Number at beginning	Number at end	Average weight at beginning	Average weight at end	Total mortality	Average gain per chick
				lb. oz.	lb. oz.		ozs.
A	Standard	20	20	1 -0	1-15·3	.....	15·3
B	Rice plus raw liver	15	13	-6·8	-15·2	2	8·4
C	Rice and yeast plus cod-liver oil	18	16	-7·1	-9·2	2	2·1
D	Rice and tomatoes plus egg yolk	12	6	-5·7	-5·7	6	.....

Remarks.—Contrary to expectations, during the first period, the chicks receiving rice and tomatoes experienced the heaviest mortality, a loss in average weight, and were in the poorest condition at the end of the period. There was a twenty-five per cent mortality among the chicks fed on rice only, and they made no gain in average weight.

The birds in pen C, with yeast added to the rice had a low mortality, but made very little gain in weight as compared with those in the control pen.

Consequently, so far as mortality, condition and weight gains were concerned, the three feeds would be placed in the following order, rice and yeast, rice alone, and rice and tomatoes.

For the second period, the addition of raw liver to the ration gave the best results, both as regards mortality and gains in weight. The next best results were obtained from cod-liver oil, and the poorest when egg yolks were added.

Throughout the experiment, however, the standard ration, as fed in the control pen, proved to be the most satisfactory.

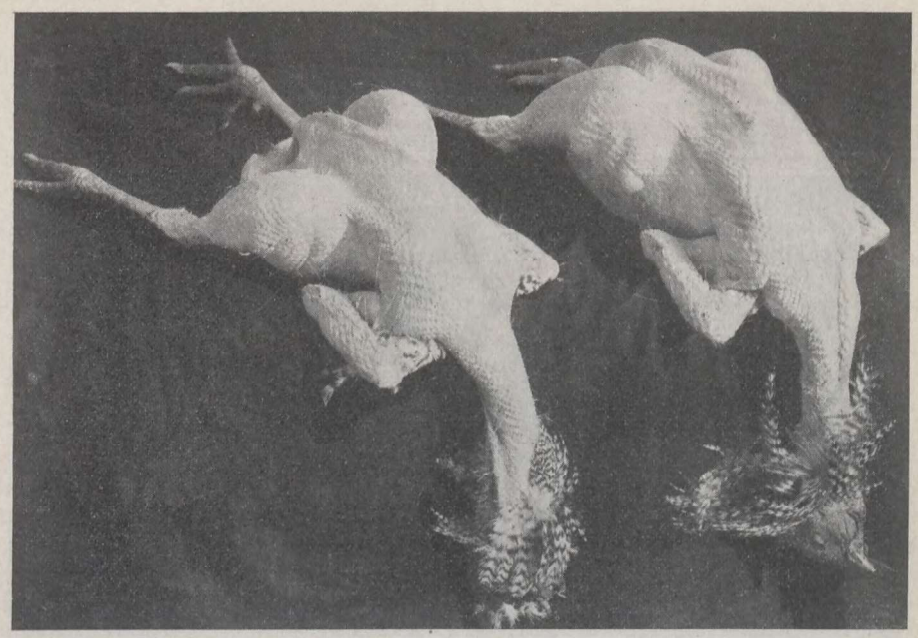
As this is the first year that similar experiments have been undertaken, further research work will have to be conducted before definite conclusions can be drawn.

CAPONS VS. ROASTERS

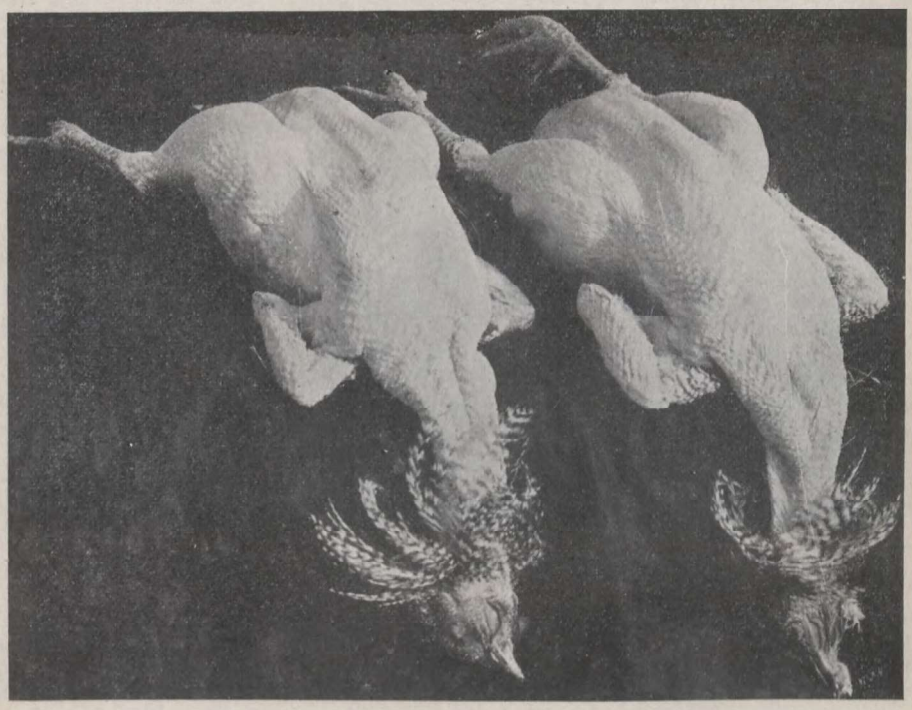
In order to obtain some information on the relative advantage of caponizing cockerels or selling them as roasters, an experiment was started on July 8, 1923. The birds used were forty-four Barred Rock cockerels about seven weeks old, equally divided into two lots, both by weight and development. Twenty-two of them were caponized and immediately after the operation, all the birds were placed in two small runs, in which they were kept until December 13. They were handled in the same way as ordinary growing stock, scratch grain being fed by hand, dry mash kept constantly before them in hoppers, and milk to drink.

The scratch grain was valued at $2.25 per hundredweight, mash at $2.03 per hundredweight, and milk at 0.3 cents per gallon.

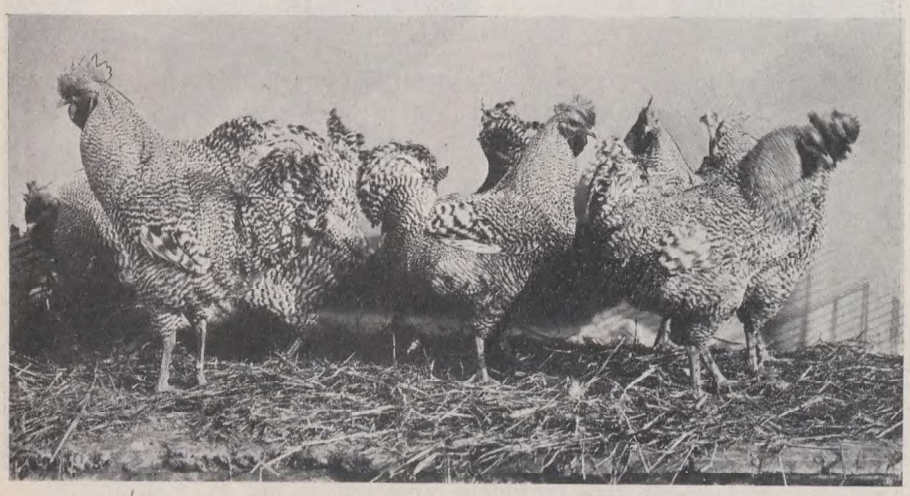
Three of the capons died two days after the experiment started, and were replaced, bringing the number of birds caponized up to twenty-five.



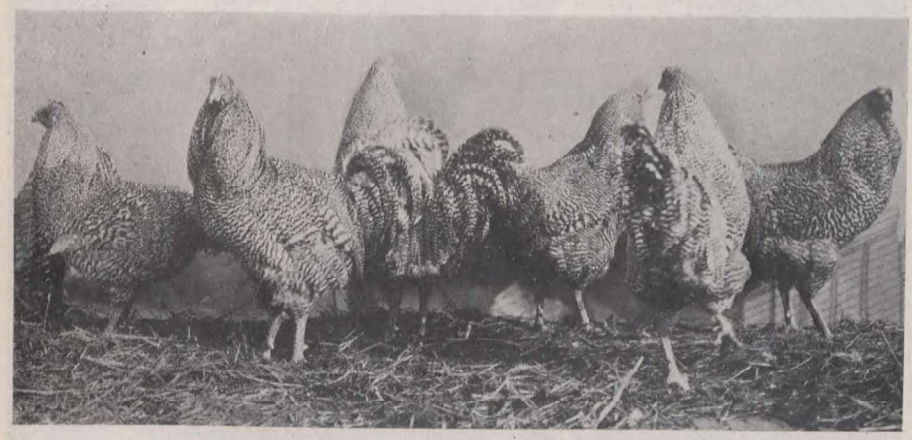
Pair of dressed roasters.



Pair of dressed capons.



Group of roasters at the end of experiment. Average weight 6 pounds 9 ounces each.



Group of capons at end of experiment. Average weight 6 pounds 13 ounces each.

Details as to costs, gains and profits are given in the following table:

CAPONS VS. ROASTERS

Lot	Number at beginning	Number at end	Feed consumed per bird				Weight per bird at beginning
			Scratch grain	Mash	Milk	Total value	
			lb. oz.	lb. oz.	gal.	c.	lb. oz.
Capons	25	22	18 5	11 9	4·8	79	1 8
Roasters	22	22	19 2	10 3	6·3	83	1 8

Lot	Weight per bird at end	Gain per bird	Lbs. of feed for 1 lb. gain	Cost of 1 lb. gain	Initial value per bird	Final value per bird	Total profit per bird
	lb. oz.	lb. oz.	lb. oz.	c.	c.	$	$
Capons	6 13	5 5	5 10	15	87½	2 72	1 05½
Roasters	6 9	5 1	5 13	16	75	1 97	0 39

Remarks.—The capons gained on an average, four ounces per bird more than the roasters, and at a slightly lower feed cost. When dressed, the flesh of the capons was far superior in quality, despite the very slight difference in the final weights of the two lots. This superiority in the quality of the flesh, accounts for the difference in the final value and total profit per bird, as the capons were valued at 40 cents per pound, as against 30 cents for the roasters. Had the two lots been valued at the same price per pound when killed, the roasters would have given 1½ cents per bird more profit than the capons. From this it may be inferred that the value of caponizing lies rather in the production of meat of a superior quality, than in any increase in weight.

