



AGRICULTURAL MARKETING IN INDIA

Report on the MARKETING OF EGGS IN INDIA AND BURMA

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INTRODUCTION.

This report deals with a profitable but sadly neglected branch of agriculture. It is commonly supposed that producers keep poultry largely for their own use. In actual fact, however, more than 60 per cent. of the hen eggs and 80 per cent. of the duck eggs are actually marketed. The total value of the eggs sold in the course of a year amounts to 5½ crores of rupees. The value of the birds themselves equals about 7½ crores. It would be appreciated, therefore, that poultry provides a considerable cash income to a very large number of village producers throughout the country, and constitutes an important cottage industry.

By sheer neglect about 14 lakhs rupees worth of eggs are simply not collected in the course of a year. This is apart from the depredations of kites, crows, jackals and other vermin to poultry itself. Much, if not most, of this waste is preventable by the provision of small but sanitary mud poultry houses and the use of a little wire netting. This would seem to indicate scope for those interested in village reconstruction.

In the course of marketing the loss due to stale eggs, breakages, etc., is enormous, and at some periods of the year amounts to as much as 25 per cent. The value of the total loss to the industry, due to various causes, is estimated to be over 57 lakhs rupees annually. This report shows how this waste might be eliminated and indicates how the business could be expanded and made more profitable to producers. The much deplored deficiency of protein matter in the diet of our people could also be remedied to some extent.

The report is short and the whole of it will bear reading, but those who wish to get quicker grasp of the essential points might read first the Inter-Chapters.

which are given at pages 37, 63, 97, 117, 137, 157, 187, 196, 209, 220 and 240.

Thanks and acknowledgments are due to a large number of producers, egg merchants and others, for their kind and friendly cooperation with the marketing staff, in getting this report out.

Note.—The Government of India should not be regarded as assuming responsibility for all or any of the material contained in this report.

Office of the Agricultural Marketing Adviser
to the Government of India,
Delhi.

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CHAPTER I.—SUPPLY.

A.—Production.

(1) NUMBER OF POULTRY.

Fowls may be divided into two general types, viz., *desi* and improved. The term *desi* is used in regard to all indigenous fowls which, even if they have any breed names or characteristics (e.g., *tenies*, *chittagong*, *asils*, *ghagas*, *lolab*, *karaknath*, etc.), could not be maintained pure on account of the promiscuous breeding that takes place under uncontrolled village conditions. The *desi* fowls are generally small (the average weight of a mature hen being about 3 lb.) and even in the smallest flock various colours and conformations are generally observed. (See top plate facing page 2.)

The term "improved" is applied generally to pure-bred fowls (white leghorns, etc.), imported from abroad or bred and acclimatized in India (see bottom plate facing page 2). The cross-bred fowls, viz., the progeny of *desi* and pure-bred stock are taken with *desi* fowls. In India the number of pure-bred fowls is so small compared to the *desi* fowls, that unless there is a strict control in the villages, the cross-bred progeny in one or two generations invariably reverts to the *desi* parents. The conditions under which poultry is kept in the villages actually helps to hasten the process of reversion. For these reasons the number of cross-bred fowls is considered with the *desi* poultry.

(a) *Desi and improved layers (hens and pullets*)*.—Prior to this survey there were no figures available for the number of fowls kept in any part of India, except for a poultry survey of two villages in South Travancore in 1925, a census of fowls taken in 28 districts of the Punjab in 1932, a survey of 148 villages in Nizam's Dominions in 1932 and an economic survey of nine typical villages in Cochin during 1934. In the absence of a poultry census, various methods had to be devised to arrive at the estimates. These are described briefly in Appendix I.

The estimated number of laying birds, *desi* and improved for the different areas are shown in Appendices II and III from which it may be observed that India possesses 514.7 lakhs *desi* pullets and hens and 7.3 lakhs improved ones, or a total of 522 lakhs laying fowls. In Burma the *desi* birds are 9.6 lakhs whereas the improved ones are only 21,400.

(b) *Non-layers (cocks, chickens, etc.)*.—The number of birds other than pullets and hens depends upon various factors. For instance, soon after the main hatching season in March and November, the number of chicks and chickens is considerably greater than other birds, but the proportion gradually decreases. Therefore, in arriving at the estimates in different areas, only the average number of

*Pullets are female chickens, four months to a year old. They generally commence to lay when they are about seven months old.

other birds, kept per laying hen, has been considered. The estimates of the total *desi* and improved birds (including the layers) are also given in Appendices II and III and it would appear that in India there are 1,196.6 lakhs of non-laying *desi* fowls (1,711.3 lakhs less 514.7 lakhs) or for every laying hen there are 2.3 other birds. For the 7.3 lakhs of improved laying hens, there are 14.1 lakhs of other birds.

In *Burma* there are 24.9 lakhs other fowls (including *desi* and improved) or for every laying hen there are 2.5 other birds.

(c) *World's fowl population*.*—

Number of laying hens and total fowls (i.e., birds including the non-layers) in the reporting countries of the world.

	Total fowls (In lakhs).	Laying hens (In lakhs).	Percentage of layers to total fowls.	Percentage of world total.
Asia (†) (excluding India and Burma).	5,880	4,327	74	35.6
United States of America.	4,261	3,699	87	25.8
Europe (‡)	3,419	1,818	53	20.7
Africa (§)	611	144	24	3.7
Canada	530	245	46	3.2
South America (||) ..	43	33	77	0.3
<i>India</i>	1,732	522	30	10.5
<i>Burma</i>	34	9	26	0.2
Total	16,510	10,797	65.4	(100)

*Compiled from the International Year-Book of Agricultural Statistics, 1936-37. The figures relate generally to the year 1935.

†British Borneo, French India, Cambodia and Cochin China, Japan and Kwang-tung.

‡Germany, Belgium, Denmark, Spain, Estonia, Hungary, Irish Free State, Latvia, Sweden, Great Britain and Northern Ireland, Czechoslovakia and Austria.

§Madagascar, French Morocco, French West Africa and Tunisia.

||Uruguay.



A *desi* hen and cock.



A flock of improved birds.



A flock of 2,000 ducks in a concentrated area of production.



A flock of turkeys.

From the foregoing table it may be observed that India has about 10½ per cent. of the total number of fowls in the world, as reported, but that compared with these countries (except Africa) India and *Burma* carry a smaller proportion of layers. This is attributed to the incidence of poultry diseases and epidemics, on account of which the producers have always to maintain an extra number of young birds.

(d) *Laying ducks*.—Ducks by nature are semi-aquatic birds and prefer wet and muddy conditions, e.g., tanks, river-banks, creeks and deep paddy and jute fields. They thrive in areas where they have free access to mud and water or can pick weeds, plant roots and other food, including small fish and crustaceans. They are therefore almost absent in dry areas like *Baluchistan*, *Rajputana*, *Central India States*, *Sind*, *Cutch* and *Kathiawar*. The last three areas have great lengths of sea-coast but they do not possess the muddy conditions, etc., necessary. There is, however, one marked exception to the above observation, namely, the *Bombay Presidency*, where although conditions are in many parts favourable, the number of ducks is estimated to be only about 10,000.

For marketing purposes the number of ducks is negligible in *Kashmir State*, *Agency areas of North-West Frontier Province*, *Baluchistan*, *Punjab States*, *Delhi Province*, *Rajputana*, *Central India States*, *Baroda State*, *Western Indian States*, *Deccan States*, *Eastern States*, *Bundelkhand Agency* and *Assam States*. In the *Punjab States*, *Bundelkhand Agency* and *Assam States* round numbers have been taken. In case of *Travancore*, *Madras*, *Bengal* and *Burma*, however, where large numbers of ducks are generally found (see top plate on the opposite page), special methods were adopted to estimate their numbers, and these are discussed in Appendix I.

It may be further observed that the ducks in India are said to be much less susceptible to poultry diseases than the fowls. The ducks also lay more and larger eggs. For instance, the weight of 53 eggs laid annually by a hen would be about 5 lb. compared with 90 eggs laid by a duck which would weigh 12.5 lb. or about two and a half times the weight of hen eggs. In *Burma* the ducks are estimated to lay 180 eggs per annum, and the hens only 40. There, an average duck produces six times more weight of eggs than a hen.

The total number of laying ducks in India and in *Burma* is estimated to be 54.8 lakhs and 6.7 lakhs respectively, and is given in Appendix IV.

(e) *Non-layers, drakes, ducklings, etc.*—It is estimated that in India there are 111.5 lakhs other birds besides 54.8 lakhs of laying ducks making a total of 166.3 lakhs ducks. In *Burma*, the other birds number about 13.9 lakhs besides 6.7 lakhs laying ducks, or a total of 20.6 lakhs ducks. The estimates and distribution of the total ducks (including laying ducks) are given in Appendix IV, and it would be observed that, in India, for every laying duck there are 2 other birds, whereas in *Burma* there are 2.1 other birds.

(f) *World's duck population*.*—

Population of ducks (including the non-layers) in certain reporting countries of the world.

	Ducks (In lakhs).	Percentage to the world's total. (reporting countries).
Europe (†)	122	13.4
North and Central America (†) ..	7	0.8
China	567	62.1
Other Asiatic Countries (§)	25	2.8
Africa (||) .. .. .	5	0.5
India	166	18.2
Burma	20	2.2
Total	912	(100)

From the figures above, it would be seen that India and Burma contain about one-fifth of the recorded world's duck population, and excluding China, they possess more ducks than all the countries put together.

(g) *Geese, turkeys and guinea-fowls.*—The estimated number of laying gees and turkeys is small, being 1.57 lakhs and 10,500, respectively. They are found to exist only in a few areas. The distribution of these birds is shown in Appendices V and VI. So far as geese are concerned, they are found mostly in Bengal (66,000) and Bihar (57,000). (See bottom plate facing page 8.)

The surveys have shown that geese and turkeys on account of the special attention and heavy feeding that they require, together with the fact that they lay relatively few eggs per annum, are seldom maintained for production of market eggs, but are reared generally

*International Year-Book of Agricultural Statistics, 1936-37. The figures relate generally to the year 1935.

†Germany, Estonia, Irish Free State, Latvia, Lithuania, Netherlands, United Kingdom (England, Wales, Scotland and North Ireland), Czechoslovakia, Yugoslavia.

‡Canada, Panama, New Foundland.

§China, British Borneo, Korea, French India, Formosa, Cambodia (Indo-China), Japan, Japanese Sakhalin, Syria and Lebanon, Transjordan.

||Madagascar, French Morocco, Mozambique, Southern Rhodesia.

to meet the demand for table poultry, particularly during X'mas. From the table on page 25 it may be seen that about three-fourths of the goose and turkey eggs are used for hatching purposes.

The number of guinea-fowls in India is estimated to be about 4.2 lakhs of which about 3.7 lakhs (88 per cent.) are in the *United Provinces*, wherein the largest numbers are found in the districts of *Allahabad* and *Saharanpur*. Guinea-fowls are generally kept for table use as well as for production of market eggs. It may further be noticed that almost half the number of eggs produced are used for hatching, although in some of the areas they are kept and reared exclusively for table use. Appendix VII shows their numbers in the different areas.

In *Burma* the number of geese, turkeys and guinea-fowls is negligible and in some of the districts they are not to be found at all.

(h) *Non-layers (ganders, goslings, turkey-cocks and guinea-fowl cocks, etc.).*—Estimates of the numbers of these are given in Appendices V, VI and VII.

(i) *Total poultry and their approximate value.**India.*

	Laying birds.				Other birds.		
	Lakhs.	Percentage to total laying birds.	Value.		Lakhs.	Value	
			per bird Rs.	Total Rs. (lakhs)		per bird Rs.	Total Rs. (lakhs).
<i>Desi fowls</i> ..	514.7	88.3	0 10 0	321.69	1,196.6	0 4 0	299.15
<i>Improved fowls</i> ..	7.3	1.3	2 0 0	14.6	14.1	1 0 0	14.1
<i>Ducks</i> ..	54.8	9.4	1 4 0	68.5	111.5	0 4 0	27.87
<i>Geese</i> ..	1.6	0.3	3 0 0	4.8	0.8	1 0 0	0.8
<i>Turkeys</i> ..	0.1	0.02	3 8 0	0.35	0.07	1 0 0	0.07
<i>Guinea-fowls</i> ..	4.2	0.7	1 8 0	6.3	2.2	0 4 0	0.55
Total ..	582.7	(100)	..	416.24	1,325.27	..	342.54

The estimated value of the total poultry in India is Rs. 7.6 crores.

Burma.

	Laying birds.				Other birds.		
	Lakhs.	Percentage to total laying birds.	Value.		Lakhs.	Value.	
			per bird Rs.	Total Rs. (lakhs).		per bird Rs.	Total Rs. (lakhs).
Desi fowls ..	9.6	58.2	0 10 0	6.0	24.4	0 4 0	6.1
Improved fowls ..	0.2	1.2	2 0 0	0.4	0.5	1 0 0	0.5
Ducks ..	6.7	40.6	1 4 0	8.37	13.9	0 4 0	3.47
Geese ..	Neg.	..	..	Neg.	..	..	..
Turkeys ..	Neg.	..	..	Neg.	..	..	..
Guinea-fowls ..	Neg.	..	..	Neg.	..	..	..
Total ..	16.5	(100)	..	14.77	38.8	..	10.07

The estimated value of the total poultry in *Burma* is Rs. 25 lakhs.