In estimating the total profit per bird, only the initial value and feed consumed have been taken into account, no allowance being made for labour or caponizing costs.

FEEDING FOR WINTER EGG PRODUCTION

The comparison of various feeds and methods of feeding, has always been an important part of the work of this Division. A series of experiments has already been conducted along these lines, and these were continued this year.

All the experiments were conducted in the Experiment House, and lasted from November to April inclusive. The birds used in the experiments were White Leghorn pullets (fifteen in each pen) and all those for each separate experiment were pen sisters, i.e., sired by the same male. By this means the variation due to breeding, was reduced to the minimum.

All pens were mated during the breeding season, and the hatching results are included in the following tables.

HOME-MIXED MASH VS. COMMERCIAL

Pen No. 11 was fed a home-mixed mash consisting of equal parts by weight of bran, shorts, oat-chop and corn meal, with twenty per cent of beef meal, and costing $2.68 per hundred pounds. Pen No. 12 was given a commercial mash costing $3.12 per hundred pounds.

STANDARD (HOME MIXED) VS. COMMERCIAL MASH

Pen	Mash	Cost of mash	Total cost of feed	Eggs laid	Value	Cost per dozen	Profit over cost
		$	$		$	c.	$
11	Standard	4·17	16·83	1,282	73·47	15·8	56·64
12	Commercial	4·09	16·64	1,282	73·66	15·6	57·02

HATCHING RESULTS

Pen	Mash	Eggs set	Fertile	Hatched	Per cent fertile	Per cent fertile hatched	Per cent total hatched
11	Standard	247	216	77	87·4	35·6	31·2
12	Commercial	262	154	44	58·8	28·6	17·2

Remarks.—Practically no difference between the two mashes for production and profit, but standard mash gave better fertility and hatchability.

For purposes of comparison, a summary of similar experiments conducted at Ottawa and several branch farms is given herewith.

Summary of Mash Feed Experiments

Where conducted	Standard (Home mixed) Mash								Commercial Mash							
	Year	Number of birds	Duration of experiment	Total cost of feed	Eggs laid	Value	Cost per dozen	Profit over cost	Year	Number of birds	Duration of experiment	Total cost of feed	Eggs laid	Value	Cost per dozen	Profit over cost
			months	$		$	c.	$			months	$		$	c.	$
Ottawa	1921	15	6	16·28	1,134	64·62	17·2	48·34	1921	15	6	18·06	1,078	62·95	20·1	44·89
Ottawa	1922	15	6	26·01	995	60·08	31·2	32·18	1922	15	6	30·40	885	56·34	42·8	24·55
Ottawa	1923	15	6	16·83	1,282	73·47	15·8	56·64	1923	15	6	16·64	1,282	73·66	15·6	57·02
Agassiz	1922	10	7½	16·15	1,227	30·67	16·5	10·85	1922	10	7½	16·37	1,172	29·00	30·0	9·65
Charlottetown	1922	10	6	14·19	635	19·14	26·8	4·95	1922	10	6	16·14	694	21·21	27·9	5·07
Fredericton	1922	25	6	26·94	1,441	57·09	22·4	23·96	1922	25	6	33·14	1,286	51·50	30·9	18·98
Nappan	1922	50	6	63·72	2,543	92·80	30·0	29·07	1922	50	6	67·42	2,278	81·51	35·5	14·09
Sidney	1922	10	11	22·22	1,654	46·14	16·1	23·92	1922	10	11	17·66	1;600	44·53	13·2	26·87
Cap Rouge	1922	25	4	16·93	400	20·00	50·8	12·67	1922	25	4	20·39	427	30·35	57·3	9·96
Average	.....	19·4	6·5	24·36	1,257	51·56	25·2	26·95	.....	19·4	6·5	26·25	1·189	50·12	30·4	23·45

Remarks:—From the viewpoint of total production, total profit over cost of feed, and cost of producing one dozen eggs, the standard (home-mixed) mash proved to be the more economical.

BEEF SCRAP VS. TANKAGE VS. FISH MEAL AS A SOURCE OF ANIMAL PROTEIN

Three pens of birds were all fed alike except that pen 6 received twenty per cent beef scrap, pen 7, twenty per cent tankage, and pen 8, twenty per cent fish meal all mixed in the mash. Percentages of these are by weight of total mash given. Beef scrap and tankage each contained sixty per cent protein, and the fish meal fifty-six per cent. Cost per 100 pounds was $5 to $5.25 for beef scrap, $2.50 for tankage, and $5 for fish meal.

BEEF SCRAP VS. TANKAGE VS. FISH MEAL

Pen	Animal Feed	Cost of animal feed	Total cost of feed	Eggs laid	Value	Cost per dozen	Profit over cost
		$	$		$	$	$
6	Beef scrap	2·40	14·29	1,374	79·65	12·5	65·36
7	Tankage	0·93	12·07	1,167	67·04	12·4	54·97
8	Fish meal	2·40	14·28	1,257	71·88	13·6	57·60

HATCHING RESULTS

Pen	Animal Feed	Eggs set	Fertile	Hatched	Per cent fertile	Per cent fertile hatched	Per cent total hatched
6	Beef scrap	220	157	54	71·4	34·4	24·5
7	Tankage	201	183	76	91·0	41·5	37·8
8	Fish meal	217	157	61	72·3	38·8	28·1

Remarks.—For production and profit, beef scrap gave the best results, and tankage the poorest. Difference in hatching results may be due to variation in production.

The following table, showing a summary of the results obtained from beef scrap and tankage respectively in this experiment, together with those obtained in a similar experiment conducted in 1921, is given for the purposes of comparison. The figures show conclusively that tankage is not an economical substitute for beef scrap for winter egg production.

BEEF SCRAP VS. TANKAGE

——	Cost of animal feed	Total cost of feed	Eggs laid	Value	Cost per dozen	Profit over cost
	$	$		$	c.	$
Beef scrap 1921	2·34	19·27	1,011	58·67	22·8	39·40
1923	2·40	14·29	1,374	79·65	12·5	65·36
Average	2·37	16·78	1,192	69·16	17·6	52·38
Tankage 1921	·33	17·54	576	34·49	36·5	16·95
1923	·93	12·07	1,167	67·04	12·4	54·97
Average	·63	14·80	871	50·76	19·4	35·96

MILK VS. BEEF SCRAP FOR ANIMAL PROTEIN

Two pens were fed alike except that pen 9 received milk and water, but no beef scrap, and pen 10 only water to drink, with beef scrap constantly available in a hopper and twenty per cent by weight, mixed in the mash. Beef scrap was valued at $5.25 per 100 pounds, and milk at 3 cents per gallon.

MILK VS. BEEF SCRAP

Pen	Animal Protein	Cost of animal feed	Total cost of feed	Eggs laid	Value	Cost per dozen	Profit over cost
		$	$		$	c.	$
9	Milk	1·08	12·84	1,045	60·38	14·7	47·52
10	Beef scrap	3·78	15·04	1,201	69·62	15	54·58

HATCHING RESULTS

Pen	Animal Protein	Eggs set	Fertile	Hatched	Per cent fertile	Per cent fertile hatched	Per cent total hatched
9	Milk	146	135	61	92·4	45·2	41·8
10	Beef scrap	153	111	20	72·5	18	13·1

Remarks.—Higher production and greater profit were obtained with beef scrap, but milk gave better hatching results and slightly lower production costs.

The following table gives a condensed summary of seven similar experiments previously conducted at Ottawa and several branch farms, and shows that milk is a more economical source of animal protein than is beef scrap, giving greater profit and higher production at lower cost.

MILK VS. BEEF SCRAP. SUMMARY OF EXPERIMENTS

Animal protein	Number of birds	Average duration of experiments	Total cost of feed	Eggs laid	Value	Cost per dozen	Profit over cost
		Months	$		$	c.	$
Milk	143	6·9	150·33	7,523	356·51	23·9	206·18
Beef scrap	143	6·9	153·10	6,414	297·00	28·6	143·90

MANGELS VS. SPROUTED OATS VS. CLOVER VS. EPSOM SALTS AS GREEN FEED

Five pens were fed alike in everything except the green feed which was as follows:—

Pen 1. Mangels once a day, all they would eat.
Pen 2. Sprouted oats in the same manner.
Pen 3. Red clover leaves gathered from the barn floor, chopped up and fed dry once a day.
Pen 4. Mangels, sprouted oats and clover.
Pen 5. No green feed, but 1½ ounces of Epsom salts (98 per cent pure) to each pen per day in the drinking water.

Values of green feeds per hundred pounds were: Mangels, 50 cents; sprouted oats, $2; clover, $1; and Epsom salts, 4 cents per pound.