(2) AVERAGE NUMBER OF BIRDS PER VILLAGE.

From the maps facing pages 10 and 11, it would be seen that the production of eggs varies even within a province or State. The table below, however, shows the number of poultry kept per average village in different provinces and States. It would be seen that the number ranges from 102 in the *Central Provinces* to 1,985 in *Cochin State*. The all-India average (including areas of sparse production which are not mentioned in the table) is 286 birds per village.

Average number of fowls and ducks kept per village.

	Fowls*	Ducks*	Total.
Kashmir ..	453 (50)†	Neg.	453
North-West Frontier Province ..	919 (49)	11 (100)†	930
Punjab ..	183 (55)	3 (50)	186
Sind ..	291 (55)	2 (40)	293
Bombay Presidency ..	432 (60)	0.9 (150)	433
Mysore State ..	334 (60)	0.6 (100)	335
Cochin State ..	1,728 (50)	257 (120)	1,985

*Including layers and other birds, e.g., cocks, drakes, chickens, ducklings, etc.

†The figures in brackets indicate the number of eggs produced per hen or duck in the various areas, and these are discussed on pages 8 and 11.

	Fowls.	Ducks.	Total.
Travancore State ..	1,753 (50)	56 (120)	1,809
Madras ..	652 (51)	106 (126)	758
Nizam's Dominions ..	266 (62)	3 (61)	269
Central Provinces ..	101 (48)	0.5 (80)	102
United Provinces ..	166 (70)	5 (100)	171
Bihar ..	161 (60)	2 (130)	163
Orissa ..	133 (50)	15 (127)	148
Bengal ..	518 (36)	83 (75)	601
Assam ..	157 (41)	79 (39)	236
All-India Average ..	261 (53)	25 (90)	286
Burma ..	107 (40)	64 (180)	171

In the absence of any investigation or research in this direction, it is difficult to say if conditions in the villages are good enough to provide sufficient and proper natural food for the present number of fowls to enable them to maintain a normal rate of growth or to produce eggs to the maximum of their inherent capacity. On the other hand, the estimates of egg production indicate that the *desi* hens in the *Central Provinces*, with an average of only 101 birds per village, lay less eggs per annum (48) than the hens in *Travancore State*, where the number of fowls per village is 1,753 and the average hen lays 50 eggs per annum. A comparison of other figures in brackets would also show that there is apparently no relationship between the number of birds maintained per village and the number of eggs laid per bird. The number of birds kept per village no doubt largely depends upon the class of population, e.g., Muslims, Christians, etc., as the keeping of poultry is confined mostly to these, the majority community of Hindus abstaining from it generally.

There is also another aspect of feeding of birds and production of eggs. Among other things a bird must have sufficient and right type of feed (balanced ration) to enable it to lay normal eggs that can hatch into chickens. Since the percentage of hatching in village produced eggs is often reported to be as high as 75, there seems little doubt that the birds are getting normal balanced feed. This may be attributed to the instinct, and the industrious habits of the birds that help them to procure for themselves sufficient and proper food. As such it is desirable that experiments should be carried out in the villages to study the potentialities of increasing the number of birds, and consequently the production of eggs in each village, without incurring any considerable expenditure on hand-feeding or raising the cost of production of eggs. For instance, there appears to be hardly any reason why even under the existing conditions, the *Central Provinces* should maintain an average of only 101 fowls per village and not an average of 266 as in the adjoining *Nizam's Dominions*. Similarly the extent to which the number of eggs per bird, or the size of eggs can be improved through proper feeding, breeding and management, needs to be further studied.

One of the very few places where work in the last named direction appears to have been in progress, is the Government Farm, *Gurdaspur* (*Punjab*), and it is indicated* that the laying capacity of *desi* fowls is capable of considerable improvement. For instance, in their sixth generation, a pen† of 16 *desi* hens laid 67 eggs per bird against 59 in the previous year.

(3) PRODUCTION OF EGGS PER BIRD.

(a) *General*.—From the table on page 5 it would be noticed that, of the total laying birds in India, *desi* hens constitute over 88 per cent., whereas the improved hens comprise only 1.3 per cent. The *desi* hens are mainly kept in the villages. It is, however, significant that in the past on most of the Government or private poultry farms, only fowls of imported strains were kept in large numbers and their records studied. For this reason, the information regarding the *desi* poultry or their egg laying capacity is very meagre. A few records of selected improved hens (Leghorns, Rhode Island Reds, etc.), bred and kept under farm conditions are also available but the performance of these birds, under farm conditions, cannot be compared with that of *desi* poultry under village conditions. For that matter even the records of *desi* birds kept under farm conditions, cannot be applied to all *desi* birds.

The value of the farm records is further minimised by the fact that they are seldom available for the same birds or even the same number in a pen for any length of time. This is due to epidemics (which are quite frequent throughout the country) and to birds being sold out constantly.

It might further be pointed out that the total number of laying ducks in India is 54.8 lakhs and in Burma 6.7 lakhs. In India they constitute about 9 per cent. of the layers, but in Burma they are 40 per cent. of the total laying birds. Laying records are, however, not available on any of the Government farms except for 12 ducks at the *Tarnab* Farm, *North-West Frontier Province*. Ducks, it appears, are kept on only a few Government farms and even in areas where they are of considerable commercial importance, no attempt is made to study their egg laying capacity.

No records have come to light in the course of the survey regarding the production of eggs by turkeys, geese and guinea-fowls.

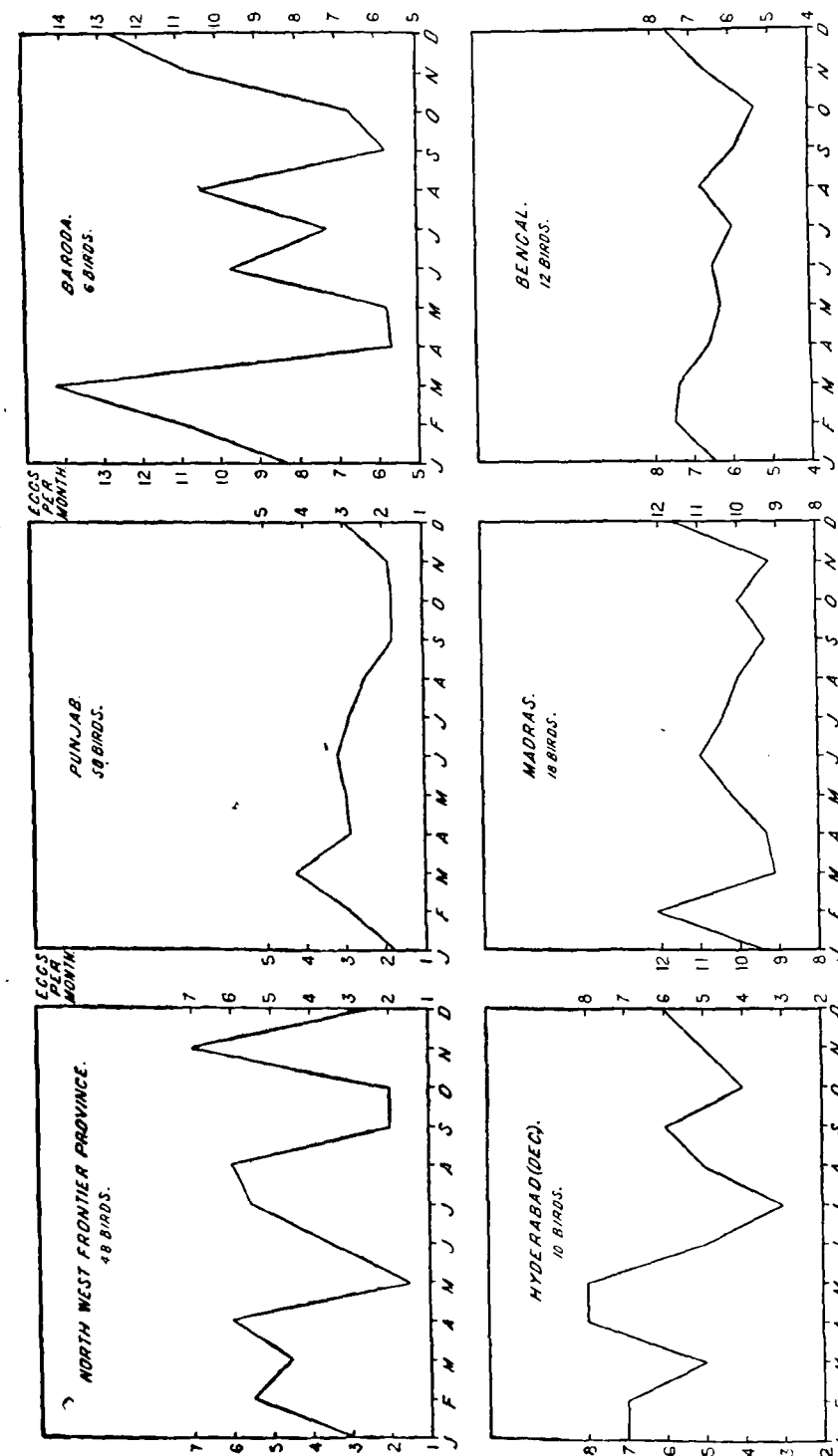
(b) *Desi hen eggs*.—The only reliable and complete records available are reproduced in Appendix VIII. (See also the diagram on the opposite page.) In the last column of the Appendix, the figures taken as the average number of eggs laid per *desi* hen, in the respective areas, are also given. It would be seen that in every case (except in the *Punjab*) the figures adopted are less than those obtained under farm conditions.

*Annual Report of the Poultry Expert for the year ending 30th June 1936.

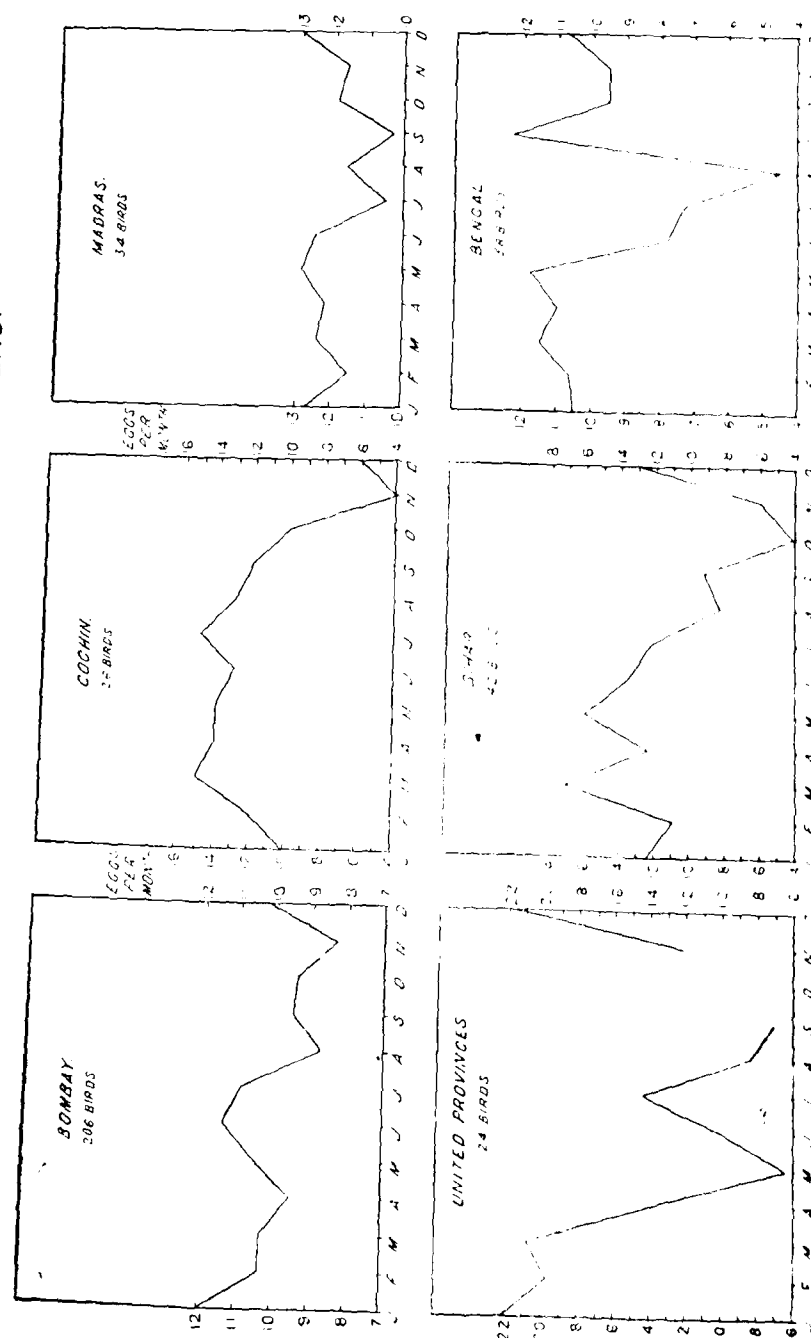
†A "pen" is a group of a few hens with (or without) a cock.

[Facing page 8.]

LAYING RECORDS OF DESI HENS



LAYING RECORDS OF IMPROVED HENS.



In this connection the results of an experiment carried out at the Government Poultry Farm, Gurdaspur,* on a common type of black *desi* fowl, are interesting. Specimens were obtained and work on two pens of this type was commenced and it was observed that even with the first generation a selection of 25 per cent. of a fairly uniform type was possible, but what was more, the unimproved village birds laid on an average 64 eggs per annum. It would, therefore, appear that the estimate of 55 eggs per hen is a reasonable one for the whole of the *Punjab*.

It, however, seems extraordinary that in a country where there are about 525 lakhs *desi* hens (India and *Burma*), annual and reliable records of only about 250 *desi* birds should be available, and it may be appreciated that if an estimate of the numbers is difficult, an estimate of their capacity to produce eggs, which depends on a multitude of factors, is still more so. The number of hens kept per household generally varies between 1 and 4. Their numbers from day to day, apart from other factors, depend upon the incidence of disease, requirements for eating purposes, sales and the number reared from hatchings. These factors, together with the indifferent and poor laying capacity, prevent even regular poultry keepers from estimating confidently the annual laying capacity of their birds. Most of the figures of production are, therefore, based on enquiries made from various sources including the village egg collectors who visit the holdings regularly and are generally conversant with the conditions of village poultry. The help of numerous Veterinary Assistants and village officials was also taken to collect or verify the information on this point. Appendix II shows the estimates of the number of layers, the number of eggs laid annually per *desi* bird and the annual production of eggs. It may be observed that while the all-India (excluding *Burma*) average production for a *desi* hen is 53 eggs per annum, it varies in different areas, from 32 in the *Madras States* (excluding *Cochin* and *Travancore*) to 65† in the *United Provinces* and *States*. The average of 60 eggs per hen is, however, applicable to about a third of the country excluding *Burma* where the production per hen is only 40 eggs per annum.

(c) *Localisation of desi hen egg production.*—Speaking in terms of percentages to the total of *desi* fowl eggs, the production in the *United Provinces* is 14.1 per cent., *Madras Presidency* 12.3 per cent., *Bengal* 12 per cent., *Bombay Presidency* 10.2 per cent., *Bihar* 8.6

*Annual Report of Poultry Expert for the year ending 30th June, 1935.

†From the figures given in column 3 of Appendix II it would, however, appear that against the *United Provinces* and the *United Provinces States* a production of 70 eggs per bird is given and not 65. This was due to the fact that the surveys there took into account the number and production of cross-bred birds also. These birds are the progeny of the pure-bred and *desi* fowls. The estimate of their annual production was 85 eggs per bird and their number was 15.2 lakhs. The number of *desi* hens was 39.7 lakhs with a production of 65 eggs per bird. As the performance of cross-bred birds was nearer to the *desi* parents and as their number or the degree of pure blood in them was unfixed, it was considered advisable to take them together with the *desi* birds. Accordingly, the average performance of the combined flocks comes to 70 eggs per bird per annum.

per cent., and *Punjab* 7 per cent. Amongst the Indian States, the *Nizam's Dominions* alone produce 8.5 per cent. of the country's production. *Travancore*, a comparatively small State, stands next contributing over 4.2 per cent. of the total production. *Mysore State* is third with 3.9 per cent., whereas *Kashmir* produces only 1.8 per cent.

The total production of the provinces and the British administered areas is about 74 per cent. and that of the States 26 per cent.

The map facing this page shows the density of production of fowl eggs (*desi* and improved). It would be seen from this that the degree of concentration is fairly high in the *Punjab* except in the south-eastern parts, the *Indo-Gangetic plain* and the Indian Peninsula excluding the *Central Provinces* and the north-west of the *Nizam's Dominions*. The main areas of higher concentrated production are, however, south-eastern *Bengal*, the deltaic region of the river *Godavari* in *Madras Presidency*, *Atraf-i-Balda* district of *Nizam's Dominions*, *Cochin* and *Travancore States* and *Thana* district of the *Bombay Presidency*. In *Rajputana*, *Central India* and *Western India States*, and in *Sind* and *Assam* the production is generally sparse. In *Burma* also on the whole it is sparse.

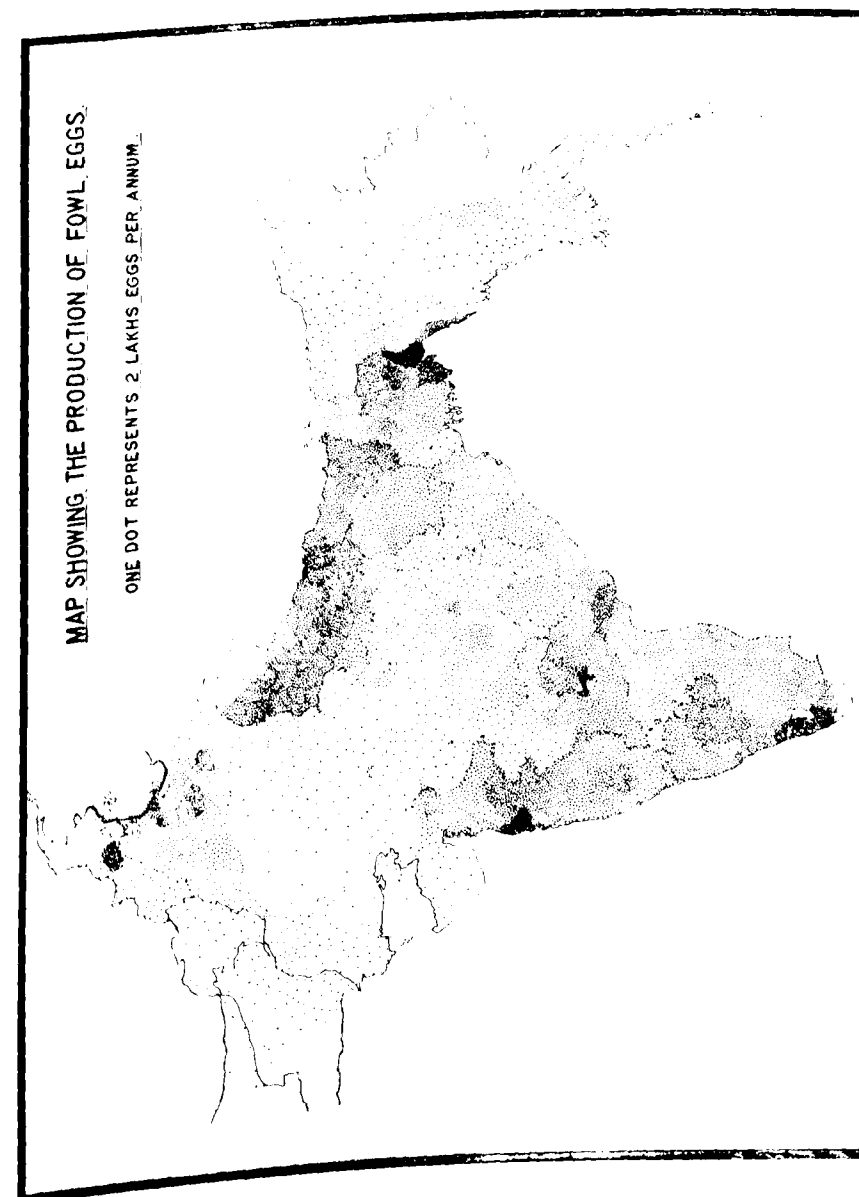
(d) *Improved hen eggs*.—Only a few Government and private poultry farms are keeping improved birds in India. Besides these there are other individuals keeping improved poultry on semi-farm conditions, for the supply of eggs for their own use and sale of surplus. Generally all the farms sell poultry as well. In the *United Provinces*, however, through the continuous activities of the *United Provinces Poultry Association*, *Lucknow*, and the *Mission Farm at Etah*, and in the *Travancore State* through the activities of the *Y. M. C. A. Rural Reconstruction Centre at Martandam*, improved birds have been introduced in villages also.

In spite of all these activities at considerable expenditure, their present number is only 1.3 per cent. of the total laying birds in India. This is due to various factors, the main being the initial cost of the birds (which is at least two to three times higher than that of the *desi* type), the cost of feeding and consequently the relatively high cost of improved egg production. The birds, by virtue of their larger size and heavy laying qualities, have a limited scope for picking food for themselves, and as such have to be fed adequately if proper results are to be obtained.

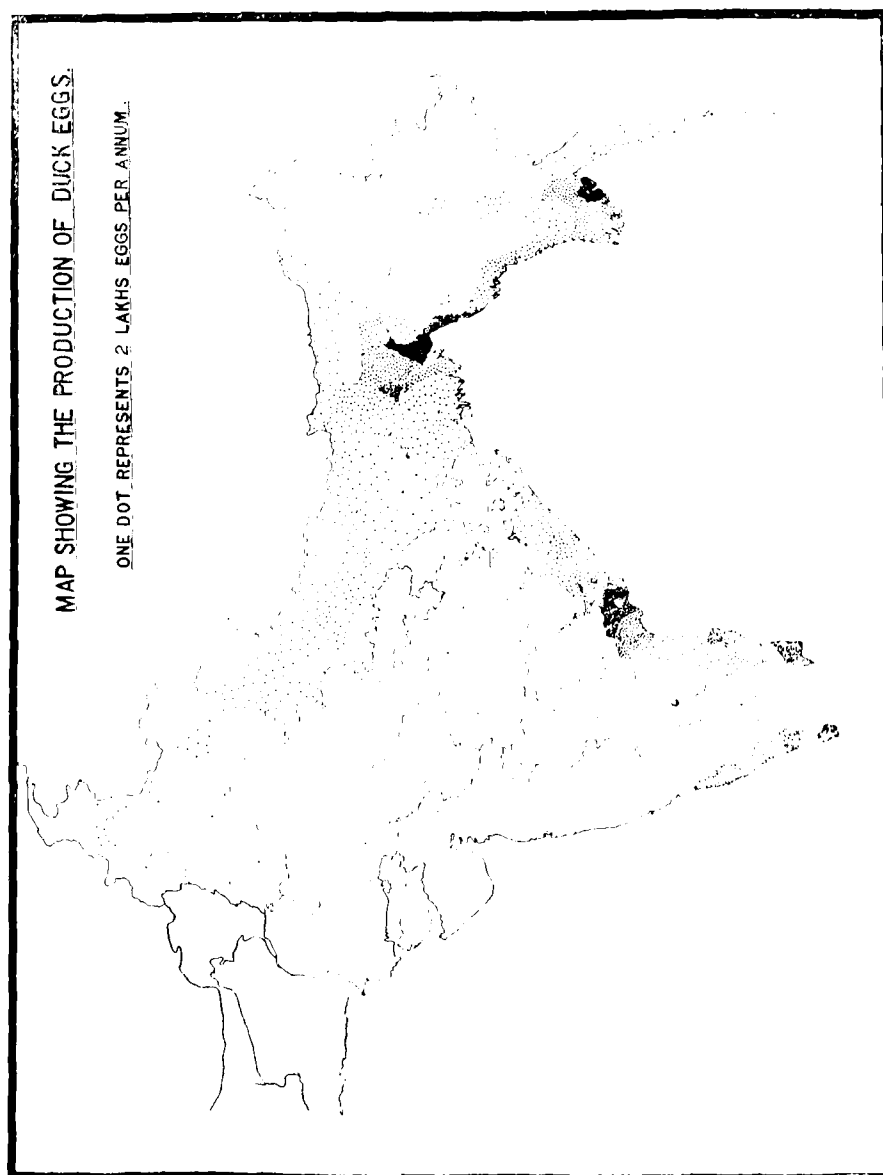
Appendix IX gives the monthly and annual production records of some of the departmental and private farms (see also diagram facing page 9). The average figures adopted for estimating the production per bird in the different areas, are given in the last column, and it would be observed that in every case this is lower than the performance obtained at the farms.

From Appendix III it would be observed that improved birds are found only in a few areas, and the *United Provinces* and *Bihar* have over 60 per cent. and 16 per cent. respectively, of the total improved layers in India. As said before, in these areas a large

[Facing page 10.]



Facing page 11.]



number of these birds are found in the villages, and as a result of enquiries in the *United Provinces* it is observed that the improved fowls are doing quite well under village conditions. It might, however, be mentioned that an average of 120 eggs per bird (column 3 of Appendix III) for over 4.5 lakhs layers appears high, but several enquiries have confirmed this high production.* In the *Central Provinces* also the average is 120 eggs, but the number of birds is only 5,700. The highest average of 130 is, however, from *Patiala State* but the number there is only 1,200 birds. The average production of eggs per improved bird for all-India is 103 eggs whereas for *Burma* it is 101.