MANGELS VS. SPROUTED OATS VS. CLOVER VS. EPSOM SALTS

Pen	Green Feed	Cost of green feed	Total cost of feed	Eggs laid	Value	Cost per dozen	Profit over cost
		$	$		$	c.	$
1	Mangels	1·80	16·51	1,285	73·11	15·4	56·60
2	Sprouted oats	0·48	14·18	1,403	79·41	12·1	65·23
3	Clover	1·50	16·58	1,438	83·76	13·8	67·18
4	Mangels, sprouted oats and clover	2·28	15·96	1,393	80·76	13·7	64·80
5	Epsom salts	0·78	15·43	1,414	80·96	13·1	65·53

HATCHING RESULTS

Pen	Green feed	Eggs set	Fertile	Hatched	Per cent fertile	Per cent fertile hatched	Per cent total hatched
1	Mangels	261	240	77	91·9	32·0	29·5
2	Sprouted oats	248	233	87	93·9	37·3	35·1
3	Clover	251	232	118	92·4	50·8	47
4	Mangels, sprouted oats, clover	286	257	97	89·8	37·7	33·9
5	Epsom salts	313	292	131	93·3	44·8	41·8

Remarks.—Clover gave the best results, which accords with previous tests. Birds in pen 5 given Epsom salts in place of green feed were always in good condition and showed no looseness of the bowels. So far as the effects upon fertility and hatchability are concerned, the various feeds would be placed in this order: Clover; Epsom salts; sprouted oats; mangels, sprouted oats, and clover; and mangels alone. These are results of only one experiment. It is being repeated upon the whole Experimental Farms System, and more definite conclusions can be drawn later.

MILK VS. WATER AS DRINK FOR LAYING PULLETS

Two pens of pullets were fed in the same manner, except that pen 14 received milk and water to drink, and pen 15, only water. The milk used was butter-milk costing 30 cents per 100 pounds.

MILK VS. WATER

Pen	Drink	Cost of milk	Total cost of feed	Eggs laid	Value	Cost per dozen	Profit over cost
		$	$		$	c.	$
14	Milk	1·08	16·55	1,535	88·05	12·9	71·50
15	Water	.....	15·13	1,139	64·37	15·9	49·24

HATCHING RESULTS

Pen	Drink	Eggs set	Fertile	Hatched	Per cent fertile	Per cent fertile hatched	Per cent total hatched
14	Milk	283	213	81	75·3	38·0	28·6
15	Water	203	191	104	94·1	54·4	51·2

Remarks.—Results are overwhelmingly in favour of milk for production and profit, confirming results of previous experiments. Better hatching results from birds given water, but may be due to increased production in other pen having weakened vitality.

DUCK FEEDING EXPERIMENTS

Duck feeding experiments, similar to those conducted in 1921 and 1922 (for details see the Annual Reports for those years), were undertaken at the Central Farm, this year, to compare results with those previously obtained.

The objects of these experiments were to determine the costs of, and profits from growing green ducks, and the effect of adding green feed to the ration.

METHODS OF CONDUCTING EXPERIMENTS

All the ducklings used in the experiments were Pekins, incubator hatched, and housed in the pipe brooder house for the first four weeks. They were then transferred to colony houses for the remainder of the experiment. When taken from the incubator, the ducklings were carefully weighed and divided into lots, and weighed again at intervals throughout the experiment.

The mash used for all experiments was similar to that fed last year, containing wheat bran, middlings, cornmeal and ground oats in equal parts, with one half part of beef scrap and 5 per cent sand. An analysis of this mash gave 14·4 per cent digestible protein, 4·8 per cent fat, 72·8 per cent total digestible nutrients, and a nutritive ratio of 1:4·1. The cost was estimated at $2.20 per 100 pounds.

During the first three or four days, milk was used to moisten the mash, but as soon as the ducklings started to eat well, water was substituted. For the first two weeks the ducklings were fed five times a day, after which time the meals were gradually reduced to three daily. A supply of drinking water was kept constantly before them.

GREEN FEED VS. NO GREEN FEED IN THE GROWING OF MARKET DUCKS

For this experiment ninety early June-hatched Pekin ducklings were used, being divided into two equal lots named A and B. Both lots were kept in small pens, with no access to grass runs during the entire period, and were kept under experiment for ten weeks. They received identical care and feed in every respect except that lot A was given green feed with the mash, while lot B received no green feed whatever.

The experiment was repeated later in the season, with fifty ducklings hatched at the end of June, and the following table gives details as to weights, gains, etc., in addition to a comparison with last year's experiment.

GREEN FEED VS NO GREEN FEED FOR MARKET DUCKS—SUMMARY OF THREE EXPERIMENTS

Lot and year	Number at beginning	Number at end	Average weight at beginning	Average weight at end	Average gain	Average feed consumed	Pounds feed for 1 pound gain	Average cost of feed	Average profit over cost of feed and ducklings
			oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	c.	$
Green Feed									
A.....1922	30	28	1·6	4 14	4 12·4	20 1	4 4	44	1·02
A (early).1923	45	38	1·6	4 8	4 6·4	18 5	4 4	40	0·92
A (late)..1923	25	20	1·4	5 12	5 10·6	22 2	3 15	48	1·28
Average..	33·3	28·7	1·5	5 0	4 15·1	20 2	4 2	44	1·07
No Green Feed									
B.....1922	30	30	1·5	5 2	5 0·5	19 15	3 12	42	1·12
B (early).1923	45	33	1·6	4 6	4 4·4	17 4	4 7	38	0·89
B (late)..1923	25	19	1·4	5 8	5 6·6	21 5	3 15	46	1·20
Average..	33·3	27·3	1·5	5 0	4 14·5	19 8	4 1	42	1·07

Remarks.—The table indicates that, taking the summary of the three experiments, the addition of green feed to the ration had no very appreciable effect upon the results. From the viewpoint of mortality the advantage was slightly in favour of green feed, but on the other hand, while the net profit was identical in both cases, the lots receiving no green feed cost a little less to feed and made a pound of gain on a slightly decreased amount of feed.

In view of the results obtained in 1922, when the difference was in favour of no green feed, it should be noted that during that experiment, the birds which received no green feed in the ration had access to small yards in which they were able to obtain a small quantity.

Conclusions.—As the results were so uniform in each instance, it may safely be inferred that provided access is afforded to small runs containing some verdure, the addition of green feed to the ration for feeding green ducks is not a necessity. This point is important, inasmuch that green feed has always been considered necessary to give bulk to the ration, entailing considerable time and trouble in its preparation.

No further experiments along these lines will be conducted in the near future, as the information obtained to date may be regarded as fairly conclusive.

PRESERVING AND STORING EGGS

Many requests are received by the Division for information regarding various methods of preserving and storing eggs, and in 1921 experiments were undertaken with different preservatives. This year a further series of experiments was conducted, in order to try a new egg-preserving process, to compare the results obtained from storing eggs in two positions and in different kinds of cases and fillers, and also to test the relative values of clean and washed eggs for storing and preserving purposes.

All the eggs under experiment were stored with the Canadian Cold Storage Co., Ottawa, and kept under ordinary storage conditions for a period of six and a half months, from June 6, 1923, until December 19, 1923.

In each experiment were eggs treated by the preserving process. When taken out of storage, all the eggs were graded by a government egg inspector, and the details of the grading are given for each experiment.

PROCESSED VS. NON-PROCESSED NEW-LAID EGGS

For this experiment sixty dozen new-laid eggs were used, and placed in two cases, those in one case being treated by the preserving process, and the others left in their natural state. The cases used were the ordinary heavy unventilated egg cases used on the Experimental Farms.

The following table gives the details of the experiment, including weights of eggs, cases and fillers, and grade of the eggs when taken out of storage.

PROCESSED VS. NON-PROCESSED NEW-LAID EGGS

No. of case	Kind of eggs	Dozen	Net weight of eggs	Net weight of case	Net weight of fillers	Gross weight before processed	Gross weight when stored	Gross weight when taken out	Net weight eggs when taken out	Net weight fillers when taken out	Flavour when taken out	Grade when stored	Grade when taken out					
													Extras	Firsts	Seconds		Cracked	Dirty	Bad
															Heavy yolk	Weak and watery			
			lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.									
1	Non-processed eggs..	30	44 14	17 6	2 12	65 0	65 0	65 0	43 8	3 0	Generally good	New laid	153	181	.....	10	16	....	.....
2	Processed eggs.....	30	44 4	18 6	2 12	65 6	66 8	66 4	44 0	3 0	Fair to bad...	New laid	101	240	.....	3	15	....	1

Remarks.—Judged by candling, the eggs which did not undergo the preserving process graded much better when taken out of storage, giving forty-two per cent Extras, as against twenty-eight per cent for those which were processed.

PROCESSED VS. NON-PROCESSED COMMERCIAL EGGS

This experiment was similar to the foregoing, except for the fact that the eggs used were commercial instead of new-laid, half the quantity in each case being graded as extras, and the other half as firsts. The detailed figures are given in the following table:—

PROCESSED VS. NON-PROCESSED COMMERCIAL EGGS

Case No.	Grade of Eggs	Dozens	Net weight eggs	Net weight cases	Net weight fillers	Gross weight before treatment	Gross weight when stored	Gross weight when taken out	Net weight eggs when taken out ½	Net weight fillers when taken out	Grade when taken out						
											Extras	Firsts	Seconds		Cracked	Dirty	Bad
													Heavy yolk	Weak and watery			
			lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.							
8	Extras (non-processed)	13¾	22 0	6 12	2 7	31 3	31 3	30 9	21 7	2 6	82	236	.....	.....	12	.....	.....
	Firsts (non-processed)	13¾	20 2	6 12	2 7	29 5	29 5	29 2	20 0	2 6							
	Total	27½	42 2	13 8	4 14	60 8	60 8	59 11	41 7	4 12	82	236	.....	.....	12	.....	.....
9	Extras (processed)	13¾	21 10	7 4	2 8	31 6	31 12	31 10	21 7	2 9	118	175	.....	19	15	.....	3
	Firsts (processed)	13¾	20 13	7 4	2 8	30 9	30 12	30 11	20 6	2 9							
	Total	27½	42 7	14 8	5 0	61 15	62 8	62 5	41 13	5 2	118	175	.....	19	15	.....	3

Remarks.—When taken out of storage there were eleven per cent more extras among the processed eggs than among those non-processed. On the other hand, however, there were also more seconds and cracks among these processed eggs.