Of the total number of improved eggs produced in India, the *United Provinces* alone produce more than two-thirds (68 per cent.) and *Bihar* about 11 per cent. The reason of this high production in *Bihar* is probably due to the influence of the relatively large number of improved poultry in the adjoining area of the *United Provinces*. From the performance of the *Bihar* improved birds (72 eggs per annum), however, it appears that they must possess a considerable amount of *desi* blood in them, the performance of which in that area is 60 eggs per annum. The *State of Travancore* contributes 9 per cent. of the total production of improved eggs in India.

(c) *Duck eggs*.—It has already been pointed out that of all the departmental farms, only the *Tarnab Farm* (*North-West Frontier Province*) possessed a record and that for only 12 ducks. These records show that a duck lays only 45 eggs per annum, although as a result of enquiries 100 eggs per bird are considered to be the correct estimate for the *North-West Frontier Province*. The estimates in all other areas are also based entirely upon enquiries. In *Cochin State*, however, it is found that large scale duck keepers generally borrow money from the egg merchants and agree to supply all the eggs produced by the flocks. A flock is generally maintained for three years only, when the period of agreement terminates and the birds are sold away for eating purposes. The ledger accounts of several merchants show that a flock of, say, 500 laying ducks produces annually about 60,000 to 65,000 eggs, or about 120 to 130 eggs per duck. Accordingly, an annual production of 120 eggs is adopted for all the laying ducks in the State. In the *Travancore State*, where conditions are reported to be generally identical, a similar figure has been adopted.

The estimates of production of eggs per duck in the various areas may be seen from Appendix IV and it would be observed that the average production per bird for India is 90 eggs. It would also be seen that there is a distinct drop in the productive capacity of ducks in the *Punjab* (50), *Sind* (40), the *Central Provinces States* (40) and *Assam* (39). Except for *Assam*, the number of ducks in these areas is small. Most of the ducks in India are found in *Bengal*

*A check made in a number of villages in *Merrut*, *Etah*, *Aligarh* and *Bulandshahr* districts, actually shows that the above figure is not an over-estimate. In the districts referred to, the production in some cases was as high as 175 eggs per improved bird, and about 120 for the crosses between the *desi* and improved fowls.

and Madras and in these areas the annual production per duck is 75 and 126 eggs respectively.

In *Burma* the average production per duck is, however, 180 eggs, or double that of the average of India. There may be some difference in the breed or type of the *Burmese* ducks, but the high rate of production is particularly due to careful feeding and management of the birds. For instance, when the ducklings are received from the hatcheries*, for the first five days or so they are fed on boiled rice. Thereafter they are given a mixture of small fresh fish (cut into pieces) and rice-bran. Two to four feedings per day of the above are given when they are young. When 6 to 8 weeks old, they are able to pick food for themselves, and are generally let loose in paddy fields which abound in feeding matter. The laying ducks receive regularly two feeds during the day. A flock† of, say, 1,000 laying birds is given daily 28 lb. of prawn refuse and two baskets (144 lb.) of broken rice. Good feeding also results in early maturity and most of the ducks are reported to commence laying when they are about five months old, whereas in India they seldom commence laying before they are eight to nine months old. Also, the laying flocks are generally renewed every three years in *Burma*, and the old ones are sold off for eating purposes.

From Appendix IV it may be further observed that India produces annually 5,168.9 lakhs duck eggs. These comprise about 15 per cent. of the total production of eggs in India. In *Burma* the production is only 1,224.7 lakhs but it represents about 75 per cent. of the total of *Burma's* egg production.

(f) *Localisation of duck egg production.*—The *Madras Presidency* produces as much as 40.9 per cent. of the total duck eggs in India and *Bengal* about 34.4 per cent., or between them they account for about three-fourths of the country's production. The *United Provinces*, although it produces only 6.6 per cent., stands third in order of importance, whereas the provinces of *Bihar* and *Orissa* produce 3.4 per cent. and 2.6 per cent. respectively, and *Assam* about 3.4 per cent. Amongst the Indian States, the *State of Travancore* produces as much as 3.8 per cent. of the total production or about 25 lakhs more eggs per annum than large provinces like *Bihar* and *Assam*.

From the map facing page 11 showing the production of duck eggs, it would be further observed that the production is concentrated on the *East Coast* (excluding the extreme south) and extends throughout the *West Coast* of *Burma*. The production is concentrated in *Bengal* (particularly in *East Bengal*), *Malabar* (on the *West Coast*) and *Central Travancore*. The *United Provinces* and *North Bihar* are areas of fair production. The production is also fairly intense in the deltaic regions of river *Godavari* and *Tanjore* district of the

*In *Burma* there are large scale hatcheries run by Chinese. For details see page 214.

†In *Burma* the flocks of ducks are quite large, sometimes consisting of 2,500 birds per flock.

Madras Presidency, Chittagong, Noakhali and Tippera districts of *East Bengal* and the deltaic regions of *Lower Burma*.

(g) *Goose eggs.*—The position with regard to the number of eggs produced per goose in the different areas and the annual production of goose eggs may be seen from Appendix V. The annual production is about 30 lakhs eggs only, or about one-tenth of 1 per cent. of the total production of eggs in India.

By nature and habit geese have certain common characteristics with the ducks, and it is observed that their distribution also is somewhat similar to that of the ducks. In *Burma*, however, although duck eggs represent 75 per cent. of the total eggs, the number of goose eggs is reported to be negligible. *Bengal* produces as much as 65.9 per cent. of the total production, and *Bihar* only 19 per cent. *Punjab* comes third with 4 per cent. The *United Provinces* produce 2.7 per cent. of the total production, and this is the highest of any of the remaining areas.

Geese are seldom kept on farms for the production of eggs. Private persons keep them sometimes as pets*. Their main use, however, is for producing birds for eating purposes. Egg laying records are not available from any area. The production of eggs by the goose is confined to the months of February and March, and they generally lay all the eggs in one clutch†. It is observed that for this reason, the persons who keep them have a reasonably good knowledge about their laying capacity.

The annual average for the areas where they are found is 19 eggs per goose, although in over three-fifths of the area, the average is between 12 and 15 eggs per bird. It would, however, seem that in the south, viz., *Nizam's Dominions, Cochin* and *Travancore*, and in *Bengal* also, the laying capacity is quite high being 25 to 30 eggs.

(h) *Turkey eggs.*—It may be seen from Appendix VI that turkeys are found in a few areas only, and the total annual production of eggs is only 4 lakhs. The concentration of production is as follows: *United Provinces* 32.4 per cent., *Mysore* 24.8 per cent., *Travancore State* 21.7 per cent., *Nizam's Dominions* 7.4 per cent. and *North-West Frontier Province* 3.9 per cent. The production in *Burma* is negligible.

The range of production varies from 16 to 60 eggs per bird, with an average of 38 for areas where they are found. The production in *Bihar* and *Central Provinces* is, however, considerably lower being only 16 and 20 eggs per bird respectively. Their number in these areas is, however, small, being only 175 and 400 laying birds respectively.

(i) *Guinea-fowl eggs.*—The distribution of guinea-fowls and the production of their eggs is given in Appendix VII. A comparison with the other eggs would show that guinea-fowl eggs are only 0.8 per cent. of the total egg production, but that they are about nine

*Geese generally make considerable noise when they see strangers approaching the house, and it is said that at times they are kept for the above reason also, viz., as watch birds.

†A clutch is a number of eggs laid for a number of days without a gap.

times the number of goose eggs and about seventy times that of turkey eggs. In *Burma* the production is reported to be negligible.

From Appendix VII it would be seen that the guinea-fowls are concentrated mainly in the *United Provinces* (and the States there) which produce as much as 88.6 per cent. of the guinea-fowl eggs in India. The provinces of the *Punjab* and *Bihar* produce 7.2 per cent. and 1.5 per cent. respectively, so that over 97.3 per cent. of India's total guinea-fowl eggs are produced in these three provinces.

It is difficult to indicate the reason for guinea-fowls being confined to these areas, particularly in the *United Provinces*, or to say why they have not spread to other areas, especially since a guinea-fowl lays more eggs than a hen (60 versus 53) and as a table bird also, it fetches a better price than a fowl. It may, however, be pointed out that these birds are of a semi-wild nature, are unusually shy and not so easily managed as the fowls. It is also reported from *Nizam's Dominions* and *Travancore* that as many as 20 per cent. and 50 per cent. of their eggs respectively, are lost before collection in these areas. The birds are reported to be noisy as well, and their eggs are speckled, look different from those of ordinary fowls and have a strong flavour. It is for these reasons perhaps that guinea-fowls are not popular with the poultry keepers who produce market eggs.

The average egg production for the areas where they were found is 60 eggs per bird per annum, the highest being in the *Punjab* (100) and lowest in the *North-West Frontier Province* (40). In the *United Provinces* the production is 64 eggs.

(4) EGGS LOST BEFORE COLLECTION.

There are two special features of poultry keeping in India : (a) that poultry farms of the type found in other countries are generally conspicuous by their absence and small flocks of *desi* birds are kept in the houses or back-yards of the producers who mainly live in villages, and (b) that the laying capacity of the *desi* birds is poor and irregular.

With regard to the first point, it is found that an average producer keeps 2 to 5 *desi* fowls under indifferent village conditions. There are generally no enclosed pens, runs, proper poultry houses or nests to protect the birds or collect all the eggs. He practically does no hand-feeding of the fowls and the keeping of a few birds hardly justifies wholtime attention. Like the birds of air, the fowls have also to roam about in search of food and in doing so they often become prey to dogs, cats or jackals, and the chickens to kites and crows. Also, the annual average of 53* eggs per hen works out to one egg per week per bird. Sometimes the birds lay the eggs in unknown places and the conditions of poultry keeping are such that the producers are not always aware of the fact. At other times the birds tramp over the eggs, or the crows and kites peck at them. It is certain that the producers cannot trace every egg that is laid by the birds, and a cer-

*53 eggs is the all-India average, the average for *Burma* being only 40.

tain number of eggs are lost before they can be collected. The results of the enquiries on the extent of such loss in each area are given in terms of percentages in the various Appendices dealing with production of eggs, and it is to be observed that although the percentage of the loss appears small and is likely to be overlooked, the loss to the industry as a whole is considerable, inasmuch as about 837 lakhs eggs are lost annually in India and about 73 lakhs in *Burma*, making a total of about 910 lakhs eggs. In other words the amount of loss is equal to the annual hen egg production of three provinces, viz., *Sind*, *Orissa* and *Assam*, or about two and a half times the annual hen egg production of *Burma*. The value of this loss at a nominal price of (say) one pice per egg (3 annas a dozen) amounts to over Rs. 14 lakhs per annum. The value of loss in the shape of live-birds is, however, additional to the above, and although it could not be actually estimated, it is considered greater than that of eggs. For instance, the loss of an egg is valued only a pice but that of a chicken or a fowl amounts to 4 to 12 annas.

It is difficult to say to what extent this loss is preventable under the existing conditions of poultry keeping, but there is little doubt that with continuous propaganda in the villages, the producers could be induced to construct secured mud-houses for the poultry without much cost, or to make use of wire netting whenever possible. The departmental poultry farms should also demonstrate to the villagers the construction and use of various types of suitable country-made poultry houses and enclosures so that the birds and the eggs, might be properly secured and the losses minimised.

(5) SUMMARY OF EGG PRODUCTION.

The figures of the various Appendices are summarised below, separately for India and *Burma*, and the position is also illustrated in diagram facing page 24.

(a) India.

	Desi fowl.	Improv- ed fowl.	Duck.	Goose.	Tur- key.	Guinea- fowl.	Total.
Laying birds (lakhs)	514.7	7.3	54.8	1.6	.1	4.2	582.7
Eggs laid per bird	53	103	90	19	38	60	..
Annual egg production (lakhs).	27,376	792	5,169	30	4	277	33,648
Percentage of India's total production.	81.3	2.4	15.4	.1	.01	.8	(100)
Percentage of eggs lost.	2.3	1.5	3.4	2.5	0.3	2.3	2.5
Eggs lost (lakhs) ..	641.4	12	176.5	0.7	.01	6.5	837.11
Not collected (lakhs).	26,733.6	780	4,991.7	29.3	4.0	270.9	32,809.5

(b) *Burma.*

	<i>Desi</i> fowl.	Improved fowl.	Duck.	Total.
Laying birds (lakhs)	9.6	.2	6.7	16.5
Eggs laid per bird	40	101	180	..
Annual egg production (lakhs) ..	389	22	1,225	1,636
Percentage of <i>Burma's</i> total production.	23.8	1.3	74.9	(100)
Percentage of eggs lost	2.95	0.5	5	4.5
Eggs lost (lakhs)	11.5	0.1	61.2	73.7
Not collected (lakhs)	377.6	21.6	1,163.5	1,562.8

From the diagram facing page 24, and the table on the previous page, it would be abundantly clear, that in the poultry industry in India, the *desi* fowl eggs occupy the most prominent position by covering over 81 per cent. of the total production. Duck eggs come next in importance and comprise over 15 per cent., whereas eggs of the improved fowls do not exceed 2.5 per cent. and are of very little commercial importance. Nevertheless, it would be seen from the table on page 185, that about Rs. 74,000⁰ are spent annually by the Departmental poultry farms for experimental purposes, and that nearly 85 per cent. of the birds kept on them are of the improved type, whereas the number of the *desi* birds is small (11 per cent. of the total number of birds) and restricted to a few farms only. Ducks are being kept only on 4 or 5 farms, constituting only 4 per cent. Even in *Madras Presidency, Bengal and Travancore*, where duck farming is an important industry (see diagram facing page 25), no attention is apparently paid to the keeping and improvement of ducks on the farms.