FARM (NON-VENTILATED) CASE VS. COMMERCIAL CASE

As previously stated, the egg cases used on the Experimental Farm are of a heavy solid type without any openings for ventilation, while the commercial cases are lighter and more open in construction. In order to test the two types, the results obtained in experiment No. 1, in which farm cases were used, were compared with those obtained in a similar experiment, when the eggs were stored in commercial cases. As in each experiment, half the eggs were processed and the remainder left in their natural state, the total covering both processed and non-processed eggs, are given in each instance.

In the following table will be found the detailed figures for the one hundred and twenty dozen eggs used in the experiment:—

FARM (NON-VENTILATED) VS. COMMERCIAL EGG CASE

Case No.	Type of case and kind of eggs	Dozens	Net weight eggs	Net weight case	Net weight fillers	Gross weight before treatment	Gross weight when stored	Gross weight when taken out	Net weight eggs when taken out	Net weight fillers when taken out	Grade when taken out						
											Extras	Firsts	Seconds		Cracked	Dirty	Bad
													Heavy yolk	Weak and watery			
			lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.							
1	Farm case (non-processed eggs)	30	44 14	17 6	2 12	65 0	65 0	65 0	43 8	3 0	153	181	.....	10	16	.....	.....
2	Farm case (processed eggs)	30	44 4	18 6	2 12	65 6	66 8	66 4	44 0	3 0	101	240	.....	3	15	.....	1
	Total	60	89 2	35 12	5 8	130 6	131 8	131 4	87 8	6 0	254	421	.....	13	31	.....	1
3	Commercial case (non-processed eggs)	30	43 11	13 13	5 0	62 8	62 8	61 0	42 0	5 4	104	228	.....	11	16	.....	1
4	Commercial case (processed eggs)	30	44 10	12 0	2 13	59 7	61 8	61 4	44 4	4 0	138	201	.....	6	15	.....	.....
	Total	60	88 5	25 13	7 13	121 15	124 0	122 4	86 4	9 4	242	429	.....	17	31	.....	1

Remarks.—Practically no difference was found between the two types of cases, the very slight advantage being in favour of the farm cases.

CLEAN VS. WASHED EGGS FOR STORAGE

For this experiment, six dozen clean, and twelve dozen washed eggs were used. Half the eggs in each lot were treated by the preserving process, while the others were not. The following table shows the results obtained in each case:—

CLEANED VS. WASHED EGGS FOR STORAGE

Lot Nos.	Kind of Eggs	Dozens	Net weight of eggs	Net weights eggs when taken out	Grade when taken out		
					Extras	Firsts	Cracked
			lbs. oz.	lbs. oz.			
1	Clean (non processed)	3	5- 3	5- 2	15	19	2
	Clean (proceessed)	3	4–11	4–11	23	12	1
	Total	6	9–14	9–13	38	31	3
2	Washed (non processed)	6	8–15	8–14	39	33	.....
	Washed (processed)	6	9- 0	8–14	52	17	3
	Total	12	17–15	17–12	91	50	3

Remarks.—When taken out of storage, the clean eggs gave only fifty-three per cent extras, as against sixty-three per cent for those that were washed. This is contrary to what might have been expected, though it is possible that in the washing, the pores of the eggs were closed, thus helping to preserve the contents. As this is the first experiment of its kind which has been conducted, no definite conclusions should be drawn from these results.

CLEAN VS. DIRTY FLATS AND FILLERS

The object of this experiment was to determine the extent to which dirty flats and fillers affect the keeping qualities of storage eggs. Two cases of eggs were used, half the eggs in each case being processed, clean flats and fillers being used in one case, and dirty ones in the other.

CLEAN VS DIRTY FLATS AND FILLERS

Case No.	Kind of flats and fillers	Dozen	Net weight of eggs	Net weight of case	Net weight of fillers	Gross weight before treatment	Gross weight when stored	Gross weight when taken out	Net weight eggs when taken out	Net weight of fillers when taken out	Grade when taken out				
											Extras	Firsts	Seconds		Cracked
													Heavy Yolk	Weak and watery	
			lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.					
6	Clean (processessed eggs)	15	21 12	7 1	2 6	31 3	31 8	31 6	20 11	2 2	78	100	.....	.....	2
	Clean (non-processed eggs)	15	22 2	6 12	2 9	31 1	31 1	31 1	20 3	2 2	86	86	.....	1	7
	Total	30	43 14	13 13	4 15	62 4	62 9	62 7	40 14	4 4	164	186	.....	1	9
7	Dirty (processed eggs)	15	21 10	7 1	2 9	31 4	31 8	31 6	21 8	2 5	73	105	.....	.....	2
	Dirty (non-processed eggs)	15	21 14	6 12	2 7	31 1	31 1	31 1	21 12	2 10	80	95	.....	1	4
	Total	30	43 8	13 13	5 0	62 5	62 9	62 7	43 4	4 15	153	200	.....	1	6

Remarks.—The eggs packed in clean flats and fillers graded three per cent better when taken out of storage than those in dirty flats and fillers. The flavour was not taken.

STORING EGGS WITH SMALL END UP VS. SMALL END DOWN

In order to determine the difference, if any, between the keeping qualities of eggs stored with the small end up, and those stored with the small end down, two cases of eggs were used. Half the eggs in each case were processed, all those in the first case being placed with the small end up, and those in the second case with the small end down.

STORING EGGS, SMALL ENDS UP VS. SMALL ENDS DOWN

Case No.	Kind of Storing	Dozen	Net weight of eggs	Net weight of case	Net weight of fillers	Gross weight before treatment	Gross weight when stored	Gross weight when taken out	Net weight eggs when taken out	Net weight eggs fillers when taken out	Grade when taken out					
											Extras	Firsts	Seconds		Cracked	Bad
													Heavy yolk	Weak and watery		
			lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.	lbs. oz.						
10	Small ends up (Non-processed)	15	22 0	13 0	2 8	37 8	37 8	37 4	21 10	2 6	42	99	30	7	2	.....
	Small ends up (processed)	15	22 8	13 8	2 8	38 8	38 8	38 5	22 6	2 9	67	74	26	9	2	2
	Total	30	44 8	26 8	5 0	76 0	76 0	75 9	44 0	4 15	109	173	56	16	4	2
11	Small ends down (Non-processed)	15	21 0	13 0	2 8	36 8	36 8	35 9	20 6	2 7	108	67	.....	.....	4	1
	Small ends down (processed)	15	22 0	13 8	2 8	38 0	38 0	37 8	21 12	2 7	126	50	.....	.....	4	.....
	Total	30	43 0	26 8	5 0	74 8	74 8	73 1	43 2	4 14	234	117	.....	.....	8	1

Remarks.—The difference was in favour of storing eggs with the small end down.

The seconds found among the eggs stored with small end up, were due to the yolks having dropped to the bottom and stuck to the shell.

THE VALUE OF THE PRESERVING PROCESS

In order to test the value of the preserving process under varied conditions, a summary of all the preceding experiments was compiled, comparing the eggs which had undergone the process, with those which had not been so treated.

SUMMARY SHOWING THE VALUE OF THE PRESERVING PROCESS

Kind of Eggs	Dozen	Net weight of eggs	Net weight eggs when taken out	Grade when taken out						
				Extras	Firsts	Seconds		Cracked	Dirty	Bad
						Heavy yolk	Weak and watery			
		lb. oz.	lb. oz.							
Non-processed.....	186½	277–4	270–6	859	1,237	30	32	78	.....	2
Processed.....	186½	276–9	271–15	880	1,202	26	48	75	.....	7

Remarks.—Though the candling report does not show much difference between the processed and the non-processed eggs, an attempt was made to ascertain the relative value of the two for household purposes. With this in view, about 30 dozen each of the processed and non-processed new-laid eggs were sent out to private families with a request that a report be returned. The superiority of the processed eggs was most evident from the reports, some of which even stated that the processed eggs had been used upon the table in every way that a new-laid egg could be used.

GENERAL REMARKS

When these experiments were begun at the Central Farm, an attempt was made to have similar experiments conducted simultaneously at several Branch Farms. Owing to the lateness in the season, however, this was found to be impossible, but next year it will be done. The experiments will also be repeated at the Central Farm, and as stated in the remarks appended to the individual experiments, until the experiments have been repeated, no definite conclusions should be drawn.

It may be remarked, however, that experiments similar to Nos. 3, 4, 5 and 6 were conducted at the Brandon and Charlottetown Experimental Farms during the year, and the results were practically identical with those obtained at the Central Farm. Details of these are given in the annual report of these two Farms for 1923.

CANADIAN NATIONAL EGG LAYING CONTESTS

During the year eleven Egg Laying Contests have been conducted in Canada by this division. The Canadian Contest was conducted at Ottawa and was open to the world, while the remaining ten contests were provincial in nature. The location of the contests and various details are given in the following table:—

NOVEMBER 1, 1922 TO OCTOBER 30, 1923

Contest	Number of birds	Average number eggs laid	Cost per dozen	Production of highest pen
Canadian	700	162·5	16·0	2,275
Prince Edward Island	200	160·1	15·6	1,996
Nova Scotia	200	152·7	21·0	1,915
New Brunswick	200	162·2	19·9	2,463
Quebec East	120	112·5	22·5	1,339
Quebec West	200	145·7	13·4	1,921
Ontario	370	182·2	13·6	2,205
Manitoba	190	166·2	12·9	2,066
Saskatchewan	220	141·8	15·0	1,889
Alberta	240	173·2	13·2	2,389
British Columbia	360	199·8	15·3	2,382
Total	3,000	Aver-age 165·0	16·2	.

Ten birds constitute a pen and the average egg production per bird for the 3,000 birds was 165 eggs, at a cost per dozen, for feed only, of 16·2 cents.

THE NUMBER OF BIRDS AND AVERAGE PRODUCTION BY VARIETIES FOR ALL CONTESTS

Variety	Number of birds	Average production
Barred Plymouth Rocks	1,170	164·1
White Leghorns	1,010	167·9
White Wyandottes	420	158·2
S. C. Rhode Island Reds	140	129·5
Anconas	70	148·9
White Plymouth Rocks	70	141·3
Buff Orpingtons	30	152·8
R. C. Rhode Island Reds	20	137·8
Blue Andalusians	10	165·5
R. C. Brown Leghorns	10	144·9
Partridge P. Rocks	10	142·6
Columbian Wyandottes	10	124·7
Black Langshans	10	106·6
S. C. Brown Leghorns	10	99·9
Chantecler	10	99·2
	3,000	Aver-age 165·0

A new series of Egg Laying Contests was started November 1, 1923, and, in addition to the ones conducted the previous year, a new contest was started at Sidney, Vancouver Island, B.C., with 34 pens of ten birds each. In the twelve contests now in operation there are 3,700 birds.

INSPECTION AND REGISTRATION

Owners of the birds, who have made application for entrance to laying contests, must have their poultry plants undergo a rigid inspection before the birds are accepted. This inspection is necessary so as to avoid carrying any infectious disease into the contest and also to see that the birds are of the proper development.

All birds which qualified for registration in last year's contest were inspected and also the male birds to which they were bred. An inspection of chickens hatched from these matings was made during the summer months, and pullets which were desirable were wing banded with metallic wing bands before entering the contest of 1923-24. Providing these pullets qualify for registration, they will be known as second generation registered females. It is to these registered females, from registered mothers, that we must look for our first registered male birds.

Of the 3,000 birds in the laying contest, 725 qualified for registration, and of this number 550 were duly registered and will be inspected for breeding work next season. This is the second year that registration has been in operation. Last season 400 birds qualified, while this season 725 have qualified. The qualifications briefly are that the birds be typical of the breed they represent; have no standard disqualifications; lay 200 or more eggs weighing 24 ounces to the dozen within the contest year—52 weeks.

DEMONSTRATIONS AND EXHIBITS

The attractive exhibit sent out each year to some of the fall fairs and winter poultry shows continues to be a popular feature of the extension work, and in order to meet engagements where dates overlapped it was again necessary to duplicate the exhibit.

These exhibits have been the means of carrying on a great educational campaign. They have been the medium for the exchange of views with the farmers and poultry keepers, and successful examples of up-to-date methods for the established poultryman and for the beginner to follow.

The fairs and winter poultry shows attended in the past season included Canadian National Exhibition, Toronto, Chicken Fair, Napanee, Poultry Shows at Hamilton, Woodstock, Renfrew, Maberly, Peterboro, St. Thomas, Picton, Belleville Brantford, St. Catharines, Simcoe, Essex and Windsor.

FARM, EGG AND POULTRY ACCOUNTS

The farm, egg and poultry account work continues popular, mostly with beginners who appreciate this plan of keeping themselves informed on the profits or losses of their poultry flocks.

The encouragement given them to correspond and discuss their problems with the Poultry Division is a valuable feature of this work, and keeps the division in touch with farmers in the more remote sections, where there is little or no opportunity for them to come in contact with the information they desire.

It also enables them to discuss the questions that puzzle them directly, and the information conveyed on the copy of the report, received monthly by the division, generally gives some indication of where the trouble lies, whether it be in bad methods in feeding, poor rations, immature stock, or other causes.

A survey of the results obtained on the majority of the farms throughout the Dominion for the past year is encouraging. The number of successful and profitable plants is without doubt increasing, and this must be due to a great extent to the solution of poultry problems and to the information conveyed in this manner or through the medium of correlated extension work.

FIELD WORK IN QUEBEC

The following phases of work are grouped under this heading: (*a*) French Correspondence of the Division; (*b*) Investigational survey work conducted in Quebec; (*c*) French monthly report form service; (*d*) Co-operative work with other agencies; (*e*) Visits to the Branch Farms in Quebec and northen Ontario; and (*f*) Visits to the Illustration Stations in Quebec.

(a) French Correspondence.—The French correspondence of the division continues to increase, the letters received containing requests for information concerning practically every phase of poultry keeping.

(b) Investigational Survey Work.—For several years past, investigational survey work has been undertaken in Quebec, the primary object being to obtain authentic information regarding the actual conditions of poultry keeping on the farms in the districts served by the various Experimental Stations. At the same time, the farmers visited are kept in touch with the work of the Experimental Farms, and receive personal information concerning their poultry problems.

For the past two years, as indicated in the annual reports, this work has been conducted in the three counties of Montcalm, Rimouski and Northern Pontiac (Abitibi). One hundred and twenty-three farmers have been visited this year, as compared with ninety-seven last year.

The Provincial Poultry Service has appointed poultry instructors, to make periodical visits to Montcalm and Rimouski, and as it has always been the policy of the division to avoid overlapping, the work in these two counties is being discontinued. A similar work will be undertaken, however, in the counties of Kamouraska, l'Islet and Montmagny, for the district served by the Experimental Station at Ste. Anne, and in the counties of Quebec and Portneuf, for that served by the Cap Rouge Station.

An interesting outcome of the work done in the Abitibi District has been the organization by the local Agricultural Society of a flock contest for pure-bred poultry. In 1921, when this work was commenced, there was only one pure-bred flock in the district, whereas to-day there are over twenty-five.

(c) Co-operative Work with other Agencies.—Reference was made in the annual reports for 1921 and 1922 to the co-operative programme for poultry work in Quebec. In connection therewith a short course on "Breeding Principles" was held at the Agricultural College, St. Anne de la Pocatiere, during the summer of 1923, at which two members of the staff of the division, together with Mr. J. D. Lang, poultryman at the Lennoxville Station, assisted.

The attendance indicated the interest taken in the subject, there being sixty-seven present, divided as follows: Professors of agricultural colleges, 6; county agricultural agents, 11; technical poultrymen, 15; poultry instructors, 5; farmers, 14; and others, 16.

In addition to this, the division has co-operated wherever possible with other agencies engaged in poultry work in Quebec, and especially with the poultry associations. A member of the staff was present at the poultry shows at Quebec, St. Hyacinthe, Maria, St. Frongois du Lac, Victoriaville, St. Jerome, St. Jean de Port Joli and St. Jacques, and at the fall fairs at Rimouski and Montmagny.

(d) French Monthly Report Form Service.—This work forms a valuable supplement to the investigational survey work previously mentioned, and an increasing number of French-Canadian farmers are availing themselves of it. During the year, sixty-eight such farmers made reports on their poultry work, and for the coming year over one hundred have signified their intention of so doing.

The system followed is the same as that outlined in last year's report, with the addition that a yearly summary of each farmer's report is sent to all the others (without the names being mentioned), so that they can compare their results with those obtained elsewhere.

The following tables give a summary by breeds of the poultry operations on the sixty-eight farms for the year, and also, by districts, for thirty-one farms immediately adjacent to the St. Lawrence river:—

TABLE SHOWING RESULTS BY BREEDS, OF THE POULTRY OPERATIONS ON 68 FARMS IN QUEBEC, FOR THE YEAR ENDING OCTOBER 31, 1923

Breed	Number of flocks	Number of hens	Total eggs laid	Average production per hen	Receipts			Expenditure			Feed cost per doz.	Feed cost per bird	Total profit	Profit per bird
					Eggs	Other sales	Total	Feed	Stock and equipment	Total				
					$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	$ cts.	cts.	$ cts.	$ cts.	$ cts.
Barred Rocks	30	754	66,016	96·9	2,403 16	1,655 02	4,058 18	1,515 09	280 31	1,795 40	28	2 01	2,277 02	3 15
Rhode Island Reds	20	892	89,949	100·8	2,169 78	2,471 70	4,641 48	1,800 81	302 76	2,103 57	24	2 02	2,537 91	2 85
Mixed	11	389	20,655	53·1	776 02	270 19	1,046 21	345 50	37 40	382 90	20	0 89	663 31	1 71
White Leghorns	3	136	13,122	96·5	426 74	344 41	771 15	250 09	26 69	276 78	23	1 84	494 37	3 63
Chanteclers	2	55	5,715	103·7	541 62	294 93	836 55	181 51	58 90	247 41	40	3 43	589 14	10 71
White Wyandottes	2	88	14,812	168·3	583 60	194 28	777 88	219 04	155 49	374 53	18	2 49	403 35	4 57
Total	68	2,314	210,269	90·9	6,900 92	5,230 53	12,131 45	4,319 04	861 55	5,180 59	24·6	1·87	6,965 10	3 01

Remarks.—As will be seen by the table the average number of hens per farm was 34. The largest flock contained 191 birds, and the smallest only 4. The average production per hen was 90.9 eggs, the highest being 200.5 and the lowest 30.4. The average cost of feeding a hen for the year was $1.87, and the average price received for eggs 39·4 per dozen. The average profit per bird was $3.01, the highest being $11.87 and the lowest 67 cents.

The average price paid for scratch grain was $2.15 per hundredweight, and for mash, $2.01 per hundredweight. The average feed cost of producing one dozen eggs was 24·6 cents. The exceedingly high profit made with Chanteclers was due to the exceptionally high prices received for breeding stock and hatching eggs. As was the case in the preceding year, the mixed or mongrel flocks had the lowest production, and gave least profit over cost of feed.

TABLE SHOWING RESULTS BY DISTRICTS OF THE POULTRY OPERATIONS ON 31 FARMS IN QUEBEC

District	Number of flocks	Number of birds	Average Number per flock	———	Eggs per bird	Average value per dozen	Average cost per head	Average cost per dozen	Returns per bird
						cts.	$ cts.	cts.	$ cts.
North of St. Lawrence	16	675·5	42·2	Five winter months....	33·4	56	1 02	50	1 63
				Entire year.....	94·6	47	2 22	30	3 25
Southwest of Levis.....	11	454·4	41·3	Five winter months....	46·5	63	1 23	37	1 73
				Entire year.....	116·8	45	2 13	22	3 68
Southeast of Levis.....	4	99	24·8	Five winter months....	26·1	54	0 84	45	1 40
				Entire year.....	80·5	39	1 65	21	1 65

Remarks.—The foregoing table shows that the heaviest production and the greatest profits, both for the winter months and the entire year, were obtained by the farmers living south of the St. Lawrence and west of Levis, and the lowest by those south of the St. Lawrence and east of Levis. These figures give a very fair indication of the varying progress made in poultry keeping in those three districts, respectively.