In *Burma* also, where the duck eggs comprise nearly three-fourths of its total production of eggs, no work appears to have been done on the study and improvement of these birds.

(6) TREND OF PRODUCTION.

Since this is the first survey of its kind, it is not possible to say what the conditions were in the past, with regard to production on the whole. Nevertheless, enquiries in most of the areas have given an indication that production is on the increase. The basic reason given for this was that the eating of eggs is becoming popular or rather less objectionable* from the orthodox view point, and as such the production was generally keeping pace with the increased demand per capita, and also with the increase of population on the whole.

*This is also partly due to the possibility of producing infertile eggs, i.e., those eggs that are produced by hens without the male birds being with them. Such eggs do not hatch and are, therefore, considered lifeless.

The trends in the arrivals of eggs at the consuming markets also show an invariable increase, as would be seen from the following few examples :—

Arrivals of eggs at—	Maunds.		Percent- age of increase.
	1934.	1935.	
Bombay	50,752	51,597	1.66
Chittagong	36,426	38,039	4.43
Delhi	3,516	3,840	9.21
Hyderabad (Nizam's Dominions) ..	680	815	19.85
Karachi	4,881	4,929	0.98
Tinsukhia (Assam)	2,822	3,393	20.23

Records of some of the more important Government and private poultry farms, keeping improved birds, are reproduced below and on the whole they also show a progressive increase in their production.

	Number of eggs produced.			
	1933.	1934.	1935.	1936.
Rev. Losey's Farm, <i>Bangalore</i> ..	6,000	12,000	15,000	27,840
United Provinces Poultry Association Farm, <i>Lucknow</i> .	26,792	29,900	18,030	23,629
Government Poultry Farm, <i>Kirkee</i> (Poona).	13,688	12,377	16,804	18,074
Livestock Research Station, <i>Hosur</i> (Madras Presidency).	12,138	15,142	14,816	15,209
Government Poultry Farm, <i>Kanke</i> (Bihar).	1,931	5,468	14,673	13,563
Government Poultry Farm, <i>Gurdaspur</i> (Punjab).	6,420	9,408	10,638	11,292
Faroqui Poultry Farm, <i>Amroha</i> (United Provinces).	3,886	5,790	9,394	11,009
Total of 7 farms	70,855	90,085	99,355	120,616
Percentage of increase over previous year.	..	27.13	10.29	21.39

In the above figures although the percentage of increase appears to be high, in actual effect it means that the above seven farms in
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1933 were producing altogether about 200 improved eggs per day whereas their production in 1936 had increased to about 380 eggs per day. The average production of the *desi* fowl and duck eggs in India, is however above 90 lakhs eggs per day. The trend, as represented by the above figures of a few improved eggs per day, may indicate a growing interest in poultry on farms, but cannot be applied to the country as a whole. Nor would farm conditions truly indicate the general trend of production under village conditions for which there are no figures available to act as a guide.

(7) SEASONAL VARIATION IN PRODUCTION OF EGGS.

In the northern hemisphere the natural period of laying and hatching for birds is usually the spring*.

According to Beebe† the domesticated fowls are descendants of (1) *Gallus bankiva* (Red Junglefowl), (2) *Gallus sonnerati* (Grey Junglefowl), (3) *Gallus falayetti* (the Ceylon Junglefowl), and (4) *Gallus varius* (the Javan Junglefowl). The first two are still found in India, and are said to lay and hatch 12 to 30 eggs per annum. Most of these eggs are laid during the spring.

This tendency to lay more frequently during the early part of the year appears to persist generally in the domesticated fowls, and from such records and results of enquiries as have come to light, it is observed that there is a distinct rise in the production of eggs during these months. In India, however, it is observed that besides the rise in production during the spring, there are two other rises also, although not with the same degree of intensity or duration.

It is reported that severe conditions of weather (for instance, severe cold, severe heat or excessive rains) are generally unfavourable to the laying fowls. Of these, it is from excessive rains that the birds under village conditions, have to suffer most, owing to absence of shelter, with the result that production is at the lowest point during monsoon. Poultry diseases are also said to be more frequent during the rains. The moult‡ also generally occurs during this period—June to October—and is a further cause of lowering the production on account of the low vitality of the birds.

There are, however, two significant facts regarding the moult. The best layers begin moulting late and finish early, taking only about 6 weeks, while poor layers take up to 3 months. A change of place, sickness, or even a fright, may cause a fowl to moult (either completely or partially) at any time. Pullets which have not begun to lay by the time the hot weather is at its highest, do not generally moult at all, until the following summer.

Apart from the seasons, other factors such as methods of feeding, housing and management, time and duration of moult, age of the bird, broodiness and rearing of the chickens, etc., are also known to have

*"Spring" or *Basant* in India occurs during February and March.

†"Poultry Husbandry" by Jull.

‡The shedding of the old and the putting on of the new coat of feathers is called a "moult".

their influence upon variation in production of eggs. Since, however, there is hardly any control on the feeding of the *desi* birds or their management, and since the country is so vast, and varying conditions prevail in its different parts during the same months, it is found that the highest and lowest points of production do not generally occur during the same months in all parts.

The best index of the laying habit of the birds is the actual monthly laying records in the different areas. It has been already emphasized, however, that these are not available on an adequate scale and that much reliance cannot be placed on the meagre information available. For instance, of about 66 lakhs of *desi* hens in the *Madras Presidency*, monthly records of only about 18 *desi* birds are available. It also appears that in some cases farm records are influenced by a number of factors, which may obscure the actual numbers laid by the birds and on that account their application is limited. The main drawback, however, is that the habit of the birds with regard to laying of eggs cannot indicate the seasonal variation in the country's production. For instance, incubators are not used in the villages and eggs are hatched under the hens, for which favourable months (generally March and November) are chosen. On this account the new pullets in large numbers come in to lay when they are six to eight months old (say, in November and May) and this influences the production. The farm records of the same birds in a pen do not, therefore, indicate the extent of this influence.

With the help of such records as are available* and the information on the hatching seasons, a Production Calendar has been drawn out for important areas of production. It must, however, be pointed out that the placing of the figures below the different months gives but a general indication and the peaks (high and low) may be before or after the month actually marked.

Production Calendar.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
North West Frontier Province.	..	..	H	..	..	..	L	..	2	..	3	..
Punjab ..	2	..	..	H	..	..	3	..	L	..	..	..
United Provinces ..	..	..	H	..	..	L	..	..	3	..	..	2
Eastern Bengal ..	3	..	..	H	..	..	L	..	..	2	..	..
Gujarat (Bombay) ..	..	3	H	..	..	..	..	L	..	..	2	..
Madras Presidency ..	2	..	..	..	L	..	..	3	..	H	..	..
Cochin and Travancore ..	3	..	..	..	H	..	L	..	..	2	..	..
Burma ..	H	..	..	2	..	..	..	L	..	..	..	3

Reference:—H=Highest peak; 2=Second highest rise; 3=Third rise;
L=Lowest of the year.

*Vide Appendices VIII and IX and diagrams facing pages 8 and 9.

From the above it would appear that in most of the areas (except the South) the peak of the production occurs from January till about May. The months of March and April have generally the highest production. In *Cochin* and *Travancore* the peak is put back by about a month or so and occurs in May, which corresponds with the harvesting of the main paddy crop. On the other hand, in the *Madras Presidency* the production is on the whole lowest at this time of the year. Conditions change for the better from August onwards, and the production begins to rise gradually, when in September and October it is about the highest for the year.

It would be further observed that the lowest production of hen eggs for most of the areas is generally the monsoon period. It has already been explained that the conditions during this time of the year are most unfavourable for the village birds. The muddy floor of their *kachcha* poultry houses with invariably a leaky roof can be only miserable to the birds (see plate facing page 101). Even on the farms it is noticed that the birds get off colour during the rains.

Apart from the peak and the lowest production, there are two other slight rises above the average of other months. These are indicated in the Production Calendar by figures "2" and "3". Although the difference between the two is not great, it is noticeable. It is also not necessary that "2" (second highest rise) should always follow the highest peak or "3" be always behind "2". These figures are placed in position, as they actually are said to occur and not according to the calendar months.

The above rises are generally considered abnormal compared with some of the other countries and are attributed to the two natural hatching seasons in spring (February-March) and autumn (October-November) in India. It is observed that the pullets commence laying when they are six to eight months old. Good feeding and management on the one hand or an epidemic on the other, may of course cause the period to be shortened or lengthened accordingly. The March pullets (*viz.*, those hatched in March) come into lay from October onwards, whereas the November pullets come into lay at the end of April or so.

Burma generally falls in line with the major parts of India, with a slight exception inasmuch as that the peak production is earliest in this area, being in January and February. There is not much change up to April after which the fall is marked and in August the lowest level is reached. The rise continues and is highest in January.

In most areas the production of duck eggs is generally highest in August-September and lowest during January-February. This shows that the ducks are not affected by the wet conditions; they rather relish it.

(8) EGGS RETAINED BY PRODUCERS.

It is reported that producers in the villages seldom purchase eggs or poultry. As such practically all producers retain eggs for two purposes: (a) for their domestic consumption, and (b) for hatching. The retention of eggs for either purpose is a variable fac-

tor depending upon individual requirements, local practices, market demand, seasons of the year, etc.

(a) *For domestic consumption.*—It is generally observed in all the areas that where producers are situated within an easy reach of large towns or cities or where there is a ready market for the eggs, the domestic consumption by producers is so low as to be of a secondary importance. On the other hand, if they live in areas where the market demand for eggs is not great, the number or proportion of eggs retained for eating depends upon the intensity of production and the hatching seasons. It is also observed that the proportion of eggs retained by producers varies with the type of egg, *e.g.*, hen, duck, turkey, etc.

(b) *For hatching purposes.*—The proportion or the number of eggs retained for hatching purposes by any producer depends mainly upon three factors: (i) the degree of success with respect to the hatching of eggs or rearing of the chickens, (ii) his requirements of poultry for his own use or for sale and (iii) the incidence of poultry epidemics and replenishment of the old stock.

(i) Several examples with regard to conditions of hatching are given from the different areas, and a few typical ones are as under:—

In the *North-West Frontier Province* about 75 per cent. of the eggs set are successfully hatched, but 50 per cent. of the chickens generally do not survive and 50 per cent. of the remainder are cockerels. This means that out of 100 eggs set for hatching only 17 hens are reared.

In the *Punjab* it is found that for every six eggs set for hatching, one fails to hatch, one chick dies, two turn out cocks, one an unsatisfactory hen and only one a good hen. In other words, for rearing one good adult hen six eggs have to be hatched or again only about 17 laying hens are reared from 100 eggs set for hatching.

The report from *Mysore State* gives certain specific instances, *e.g.*: (a) Out of 8 eggs set for hatching there were only 2 chickens living at the time of observation and they were about a month old. These also were liable to be carried away by kites, cats and crows. (b) Out of 12 eggs set for hatching, only 2 chickens were living and they were six weeks old. (c) Out of 12 eggs set for hatching, only 1 chick survived.

(ii) The requirement of poultry for the domestic use of the producer or for sale varies within wide limits, and as such it is difficult to apply a cross check on the various estimates. In areas like the *Eastern States*, the producers find it more profitable to sell chickens than eggs, and as such usually retain half the number of eggs for hatching purposes. In the hilly tracts of these areas the people consider that as food one fowl is better than a number of eggs.

(iii) The incidence of poultry diseases and epidemics is a factor over which the producer has hardly any control, and as such when he finds his stock wiped out he builds it up usually by hatching all the available eggs, rather than through purchase of live-poultry. Although great stress is laid from all the areas, that poultry diseases

take a heavy toll of birds every year, adequate information regarding the actual loss on this account is available from only one farm in the United Provinces. The information is reproduced in the table below from which it would appear that the loss of birds through diseases, etc., is an important factor in the economical production of eggs or poultry. How far mortality can be combated, is, however, a question that awaits investigation.

Loss of birds on a farm in the United Provinces during a year (1936-37).

Breeds or types.	Average number of birds maintained per month.	Deaths through			Total mortality.	Percentage of mortality to birds kept.
		Accidents.	Destruction to prevent contagion.	Diseases.		
White Leghorns ..	139	3	20	11	34	24.5
Rhode Island Reds ..	138	2	27	15	44	31.9
Australorps ..	34	1	..	1	2	5.9
Minorcas ..	60	..	9	13	22	36.7
Burrahias ..	51	1	5	6	12	23.5
Total adults ..	422	7	61	46	114	27.0
Chickens ..	949	152	362	82	596	62.8

With regard to replenishment of old stock, it is reported that the average economic life of a *desi* hen is 2 to 3 years. Thereafter it becomes an irregular layer, and is sold for table use, or is killed for domestic use of the producers. As such, roughly 33 to 50 per cent. of the laying birds have to be replaced every year. The example given below might be taken as a typical one, showing the position with regard to hatching and rearing of birds.