(e) Visits to Illustration Stations in Quebec.—During the year all the Illustration Stations in Quebec were visited by a member of the staff of the division. This is dealt with in detail, however, in another section of the report under the heading "Co-operation with Illustration Stations."

POULTRY WORK IN THE MARITIME PROVINCES

As three new appointments have been made in this division to positions for work similar to that which has been conducted in the Maritime Provinces for about five years, a brief outline of what such work covers seems opportune in this year's report.

At first this included only the supervision of the poultry work upon the Branch Farms, with a limited amount of survey work among the neighbouring farmers, and the attendance at a few exhibitions. From year to year the demands have increased until the poultry supervisor's duties now include: (1) The assistance to the Farm superintendents in their poultry work upon the plants, or in the office; (2) the supervision of contests and registration; (3) demonstrations at fairs, Experimental Farm gatherings and picnics, and occasionally at Demonstration Stations; (4) a limited number of personal visits to private poultrymen in the vicinity of each farm.

Periodic visits are made (preferably one every month) to each Branch Farm, where the poultry supervisor assists in the poultry work. The nature of this assistance varies with the season, but it covers such activities as answering technical correspondence relating to poultry; the checking up of poultry records and seeing that these are up to date; going into the work of the plant with the poultryman; outlining and definitely starting experiments, and from time to time checking up the work in general. The poultryman is given help in his mating, banding, hatching and brooding, and in the pedigree work throughout all its phases, including the selection of pullets, the culling of the hens, picking the breeding cockerels, etc. In fact the work has been so varied, and the supervisor kept so busy, that it is difficult for him to get to the farms as often as the superintendents desire.

In the Maritime Provinces there are four Experimental Farms, and three of these have laying contests which come under the supervision of the poultry supervisor. This means that he has to supervise the management of each contest throughout the year. To him also falls most of the work of looking over the birds entered for the contest (these have to be inspected upon the owner's premises before they are sent to the contest), the rejection of disqualified birds, the banding of the birds, etc. Under his oversight also comes the supervision of the details of registration. In this is included actual examination of the birds that qualify in the contests; the final banding, tattooing and recording of them; the inspection of these upon the owner's premises before breeding; the inspection of the hatchings and later the chicks, and finally the passing and banding of the pullets and cockerels. As registration is new, the necessary pedigree work connected therewith is not understood as it should be, and it is therefore necessary to give the breeders instructions in this also.

Exhibits and demonstrations are given at fairs; lectures and demonstrations at gatherings upon the Experimental Farms, and at other farm gatherings, including a number of the Illustration Stations.

A limited amount of work has been done in visiting poultrymen and farmers in different sections, to give assistance regarding poultry house construction, mating, breeding, as well as selection in the fall.

CO-OPERATION WITH ILLUSTRATION STATIONS

A certain amount of assistance is given each year to the managers of the Illustration Stations. This takes the form of a donation of breeding eggs for hatching, or breeding cockerels.

This year a further step was made in this co-operation, when a member of the division visited all the Illustration Stations in the province of Quebec.

The hope is that all Illustration Stations can be visited periodically by an officer of this division, so that poultry conditions on each of these Stations will be in keeping with the other lines of work conducted, and therefore a demonstration to the community.

CO-OPERATION WITH WILD FOWL DIVISION

In co-operation with the Migratory Birds and Park Animals Division of the Canadian Parks Branch of the Department of Interior, an interesting experiment was started this year that will be keenly watched by some. It is in connection with the establishment of a " flight line " for wild (Canada) geese.

In the spring four wild geese were sent here by " Jack " Miner, of Kingsville, Ont. They had one wing clipped, so that they would have to stop here until their wings grew, when it was supposed they would fly, probably back to Kingsville or later, they would go south during the general flight of the wild geese from the north. These birds had Jack Miner's usual band bearing his name, date, and a verse of scripture, and upon arrival they were banded on the other leg by Mr. Lloyd of the Interior Department, with the recognized band for the purpose, supplied from Washington.

In addition to these four geese we hatched five young geese upon the Poultry Division plant, which were not pinioned (one wing taken off at the last joint), as is usually done with the wild fowl here, but allowed full liberty to fly. They were banded with the Washington band and it was expected they would go south this fall, along with the Miner four, in case these did not leave for Kingsville before the general flight south.

Should these nine, or even a part of them, go south for the winter, the problem was would they come via Ottawa next spring on their way north, and would that be the beginning of a permanent flight line. In the small lake (Dows) here, along with the rivers, and Britannia bay, it was thought there would be a good resting and feeding place for them in the spring and fall flights.

The experiment has not been without its interest, but the geese up to the present (January 1) have not gone south or anywhere else, evidently preferring to stop here by the " flesh pots " of the Experimental Farm, though they have been flying freely all fall, going apparently for miles in all directions. It is not probable they will leave for the south now but there is a chance they may go north in the spring, and if they do, it will be of interest to watch for them to come this way in their flight south in the fall.

MISCELLANEOUS

One bulletin on rabbits has been published, written by Mr. George Robertson and Mr. W. W. Lee, and dealing with breeding, hutches, feeds, marketing the meat and the fur. It also takes up the choice of a breed, the curing of the skins, and discusses a few of the more prevalent diseases.

Several of the exhibition circulars were revised during the year.

In August, the Annual Meeting of the American Association of Instructors and Investigators in Poultry Husbandry was held in the Poultry building, where, for four days, 125 to 175 delegates (mostly from the United States, with two from Europe) were in attendance. In the election of officers for the coming year, the Dominion Poultry Husbandman was elected president.

Important sections of this report have been prepared by the officers in charge; the Breeding by Mr. Robertson, the Contests by Mr. Taylor, the Field Work in Quebec by Mr. Lee, and the Exhibits and Farm Accounts by Mr Scott.

DISEASES

As usual we have had the co-operation of the Health of Animals Branch in our poultry disease work, and Dr. C. H. Weaver, Animal Pathologist, who is in charge of this work has put in very faithful service, and has prepared the following report of his year's work.

We appreciate very much this co-operation; the value of the work done is indicated in Dr. Weaver's report.

THE YEAR'S WORK

In concluding the year's work on poultry diseases it is felt that very satisfactory progress has been made. The records from the routine have a general accumulative value, while deductions from them when applied have apparently reduced the amount of illness. The research is largely incomplete on one year's work, but considerable advance has been made on the diseases under investigation.

While the work at the laboratory maintained at the Poultry Division is, in intent primarily and principally, of a research nature, the routine, nevertheless, is so urgent as to require due consideration. Roup and intestinal parasitism are far too prevalent and general to await their definite solution, and plans of a tentative nature have been adopted for the immediate needs.

A hospital with suitable isolation and quarantine facilities has been maintained throughout the year to accommodate ailing birds from the contests and the plant. The patients while in the hospital have had medical and surgical treatments according to the needs of each subject. And while this is very good, we have learned that it does not go far enough in dealing with some ailments, particularly those of a communicable nature. The work has, therefore, been extended to include prophylactic, or preventive treatment, to contact birds in pens, where certain contagious diseases have made an appearance. One must conclude that the substantial reduction over a corresponding period of the previous year, as being due in part at least, to this prophylaxis, since the diseases have repeatedly made an appearance without becoming enzootic (epidemic among animals) while the opposite holds good in pens where the preventive measures were not practised.

Autopsies have been made upon birds dying in the contest and the plant flock, and upon specimens received from outside sources. This work has been heavy, but here again, the information received upon the extent of the various diseases is worth the time expended thereon.

Research has been confined to one project only: Roup and Pox. Some vaccines have been partially investigated, and bacteria associated with Roup lesions have been studied largely for their pathogenic properties.

ROUTINE WORK

Autopsies for the year 1922 are summarized in the accompanying table No. 1.

According to diagnosis, this table gives the monthly number of specimens examined together with the annual total, also the monthly sum total of all diseases.

A total of 581 specimens was examined, or an average of 48.4 per month. The highest single month was in the spring season, May, with a total of 59.

Roup and Pox together, take first place in point of numbers with 132 specimens, or 22·7 per cent of all diseases. Intestinal parasitism, however, runs a close second, the number being 116 or a percentage of the total equalling 19·9.

Diseases	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
Roup and Chicken-Pox	20	17	12	20	20	8	5	1	5	7	7	10	132
Diseases incident to egg production	4	2	4	4	3	4	7	3	2	2	4	2	41
Hemorrhage	2	3	7	6	8	5	3	4	6	3	1	6	54
Peritonitis	3	5	6	8	4	4	3	5	4	3	2	6	53
Paralysis or blindness or both	5	1	2	2	2	2	2	5	....	2	1	2	26
Parasitism—intestinal	....	5	9	6	11	16	11	3	10	13	22	10	116
Distended Bursa of Fabricus	....	....	1	1	....	....	....	....	....	....	1	....	3
Tuberculosis	....	3	1	1	2	2	....	1	1	4	3	3	21
Luekemia	1	....	1	....	....	....	....	....	....	2	....	....	4
Vent Gleet	1	1	....	....	....	....	....	....	....	1	1	1	5
Tumor	....	....	....	2	....	1	....	1	....	1	2	3	10
Pneumonia	....	....	....	....	1	2	....	....	....	1	....	....	4
Heat prostration	....	....	....	....	....	2	2	1	....	....	....	....	5
Unsuitable specimen—decomposed	....	....	....	....	3	6	4	10	4	....	2	....	29
Miscellaneous	6	6	6	6	5	6	4	7	6	7	9	10	78
Total	42	43	49	56	59	58	41	41	38	46	55	53	581

This shows rather clearly the relative importance and seasonal nature of the disease Roup. August is the only month in which there is a total absence of both Roup and Pox, and at no other time have these diseases been so great as at the beginning of the year. It is also gratifying to note that at the end of the year the health conditions were bettered by more than 44 per cent over the corresponding period of the previous year. This change cannot be attributed entirely to normal fluctuations, as the sharp rise shown in the Roup curve for November and December is due to cases coming from plant pens where prophylaxis was not practised. In contrast to this, the following example is interesting:—

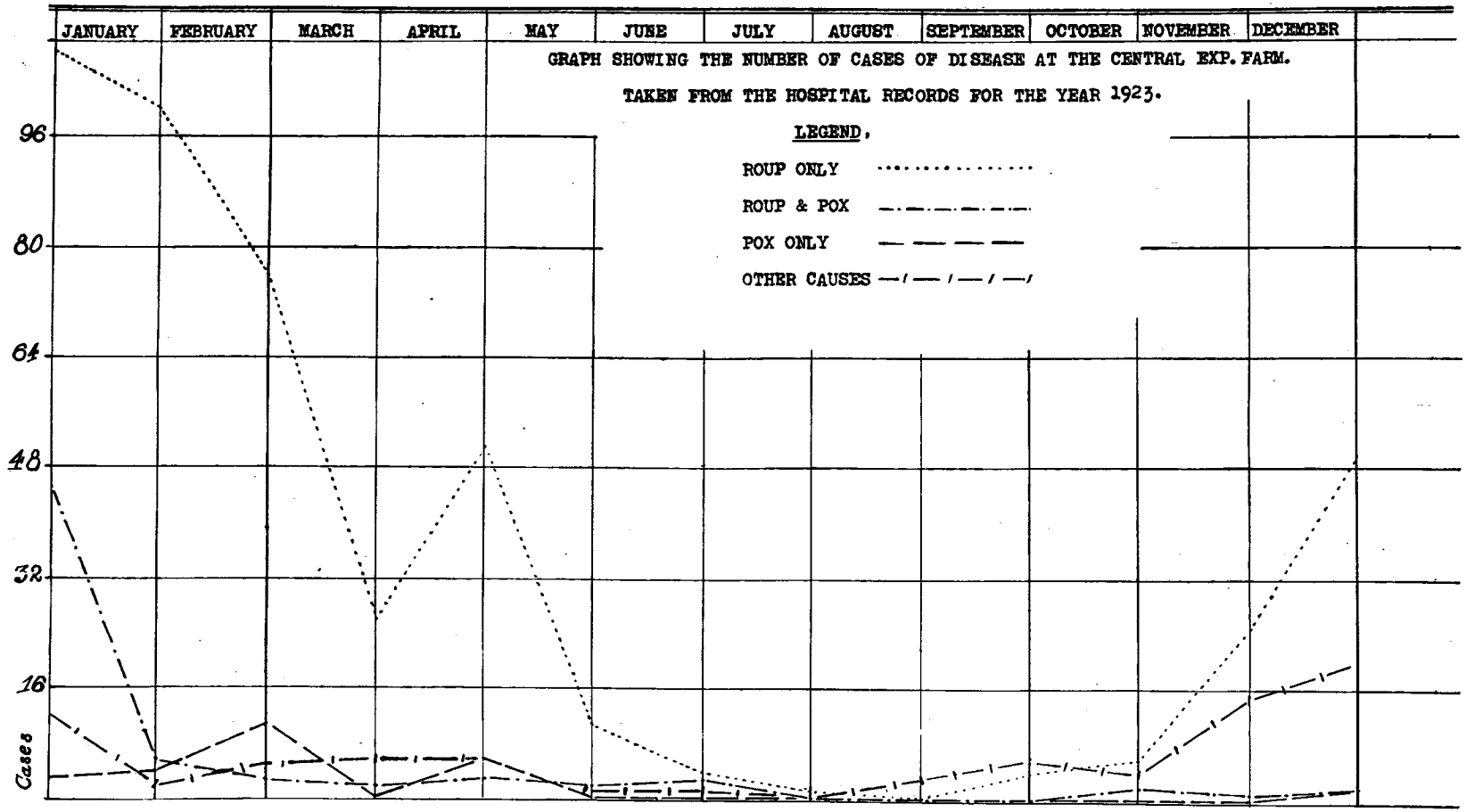
CANADIAN CONTEST

	December, 1922 — Contacts without treatment	December, 1923 — Prophylaxis to contacts
Roup	43	4
Roup and Pox	4	0
Pox only	3	3
Totals	50	7

The sharp rise in the graph (see page 42) during November and December for diseases due to "other causes" is due mainly to intestinal parasitism among the young stock returning from summer range.

Hospital Summary January to June, 1923

—	January				February				March				April				May				June				Totals			—
	—	Heavy breeds	Light breeds	Total	—	Heavy breeds	Light breeds	Total	—	Heavy breeds	Light breeds	Total	—	Heavy breeds	Light breeds	Total	—	Heavy breeds	Light breeds	Total	—	Heavy breeds	Light breeds	Total	—	Heavy breeds	Light breeds	
Roup only	....	68	31	99	....	56	20	76	....	13	13	26	....	11	40	51	....	6	5	11	....	1	3	4	....	155	112	267 or 79·2%.
Roup and Pox	....	3	3	6	....	2	1	3	....	2	0	2	....	2	1	3	....	1	1	2	....	1	2	3	....	11	8	19 or 5·6%.
Pox only	....	2	2	4	....	10	1	11	....	....	....	....	....	5	1	6	....	....	....	....	....	....	....	....	....	17	4	21 or 6·2%.
Other causes	11	....	....	....	2	....	....	....	5	....	....	....	6	....	....	....	5	....	....	....	1	....	....	....	30	....	....	30 or 8·9%.
Totals	....	73	36	109	....	68	22	90	....	15	13	28	....	18	42	60	....	7	6	13	....	2	5	7	....	183	124	337.
Per cent Roup and Pox	....	66·9	33	35·5	....	75·5	24·4	29·3	....	53·6	46·4	9·1	....	30	70	19·5	....	53·8	46·1	4·2	....	28·5	71·5	2·2	....	59·6	404	.....
Per cent other causes	36·6	....	....	....	6·6	....	....	....	16·6	....	....	....	20	....	....	....	16·6	....	....	....	3·3	....	....	....	8·9	....	....	.....


JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
GRAPH SHOWING THE NUMBER OF CASES OF DISEASE AT THE CENTRAL EXP. FARM.
TAKEN FROM THE HOSPITAL RECORDS FOR THE YEAR 1923.
LEGEND,
ROUP ONLY
ROUP & POX
POX ONLY
OTHER CAUSES
96
80
64
48
32
16
Cases

HOSPITAL REPORT

Cases to the number of 466 were cared for in hospital during the year, and grouped under four main headings, they are as follows:—

Roup only	369
Roup and Pox	13
Pox only	6
Other causes	78
Total	466

This summary covers the season in which Roup is most prevalent. Roup and Pox are separated showing the number of cases and percentages by month and for the period, dividing the heavy from the light breeds. The heavy and light breeds represent the dual purpose and egg type breeds respectively.

COURSE AND MORTALITY OF ROUP AND POX

Forty-eight birds on admittance to hospital were examined and a diagnosis made on each case. They were examined at intervals to determine the course of the disease of each, together with any complications which might arise; the results appearing as follows:—

Disease when admitted	Number	Complications, etc.
Pox	4	1 developed Roup.
Roup	18	2 developed Pox.
Roup and Pox	26	1 died.
		14 recovered from Roup first.
		1 recovered from Pox first.
		The remainder had a gradual abatement of both.

These birds were from a common source, and, in comparison with other figures herein contained, run a very high percentage of Pox.

Medical treatment was administered as required or indicated, and was instituted early in the course of the disease.

The low mortality indicates either a low virulence of the causative agents, high vitality of the stock or that the disease when taken early is quite amenable to treatment.

RESEARCH OR INVESTIGATION WORK

This work has been confined to the study of one problem, that of Roup and Chicken-pox, except for brief periods given to other important diseases, such as Intestinal parasitism, and Avitomosis (deficiency disease through faulty rations), when this did not materially interfere with the main subject.

EXPERIMENT TO DETERMINE THE CONTROLLING EFFECT OF VACCINES ON ROUP AND POX AFTER THE APPEARANCE OF DISEASE IN THE FLOCK

Three vaccines were used and were designated as follows: B, an attenuated virus (a true vaccine) prepared in a foreign laboratory from Chicken-pox scabs; A. V., a similar preparation which was made in our own laboratory; P. B., a bacterial vaccine (polyvalent bacterin) the product of a commercial firm.

In accordance with the common usage of avian vaccines they were employed in a pen after the appearance of disease. The pen is designated No. 22. All ailing fowl were removed to the hospital previous to vaccination, which left 18 birds for each vaccine, and 22 birds as controls. Any birds showing evidence of disease following vaccination were immediately removed to the hospital. Other than for this and the vaccination no change was made in the handling of the pen.