Twelve *desi* hen eggs set for hatching under a hen* would hatch into 8 chickens (66 per cent.). About 4, out of the 8 chickens, would survive and become adults (50 per cent.), of which only 2 are likely to be hens. The other 2 would be cocks. In other words to rear one hen, six eggs have to be set for hatching. A producer having, say, 10 laying hens would have annually 530 (10 × 53) eggs. To replace

*Incubators are unknown in the villages. Eggs of improved hens, ducks, turkeys and guinea-fowls are usually set under the *desi* hens. Sometimes goose eggs are also set under hens, but more often than not, the goose itself hatches them.

annually 50 per cent. of the old hens, he would require 5 young hens. On the above basis (of producing one hen out of six eggs) he would retain for hatching 30 eggs, viz., 5.6 per cent. of the production. It would be further seen that in the process of replenishment of stock, 2 cocks and 2 old hens are also produced, and if a producer keeping say, 10, laying hens, can satisfy the demand for table poultry (for his own use and for sale) from these four birds he would require only about 5.6 per cent. of the production for hatching purposes. This, however, is the normal requirement and provides no margin for heavier replacements due to epidemics or greater demand for table poultry.

The all-India average proportion of *desi* hen eggs retained for hatching is, however, estimated at 20.12 per cent. (see page 25). The 15.6 per cent. additional eggs set for hatching must therefore be taken to satisfy the demand for live poultry and epidemics. In *Burma* the proportion of *desi* eggs retained for hatching is estimated to be 60.9 per cent. and might be taken to show the extraordinary demand for table poultry in that country.

(c) *Number of desi eggs retained.*—In the case of *desi* eggs it was observed that of all the areas the producers in *Bihar* retained for eating the largest proportion of the production, viz., about 59 per cent. There, the producers are the main consumers or rather a large proportion of the consumers keep fowls mainly for supplying eggs for their own use. On the other hand, the lowest figures are reported from *Coorg* and *Madras Presidency*, viz., 2 per cent. of the production or less than an egg, per bird per annum. The proportion of eggs retained for hatching is highest in the *Eastern States* and *Bengal*, viz., 50 per cent. although the all-India average is only about 20 per cent. In *Bengal* the incidence of disease is reported to be very great and producers have to hatch a greater number of eggs to replenish the stocks. The details of *desi* eggs retained for eating and hatching in different areas are given in Appendix X, and it would be observed that about a fifth of the *desi* egg production (20.34 per cent.) is retained for eating and an equal amount (20.12 per cent.) is retained for hatching, leaving about 60 per cent. available for marketing.

In *Burma*, only about 6 per cent. is retained for eating whereas nearly 61 per cent. is retained for hatching and only about a third (33 per cent.) of the home production* is available for marketing.

(d) *Number of improved eggs retained.*—Compared with the *desi* eggs the position with regard to the retention of improved eggs, either for eating or hatching, is rather different. For instance, it is found that in areas where improved poultry are kept mainly on departmental or private commercial farms, e.g., in *North-West Frontier Province*, *Punjab*, *Bombay Presidency*, *Deccan States*, *Madras Presidency*, *Bengal* and *Burma*, the eggs are utilised (a) either for hatching purposes or (b) are marketed direct to the consumers. As such the retention of eggs by producers for eating purposes should not amount

*The term "home production" is used, as *Burma* has a fair amount of import of preserved eggs from India, which are all used for eating purposes.

to much. In other areas, particularly the *United Provinces* and their States where improved poultry are found also in the villages, the proportion of eggs retained for eating, is reported to be only about 10 per cent. From Appendix XI it would be observed that the average figure for all-India is 16.8 per cent. against 20.3 per cent. for the *desi* hen eggs. The proportion of eggs retained for hatching is also less, being only 11.7 per cent. The figures for *Burma* are 7.7 per cent. and 8.2 per cent. for eating and hatching respectively.

(e) *Number of duck eggs retained.*—Appendix XII indicates the results of enquiries in different areas with regard to the proportion of duck eggs retained for eating and hatching. The average number retained for eating is 7.2 per cent. and that for hatching 9.3 per cent. It would be again noticed that the producers in *Bihar* retain for eating half the eggs produced. The *Assam* producers retain about 38 per cent., and it is reported that during the cultivating and harvesting seasons in the *Surma* and *Assam Valleys* the people have no time for fishing and consequently use more eggs in their diet. In *Cochin*, *Travancore* and *Burma*, where the producers generally keep large flocks of birds, and produce many hundreds of eggs daily, the small number of eggs retained for eating, in terms of percentage, works out to be either negligible (as in *Burma*) or only about 5 per cent.

In *Burma* owing to the high production per bird, the proportion retained for hatching is relatively small, being about 2.5 per cent.

(f) *Number of goose, turkey and guinea-fowl eggs retained.*—It would appear from Appendix XIII that generally in the areas where only a small number of geese are kept, the producers hardly retain any eggs for eating, and in such areas most of the eggs are used for hatching. In *Bihar* and *Bengal*, where comparatively a larger number of geese is found, the producers retain 20 per cent. and 10 per cent. of the production respectively, for eating purposes. The average proportion of eggs retained for eating purposes in all the areas works out to about a ninth (11 per cent.) of the production. On the other hand, about three-fourths (72 per cent.) of the production is retained for hatching, for producing birds for table use.

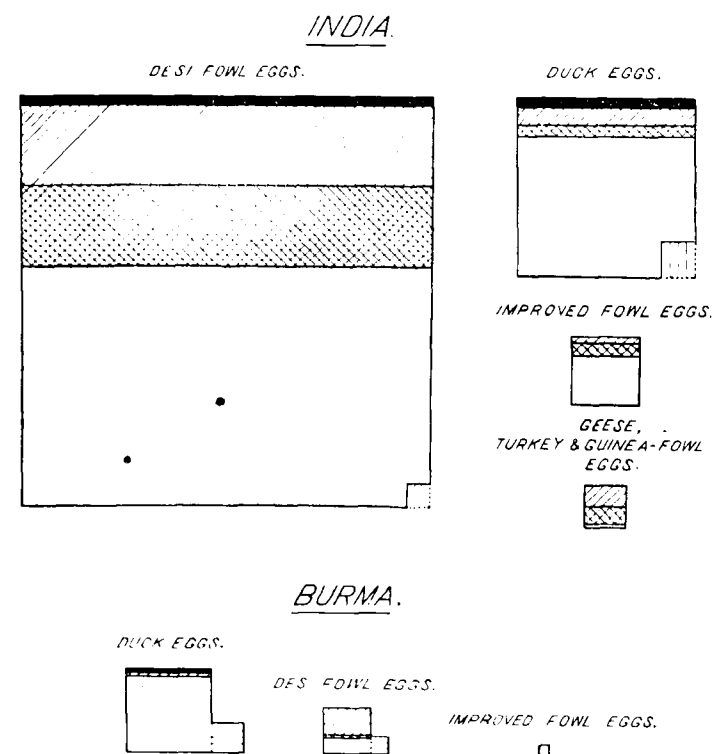
Of all the types of eggs retained by the producers for eating purposes, the number of *turkey* eggs is the smallest, the average for India being only about 2 per cent. of the production, *vide* Appendix XIV. On the other hand, of all the eggs they retain for hatching the greatest proportion is of *turkey* eggs, namely, 79 per cent. This is no doubt due to the demand for birds for table purposes, but it is also due to the high rate of mortality in the poults (young-turkeys).

About a tenth of the production of *guinea-fowl* eggs is retained for eating purposes by producers. The details for different areas are given in Appendix XV. Nearly half (47.8 per cent.) of the production is used for hatching purposes.

(g) *Summary, of eggs retained for eating and hatching, and of the net available market supply.*—The figures given in the Appendices are summarised in the table below, to show the proportion of the

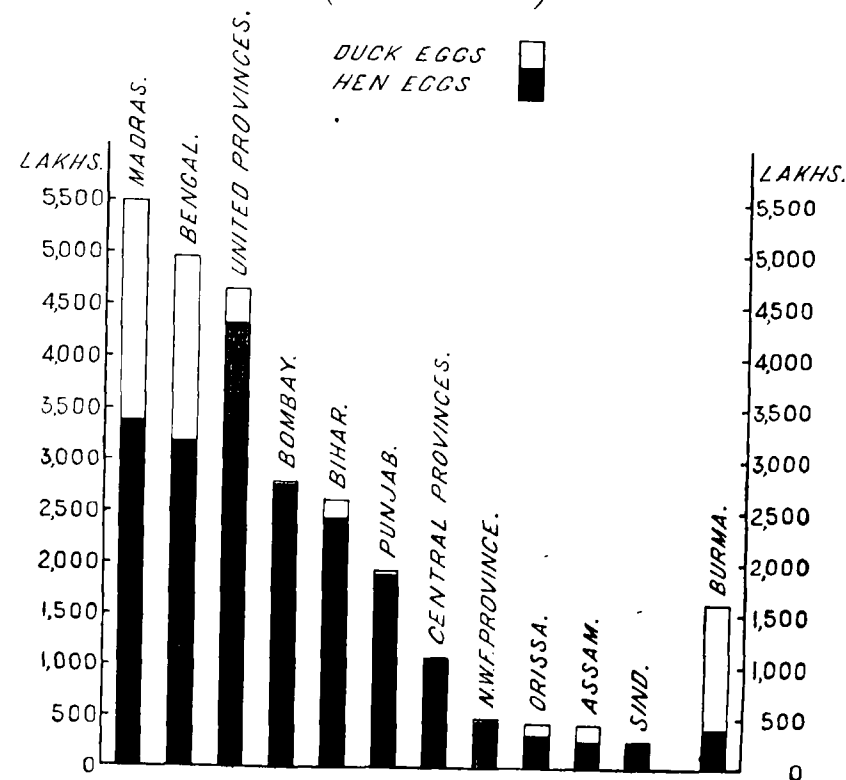
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DIAGRAMATIC ILLUSTRATION OF ANNUAL PRODUCTION AND DISBURSEMENT.

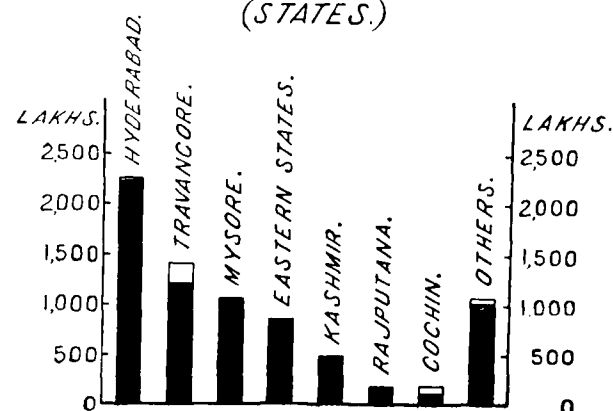


ANNUAL PRODUCTION OF EGGS.

(PROVINCES.)



(STATES.)



different types of eggs retained by producers and those available for marketing, in India and Burma.

Eggs retained by producers.

	Retained for eating.	Retained for hatching.	Available for marketing.
	Per cent.	Per cent.	Per cent.
(i) INDIA—			
Desi fowl eggs	20.3	20.1	59.6
Improved fowl eggs	16.8	11.7	71.5
Duck eggs	7.2	9.3	83.5
Geese eggs	11.3	72.3	16.4
Turkey eggs	2.2	78.8	19.0
Guinea-fowl eggs	9.5	47.8	42.7
(ii) BURMA—			
Desi eggs	6.1	60.9	33.0
Improved eggs	7.7	8.2	84.1
Duck eggs	Neg.	2.5	97.5

It would be noted that as much as 60 per cent. of the *desi* hen egg production and 83.5 per cent. of the duck egg production, are actually marketed. In other words, the producers retain only a small proportion of the production for their own use. Even the eggs retained for hatching present problems of marketing at a later stage, when the birds reach the marketable age. In the light of these findings, the old impression that poultry is kept mainly for the producers' own use needs considerable modification, and the poultry industry must really be looked upon as a source of income to about 40 million persons, consisting of the producers and their families engaged in poultry keeping (see also diagram facing page 24).

(9) MARKET EGGS—THEIR NUMBER AND QUALITY.

It has already been indicated that the important sources of production of market eggs are those of fowls (*desi* and improved) and ducks. Geese, turkeys and guinea-fowls are generally kept for producing table birds. The marketable number of these eggs is so small that they do not play any important part commercially.

(a) Number in different areas.—The number and proportion of (i) *desi* fowl eggs, (ii) improved fowl eggs, and (iii) duck eggs, produced in different areas, are shown in Appendix XVI and diagram facing this page. The appendix would show that in majority of the areas, the eggs of *desi* fowls comprise over 98 per cent. of the

market eggs, but in certain cases, e.g., in *Delhi Province*, *desi* eggs comprise only 56 per cent. and those of improved fowls, the remaining 44 per cent. In *Cochin, Madras Presidency* and *Assam* also, *desi* eggs constitute only about 60 per cent. of the market eggs. In these areas the proportion of duck eggs is important, and ranges between about 35 per cent. and 40 per cent. although the all-India average is only 15.5 per cent.

In *Burma*, the position is quite different. There, the duck eggs comprise about 75 per cent. and the eggs of *desi* fowl 23.8 per cent. The eggs of improved fowls form only 1.3 per cent. of the provincial production.

(b) *Quality factors.*—(i) *Desi fowl eggs.*—These eggs are generally small, being laid by smaller birds, compared with the improved birds. However, in the North the eggs are usually larger than in the South and East. The average weight of 100 eggs in the *North-West Frontier Province*, for example, is 9 lb. whereas in *Travancore State* they weigh 8 lb. 2 oz. and in the *Birbhum* district (*Bengal*) the average weight per 100 eggs is only 7 lb. 12 oz. In *Burma* the weight per 100 eggs is about 10 lb. 8 oz.

Generally there are more of white shelled eggs in the North-West, but further South, the proportion of brown shelled eggs increases. In the East, white and brown shelled eggs are found in about equal proportions. In *Burma*, practically all eggs are white, with very few brown ones.

The weight of the shell varies from 10 to 12 per cent. of the weight of the egg, about 11 per cent. being about the average in case of *desi* hen eggs.

(ii) *Improved fowl eggs.*—By virtue of being produced by birds of imported strains which have been bred for the production of superior quality market eggs, the proper feeding which the improved birds generally get under farm conditions, the sanitary conditions under which such poultry is usually kept and the fact that they are generally marketed in a fresher state, the improved eggs are as a rule superior to the *desi* hen eggs.

The average weight of improved eggs varies with the breeds but may be taken as about 12 lb. per 100.

(iii) *Duck eggs.*—These eggs are most easily noticeable by their comparatively large size, as well as the smooth and distinct appearance of the shell. The average weight of 100 duck eggs is reported to be as much as 17 lb. from *Cochin State*. As is the case with hen eggs, the duck eggs are also smaller in *Bengal*, their weight being only about 10 lb. 8 oz. per 100.

In appearance, the duck eggs are mostly white, although in *Bengal* and *Burma* a large proportion of the shells have a distinct bluish tinge.

The duck eggs have a distinct flavour of their own, which is considered to be too strong for the ordinary palate, and they are therefore not much in demand for table use. They are generally used for cooking (specially for frying or currying) purposes.

(10) COMPARISON WITH WORLD'S PRODUCTION OF HEN EGGS.

The production of hen eggs in some of the reporting countries of the world* is as follows:—

	Annual egg production. (Millions)	Percentage to the world's production (reporting countries).	Average number of eggs produced per hen per annum.
EUROPE.			
Netherlands	1,950	3.8	125
Northern Ireland	528	1.0	122
Irish Free State	1,074	2.1	121
England and Wales	2,964	5.7	120
Denmark	1,432	2.8	120
Scotland	410	0.8	118
Belgium	1,601	3.1	115.6
Estonia	109	0.2	107.6
Austria	730	1.4	82
AFRICA.			
French Morocco	1,000	1.9	60
Tunisia	150	0.3	60
CANADA. .. .	2,682	5.2	109
UNITED STATES OF AMERICA ..	30,253	58.6	81.8
ASIA.			
Japan	3,609	7.0	129.6
Japanese Sakhalin	7	0.01	99
Cochin China	135	0.3	90
Kwantung	22	0.04	79
British Borneo	1	0.002	70
Transjordan	24	0.06	70
Philippines	124	0.2	41
OCEANIA.			
Pacific Islands under Japan (Mand.) ..	3	0.005	56.0
French Settlement in Oceania ..	2	0.003	46
India	2,737†	5.3	53†
Burma	39†	0.07	40†
Total ..	51,596		

*International Year Book of Agricultural Statistics, 1936-37. The figures relate to the year 1935.

†These figures relate only to the eggs of *desi* hens. Besides these, India produces annually 79 million eggs of improved hens, and the production per improved hen is 103 eggs per annum. Similarly *Burma* produces 22 lakhs of improved eggs with an annual average of 101 eggs per improved hen.

From the table above it would be noticed that India produces about 5.3 per cent. of the world's (reporting countries) hen egg production, or as much as the production of Canada. With regard to the production per hen, it may be said that although the average for India is only 53 eggs per *desi* hen, and is below that of improved hens kept under proper farm conditions, it compares favourably with the tropical and semi-tropical countries of the East.

With regard to production of improved eggs, the average for the country is 103 eggs per bird. However the average of 120 eggs per bird for a large number (4.5 lakhs) of birds in the *United Provinces* is equal to the average of England and Wales, although the number of birds there is about 25 millions.

B.—Imports.

Since the separation of *Burma* from India, the former must be treated as an independent unit and the movement of eggs between the two countries is taken as import or export trade. While there are no imports of eggs into India from *Burma*, India exports annually large quantities to *Burma*. The movements between the provinces and States in India are, however, taken as *inter-provincial* or *inter-State* trade, and are treated under the Chapter on Transportation (see page 141).

(1) INTO INDIA.

(a) *Eggs in shell**.—There is practically no import of eggs in shell by sea from abroad. A trial consignment of only about 1,400 eggs was imported in 1935 by a firm at *Bombay* from *Durban* (South Africa), but the experiment was given up due to high costs. A few eggs and also fowls are noticed at the trans-border station at the *kafra* market, *Landi-khana* in the *North-West Frontier Province* which are reported to be brought from *Kabul* (Afghanistan), but the annual number thus imported is indeed very small.

(b) *Egg products*.—Foreign made egg products like dried egg albumen, etc., may be imported in small quantities for industrial or food purposes, but they are not important enough to be mentioned in the Sea-borne Customs figures.

(2) INTO BURMA.

Burma imports annually large quantities of preserved† eggs in shell from *Madras Presidency* and *Bengal*. This matter, however, is treated under the head of Exports from India. *Burma* also imports eggs from China, through its northern land-frontier. Actual figures are not available, but enquiries made at the frontier stations of *Bhomo*, *Myitkyina* and *Lashio* show that only during the winter months about 50,000 hen eggs are imported annually from China. These eggs are also preserved in a special manner to cater for some of the Chinese living in *Burma*, and are generally sold through the *Mandalay* market. In any case, the import trade is not of any appreciable magnitude.

*“Eggs in shell” mean whole eggs, preserved or fresh.

†For details regarding preserved eggs, see page 114.

C.—Exports.

An export trade in eggs of any commercial importance has not yet developed in India. The total number of eggs exported every year usually to *Burma*, *Ceylon* and *Nepal*, is 239 lakhs—mostly from *Bengal* and *Madras Presidency*. In addition to these the supply of eggs to ships, for use in voyages, amounts to about 43 lakhs. The total annual exports from India including ships stores are thus about 282 lakhs eggs. This number is less than 1.5 per cent. of the marketable supply of eggs, and is only about .8 per cent. of the gross annual production in India. The table below gives the figures of exports of eggs and their values for the past seven years.

Export of Eggs from India (excluding the supply to ship's stores).

	To Burma.		To Ceylon.		Total Eggs (lakhs).	Total value (lakhs of rupees).
	Eggs (lakhs).	Value (lakhs of rupees).	Eggs (lakhs).	Value (lakhs of rupees).		
1930-31	374	8.9	115	3.5	489	12.4
1931-32	325	6.1	98	3.0	423	9.1
1932-33	359	6.0	90	2.8	449	8.8
1933-34	283	4.5	73*	2.2	356	6.7
1934-35	273	3.9	19	0.6	292	4.5
1935-36	274	4.0	2.3†	0.05	276	4.05
1936-37	236	3.7	2.2†	0.04	238	3.74

It would be seen from the above that during the past seven years the number has dropped to less than a half and the value to about a third, compared with the previous trade. The decrease in number and value has been dissimilar, in the two exporting provinces of *Bengal*, and *Madras*, and these are treated separately.

(1) EXPORTS FROM BENGAL.

Of the total exports from India, the share of *Bengal* is over 80 per cent. *Chittagong* is the principal port sending out exclusively to *Rangoon* and *Akyab*, in *Burma*. Supplies to *Akyab* are, however,

*In 1935, *Travancore State* also exported 60 lakhs eggs to *Ceylon*. Since figures for previous years are not available and since July 1934 the exports from *Travancore* have almost ceased, the exports from that State are excluded altogether.

†These figures relate to the years 1936 and 1937.

negligible. The table below deals with the position of exports from *Bengal*.

Export of Eggs from Bengal.

	To Burma.		Price per thousand eggs.
	Eggs (in lakhs).	Value (in lakhs of rupees).	
1928-29	261	8.0	30.6
1929-30	308	8.0	25.9
1930-31	283	6.5	22.9
1931-32	271	4.7	17.3
1932-33	302	4.7	15.5
1933-34	261	4.0	15.3
1934-35	261	3.6	13.7
1935-36	263	3.8	14.4
1936-37	231	3.6	15.5

It would be seen that in 1936-37 the exports from *Bengal* were about 231 lakhs eggs, and this number is about 9 per cent. of the number of eggs available for marketing in *Bengal*. Besides this, 23.8 lakhs eggs were also supplied to ships, from *Calcutta* and *Chittagong*.

During the course of nine years, the export of eggs has shown a drop of only about 11.5 per cent. on the whole. On the other hand, due to decrease in price from Rs. 30.6 per thousand eggs to Rs. 15.5 or nearly a half, the values have dropped considerably. The price was, however, the lowest in 1934-35, viz., Rs. 13.7 per thousand eggs and there has been an improvement during the last two years. The reason for the slight decrease in the eggs exported to *Burma*, is attributed to the development of the local poultry industry.

Periodicity.—The table below deals with the monthly export of eggs from *Bengal* to *Burma* (1934).

	Maunds*.	Per-centage to annual.		Maunds*.	Per-centage to annual.
January	3,951	10.5	July	4,100	10.9
February	2,690	7.2	August	4,276	11.4
March	4,486	11.9	September	3,641	9.7
April	3,400	9.1	October	2,309	6.1
May	2,390	6.4	November	900	2.4
June	3,381	9.0	December	2,025	5.4
			Total	37,549	(100)

*A standard maund may represent about 500 duck eggs, and 800 hen eggs, gross with packing.

It would be observed that there are two main rises, namely, one during *March* and the other during *July* and *August*. This is due to the seasonal rise of demand in *Burma* owing to local festivals. This aspect is, however, dealt with in Chapter on Demand.

The eggs exported from *Bengal* are both hen and ducks, but the proportion of the two is not known. The customs figures classify them only as "Eggs", irrespective of the type. Enquiries in *Bengal*, however, show that generally 60 per cent. are duck eggs and 40 per cent. hen eggs. In *Burma* the impression is that the proportion of hen egg is not so large and most of the eggs are duck eggs.

The eggs exported from *Bengal* to *Burma* are preserved or pickled with lime, mud or salt, but this aspect of the trade is dealt with in the Chapter on Preparation for Market (page 114). The eggs supplied to ships are, however, fresh (i.e., unpreserved).

(2) EXPORTS FROM MADRAS PRESIDENCY.

The *Madras Presidency* exports eggs from ports of *Madras*, *Cocanada* and *Tuticorin* to *Burma* and *Ceylon*. The table below shows the position :—

Export of eggs from Madras Presidency.

	To Burma.			To Ceylon.			Total eggs (lakhs).	Total value (lakhs). Rs.
	Eggs (lakhs).	Value (lakhs). Rs.	Price per 1,000 eggs. Rs.	Eggs (lakhs).	Value (lakhs). Rs.	Price per 1,000 eggs. Rs.		
1930-31	91	2.4	26.3	115	3.5	30.4	206	5.9
1931-32	54	1.4	25.9	98	3.0	30.6	152	4.4
1932-33	57	1.3	22.8	90	2.8	31.1	147	4.1
1933-34	22	0.5	22.7	73	2.2	30.1	95	2.7
1934-35	12	0.3	25.0	19	0.6	31.5	31	0.9
1935-36	11	0.2	18.1	2.3*	0.05	22.6	13	0.25
1936-37	5	0.1	20.0	2.2*	0.04	20.6	7	0.14

It would be seen that exports from *Madras Presidency* (both to *Burma* and *Ceylon*) have decreased greatly and the present number forms but a negligible proportion of the local production of eggs, which is over 5,500 lakhs per annum.

(a) *Burma trade.*—During the course of seven years the export to *Burma* has dropped from 91 lakhs eggs per annum to 5 lakhs. The reason indicated is that *Burma* has been developing its own egg

*These figures relate to the years 1936 and 1937.

production, and although (perhaps for the same reason) exports from *Bengal* have also decreased slightly, the fall there has been nowhere near that of *Madras Presidency*. Exports from *Bengal* have decreased only by about 11·5 per cent. whereas those from *Madras Presidency* have decreased by about 96 per cent. In fact, if the present rate of decline continues, *Madras Presidency* might stand to lose the entire trade with *Burma*.

The correct reason appears to be that *Madras Presidency* exports mostly hen eggs which are expensive compared with the duck eggs supplied from *Bengal*. The difference between the two is apparent from the table below :—

Price of eggs exported to *Burma*.
(in Rs. per thousand).