Vaccination was done on December 11, 1922, and on December 15, 1922, birds had been admitted to the hospital from this pen as follows:—

Vaccine B	4 birds	22·2%	
" A.V	4 "	22·2%	
" P.B	8 "	44·4%	
Total average from vaccinated			29·6%
Non-vaccinated	4 birds	18·1%	
Average from non-vaccinated			18·1%

On December 22, 1922, in addition to and including the above, birds were admitted as follows:—

Vaccine B	7 birds	38·8%	
" A.V	5 "	27·7%	
" P.B	9 "	50·0%	
Total average from vaccinated			38·8%
Non-vaccinated	8 birds	36·3%	
Average from non-vaccinated			36·3%

Final results on March 31, 1923, were as follows:—

Vaccine used	Percentage contracting disease	
B	88·8%	
A.V	55·5%	
P.B	55·5%	
Average		66·6%
Non-vaccinated controls		72·7%

Summary of duration of disease in each vaccinated group, and the control birds:—

Vaccine used	Number of birds diseased	Days in hospital	Average days
B	5	173	11·5
A.V	8	174	21·75
P.B	10	131	13·1
Non-vaccinated	13	184	14·1

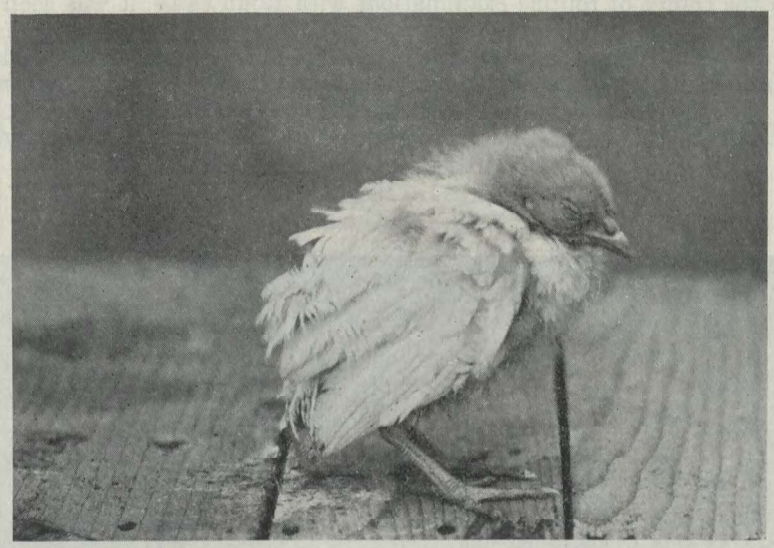
Average number days illness, vaccinated group	14·4
Average number days illness, non-vaccinated group	14·1

ROUP INVESTIGATION

With Roup and Pox, considerable controversy exists among those who are in a position to discuss the subject, as to whether the two represent different forms of the same disease, or are separate diseases.

In this report there is no intention of entering into this discussion, for up to date the work has been almost entirely with the one condition or disease.

From the beginning it should be pointed out that this is not intended as a report of the Roup investigation work, which will be given at the proper time, and through a suitable medium, but is merely a brief intimation of the work in hand, mode of attack and its possibilities.

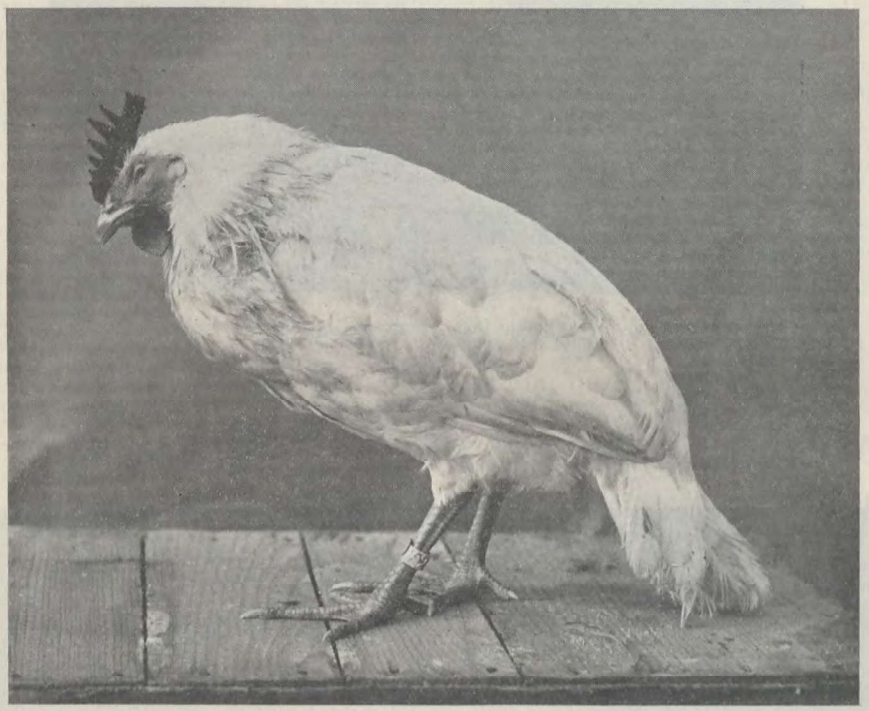


Chick fed a culture of an organism from a roup case. The eye is swollen shut and is filled with a mass of caseous material.

Chick from control pen in the feeding a culture of a roup organism experiment. Size, development of comb and wattles and bright eye are in noticeable contrast to the chick in the last illustration.

Roup, as pointed out earlier in this report, is a disease of vast economic importance to the poultry industry, and as such was selected for definite study.

In the course of routine examinations with Roup cases, it was soon learned that a bacterial organism of certain type was always associated with the lesions of the disease. Where the lesions are exposed to outside influences various organisms are, as one would expect, to be found, and usually in great numbers. This is not the case, however, where the disease localizes itself in more protected parts of the body, and here quite frequently, but one variety of organism is met with.

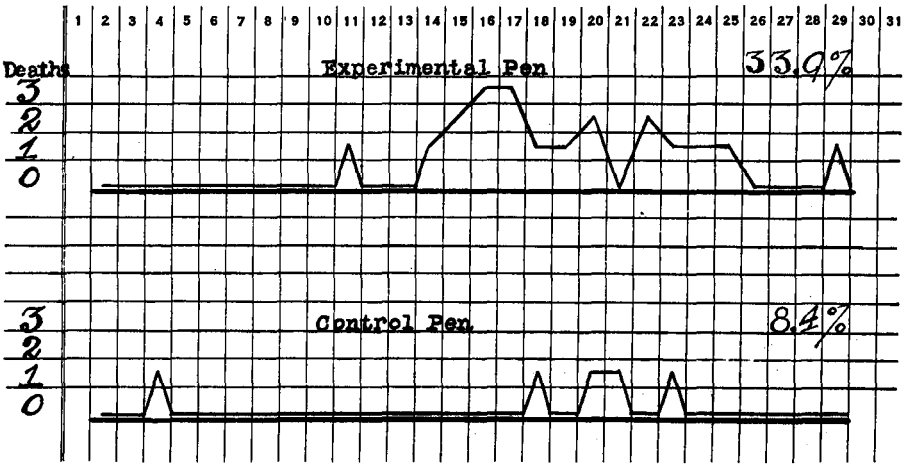


This bird was inoculated with a culture of an organism from a roup case. The photo was taken only a short time previous to death. The eye was closed and filled with a caseous exudate. The shoulder feathers were soiled and the subject had become weak and anemic.

It was, therefore, considered advisable to determine whether or not the organism in question was possessed of pathogenic, or disease producing, properties, and with this end in view a series of experiments have been undertaken.

The organism has been tested upon adult fowl, chicks, rabbits, pigeons and guinea pigs, by means of inoculations, and has been fed to chicks. Inoculations on adult fowls have produced disease in 70 per cent of the subjects, with a mortality of 14·2 per cent. In chicks, when inoculated, the mortality amounted to 100 per cent; and when fed the loss amounted to 33·9 per cent, against a mortality of 8·4 per cent in the control pen. This experiment covered a period of 27 days. (See table): Pigeons gave a mortality of 100 per cent; and rabbits and guinea pigs showed little resistance.

The brooder chicks were all held under identical conditions. The experimental pen was fed, on the 2nd of the month, a culture of an organism which was isolated from a Roup lesion. The mortality by the 29th when the deaths ceased amounted to 33·9 per cent. In the control pen (without culture) the deaths amounted to 8·4 per cent.



Mortality in culture-fed chicks. Comparison with control pen.

EXPERIMENTAL PROJECTS UNDER WAY IN THE POULTRY DIVISION, CENTRAL EXPERIMENTAL FARM, OTTAWA

INCUBATION

PROJECT NO.	TITLE
P. 1.	Best type of incubator (hot water, hot air, electric).
P. 4.	Ventilation of incubator.
P. 5.	Temperature of incubator.
P. 6.	Moisture in incubator.
P. 9.	Turning eggs.
P. 10.	Cooling eggs.
P. 11.	Cause of dead germs.
P. 17.	Natural vs. artificial incubation.

BROODING

P. 18.	Best type of brooder.
P. 21.	Starvation period for chicks.
P. 23.	Artificial vs. natural brooding.

REARING

P. 24.	Best type of colony.
P. 25.	Best size of flock for rearing.
P. 26.	Most suitable range for rearing.
	Exp. (*a*) Confinement vs. range.
P. 29.	Separation of sexes in rearing.
P. 30.	Hastening maturity of late pullets.
	Exp. (*b*) Electric lights.
P. 32.	Feeding methods in rearing.

FATTENING AND FINISHING

P. 42.	Methods and rations for fattening and finishing roasters.
	Exp. (*a*) Crate vs. pen fattening.
P. 47.	Milk substitutes for fattening.

SELECTION OR CULLING

P. 51.	Hogan test for culling.
P. 52.	Selection of pullets by handling.
P. 53.	Selection of layers by pigmentation.
P. 54.	Selection of layers by eye shape.

EGG PRODUCTION

P. 55. Methods of handling for egg production.
Exp. (a) Confinement vs. range.
Exp. (b) Electric lights.
P. 56. Pedigree breeding for egg production.
Exp. (a) Influence of sire.
P. 58. Best hatching date for egg production.
P. 62. Costs of egg production.
Exp. (a) Per dozen.

HOUSING

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P. 68. Heated vs. cold houses.
P. 69. Ventilation of laying houses.
P. 71. Best floor space for laying houses.
P. 72. Best type of front for laying houses.

FEEDS AND FEEDING

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P. 84. Buttermilk vs. beef scrap.
P. 85. Semi-solid vs. fresh buttermilk.
P. 86. Tankage vs. beef-scrap.
P. 90–95. Various green feeds and substitutes.
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P. 97. Effect of green feed on egg size.
P. 159. Effect of various green feeds on fertility.
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Exp. (a) For chicks.
Exp. (b) For layers.
P. 102. Mustard as a stimulant.

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P. 114. Breeding for egg size.
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P. 134. Life history of internal parasites of poultry.
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