—					Bengal duck eggs.	Madras hen eggs.
1928-29	..	..	..	..	30·6	..
1929-30	..	..	..	..	25·9	..
1930-31	..	..	..	..	22·9	26·8
1931-32	..	..	..	..	17·3	25·9
1932-33	..	..	..	..	15·5	22·8
1933-34	..	..	..	..	15·3	22·7
1934-35	..	..	..	..	13·7	25·0
1935-36	..	..	..	..	14·4	18·1
1936-37	..	..	..	..	15·5	20·0

When it is considered that duck eggs are at least 30 to 40 per cent. heavier than hen eggs, the difference in value is further accentuated. In *Burma* duck eggs are more popular than hen eggs, as would be seen from its own production of eggs in which the duck eggs comprise over three-fourths of the number. With the general tendency to purchase cheaper eggs, the expensive and smaller hen eggs could therefore hardly hold their own with the larger and cheaper duck eggs, and this appears to be the real explanation for the hen egg exports of *Madras Presidency* being affected so severely.

Periodicity.—The figures below deal with the monthly variations in exports to *Burma* from *Madras* and *Cocanada* (in 1936).

—		Eggs (lakhs).	Per- centage to the annual.	—		Eggs (lakhs).	Per- centage to the annual.
January ..	..	0·22	4·0	July ..	..	..	..
February ..	..	0·62	11·2	August ..	..	0·14	2·5
March ..	..	1·70	30·6	September ..	..	0·64	11·5
April ..	..	0·38	6·8	October ..	..	1·06	19·1
May ..	..	0·18	3·2	November ..	..	0·44	7·9
June ..	..	0·12	2·1	December ..	..	0·06	1·1
				Total ..		5·56	100

(b) *Ceylon trade*.—The exports to *Ceylon* consist mostly of hen eggs. Between the years 1930-31 and 1936-37 exports decreased from 115 lakhs eggs to only 2·2 lakhs. The value has decreased from Rs. 3·5 lakhs to about Rs. 4,600. It would be observed from the table on page 31 that the price during the last two years has gone down by about one-third. The export trade has been particularly affected from 1934-35, when the number of eggs was reduced from 73 lakhs in the previous year, to only 19 lakhs in 1934-35. This is due to the fact that from 28th July 1934, the *Ceylon Government** enhanced the import duty of 12½ per cent. on the tariff value, to a practically prohibitive duty of Rs. 3 per hundred eggs, i.e., equal to the value of the eggs. This has had considerable effect on the export trade and prices, not only in *Madras* but also in *Travancore State*, which also carried on a brisk export trade with *Ceylon*. For instance, in 1933 *Travancore* exported to *Ceylon* over 60 lakhs eggs, but since the imposition of prohibitive duty in July 1934 the exports have ceased completely. The average wholesale price from January to July was Rs. 18·1 per thousand eggs, but on account of duty and the stoppage of exports, the average for the remaining five months of the year was only Rs. 16·6.

Periodicity.—Appendix XVII gives the monthly export of eggs to *Ceylon* from *Tuticorin* for five years together with the percentages of monthly exports to annual. From the figures it would be observed that there has not been a regular monthly increase or decrease in each year, but generally exports have been greatest during the months of September to November. This is said to be due to the seasonal rise in the production of eggs in *Madras Presidency*. From August 1934, there has been a sharp drop in the exports due to the prohibitive duty that came into force from the previous month, i.e., 28th July.

(3) EXPORTS FROM BIHAR.

Small quantities of eggs are found to be exported over the land frontier from *Champaran* district of *North Bihar* to the adjoining territory of *Nepal*. The exports are confined mainly to the months of October to February, and it is estimated that annually only about one lakh hen eggs valued at about Rs. 2,440 are exported. Information on the trends of the above export is, however, not available.

(4) EXPORTS THROUGH SUPPLY TO SHIPS.

About 42 lakhs eggs are supplied annually to ships for use on voyages, and this may be taken as equivalent to an export from India. The ports of *Karachi*, *Bombay*, *Cochin*, *Madras* and *Calcutta*, all supply eggs to ships for use on voyages. Small supplies are taken from the port of *Rangoon* also. All the ships calling at the ports do not, however, take eggs, nor do those which take them, depend entirely on supply from Indian ports.

**Ceylon Government Gazette*, dated 27th July 1934.

The present supply is, however, as under :—

	Annual supply (lakhs).	Weekly average.
Karachi	2.4	4,600
Bombay	3	5,800
Cochin	8	15,300
Madras	5	9,600
Calcutta and Chittagong	23.8	45,800
Total	42.2	81,100
Rangoon	1	1,900

It is reported from *Karachi* that larger passenger steamers (coastal) generally take at a time 4,000 to 5,000 eggs, and the smaller ones about a thousand. Only hen eggs are required, and the supplies are made through the stevedores, who purchase them from local markets. Previous intimation is generally not given except by steamers which carry troops.

Bombay.—Of the 3 lakhs eggs that are supplied annually, it is reported that nearly half are taken by one shipping company alone.

Cochin.—Ships calling during monsoon generally take larger supplies, as at that time they do not touch smaller ports*. Of the supply taken at *Cochin*, about 80 per cent. are hen eggs and 20 per cent. duck eggs. Here also previous notice is generally not given.

Madras.—The 5 lakhs eggs taken by the ships, are generally for consumption when they are in the harbour, as at the time they do not draw from stocks under cold storage on board.

Calcutta.—90 per cent. of the supply is of hen eggs and only 10 per cent. duck eggs.

With regard to supply of eggs to the ships in general, it might be said that no definite specifications are followed for quality or size, except that cracked eggs are usually not tendered. The eggs are normally supplied loose, i.e., unpacked.

The question of supply of eggs to ships is a line of development to which hardly any attention has been given in the past. It is indicated that if large numbers of eggs could be properly graded for size and freshness, and also packed suitably for transport and storage, their supply to ships can be increased considerably. Many hundreds of steamers call at Indian ports, but due to the unsatisfactory quality and method of packing, they do not take Indian eggs. If only a reputation could be created for the supply of really good eggs at a reasonable price at the Indian ports, there seems scope for opening a new line of business.

*This indicates that coastal steamers must be having supplies of eggs all along the coast of India, but information regarding the number thus supplied, is not available.

D.—Net available market supply and value of eggs.

(1) IN INDIA.

(In lakhs).

	Desi fowl.	Improved fowl.	Duck.	Goose.	Turkey.	Guinea-fowl.	Total.
Number of eggs collected (net)	26,734	780	4,992	29	4	270	32,809
Retained for hatching	5,350	92	465	21	3	130	6,091
Retained by producers for domestic use.	5,440	132	361	3	Neg.	25	5,961
Total retention	10,820	224	826	24	3	155	12,052
Number marketed	15,914	556	4,166	5	1	115	20,757

To the 20,757 lakhs eggs that are marketed annually, add 5,961 lakhs retained by producers for domestic consumption, making a total of 26,718 lakhs eggs, available for consumption in India.

Deduct from the above :—

(Lakhs).

(a) Exports to Burma*	..	236
(b) Exports to Ceylon*	..	2
(c) Supply to outgoing ships†	..	43
(d) Exports to Nepal‡	..	1
Total		282

Total consumption in India is, therefore, 26,436 or say 26,400 lakhs eggs.

Value.—At a nominal price of say one pice‡ per egg, the annual value of the eggs :—

(i) For hatching (6,091 lakhs) is Rs. 95.1 lakhs.

(ii) For domestic use of producers (5,961 lakhs) is Rs. 93.1 lakhs.

(iii) Marketed (20,757 lakhs) is Rs. 3.25 crores.

The annual value of the gross production (33,648 lakhs eggs) is Rs. 5.25 crores.

*Hen and duck eggs.

†Mostly hen eggs.

‡This is what may be taken as the price realised by the producers. The consumers pay about 1½ to 2½ times the producers' price.

(2) IN BURMA.

(In lakhs).

—	Duck.	Desi fowl.	Improved fowl.	Total.
Number of eggs collected (net) ..	1,163	378	22	1,563
Retained for hatching	30	230	2	262
Retained by producers for domestic use ..	Neg.	23	2	25
Total retention	30	253	4	287
Number marketed	1,133	125	18	1,276

To the 1,276 lakhs eggs that are marketed annually, add 25 lakhs retained by producers for domestic consumption, making a total of 1,301 lakhs eggs available for consumption in Burma.

To the above add imports :—

	(Lakhs).
(a) From India*	236.0
(b) From China†	0.5
Total	236.5

Deduct exports :—

Supply to outgoing ships‡ 1

Total consumption in Burma is, therefore, 1,537.5 lakhs, or say 1,500 lakhs eggs.

Value.—At a nominal price of $\frac{1}{2}$ anna‡ per egg, the annual value of eggs :—

- (i) For hatching (262 lakhs) is Rs. 8.2 lakhs.
- (ii) For domestic use of producers (25 lakhs) is Rs. 78,125.
- (iii) Marketed (home produced 1,276 lakhs) is Rs. 40 lakhs.

*Hen and duck eggs.

†Mostly hen eggs.

‡This is what may be taken as the price realised by the producers. The consumers pay $1\frac{1}{2}$ to $2\frac{1}{2}$ times the producers' price.

[Supply.

INTER-CHAPTER ONE.

India produces every year about 33,648 lakhs eggs and *Burma* about 1,636 lakhs. If they were all put end to end they would stretch about 4 times round the world. As poultry keeping is usually confined to Mohammedans, Christians and certain castes, the average number of birds kept per household is small. Further the egg laying capacity of the birds is low.

Hens represent about 90 per cent. of the total number of laying birds in India and ducks the remaining 10 per cent. The number of geese, turkey and guinea-fowl constitutes an insignificant fraction of the total. Between them, India and *Burma* have about one-tenth of the world's recorded population of fowls, and excluding China, they have more ducks than all the other countries of the world put together. The main area of concentrated production are *Eastern Bengal* and the *Travancore* and *Cochin States*. The *Godavari Delta* in *Madras Presidency* is also important. The *North-West Frontier Province*, the *Thana* district of *Bombay Presidency* and parts of *Nizam's Dominions* are important as exporting centres. The *United Provinces* is both a large producer and consumer of eggs.

The seasonal fluctuation in production in the main areas varies and in some cases there are three peak periods in the course of the year. On the whole, however, production is greatest during the months of March and April and at its lowest during the monsoon.

In spite of the large poultry and duck population actual records of the output of individual birds are very scanty. The *desi* (indigenous) hens are estimated to lay on an average 53 eggs per bird in the course of a year, but this varies from 32 in *Madras States* to an

average of 65 in the *United Provinces*. "Improved" hens bred from imported stock lay on an average, 103 eggs a year. The number of such birds is small and does not exceed $1\frac{1}{4}$ per cent. of the total laying birds. At least three-fourths of the improved stock are to be found in the *United Provinces* and *Bihar*.

The amount of experimental work done on farms in connection with *desi* poultry is very small indeed. Only 875 *desi* birds are kept on such farms in the whole of India, but 9 times that number of "improved" poultry. From the small amount of experimental work so far carried out it would appear, however, that by proper selection and management the output per bird for *desi* poultry can be increased by about one-third in a very short time.

In the case of duck eggs the average output per bird for the whole of India is 90 per annum. In *Bengal* it is 75, in *Madras Presidency* 126 but in the *Punjab* the average number of eggs per duck is only 50. This compares very unfavourably with the output of the ducks in *Burma* where the average is 180 eggs per annum.

Owing largely to the disease mortality—regarding which not much information is available—roughly about 33 to 50 per cent. of laying fowls have to be replaced every year. Taking this into consideration and allowing for the fact that producers far removed from the market retain most of their eggs for their own consumption, the fact remains that on the whole producers retain only about one-fifth of the total eggs produced and at least 60 per cent. of the hen eggs and over 80 per cent. of the duck eggs are put on the market.

Very few of the hen eggs are of large size. The average weight varies from 9 lb. per hundred eggs in the *North-West Frontier Province* to 8 lb. 2 oz. in *Travan-*

core and 7 lb. 12 oz. in *Bengal*, but the average weight of "improved" hen eggs is round about 12 lb. per hundred. The duck eggs are much larger. The average weight per hundred varies from 17 lb. in *Cochin State* to 10 lb. 8 oz. in *Bengal*. Having regard to the higher output per bird in the case of ducks and the larger size of egg, it is surprising that practically nothing has been done for the improved selection and increased production of ducks. This seems especially unfortunate since the duck is apparently fairly immune to the ravages of disease.

There was, until recently, a considerable export of eggs from India to *Burma* and *Ceylon* but during the past 7 years the number of eggs exported to *Burma* has dropped by about half to 236 lakhs, and in value to about one-third or Rs. 3½ lakhs. During the same period the exports to *Ceylon* have fallen from 115 lakhs eggs to 2.2 lakhs and the value from Rs. 3½ lakhs to Rs. 4,600 only. This is largely due to the fact that from July 1934, the *Ceylon* Government enhanced the duty on eggs imported from India from 12½ per cent. *ad valorem* to a specific duty of Rs. 3 per hundred, which is more than the total value of the eggs.

There is a small but useful trade at the ports amounting to about 42 lakhs eggs which are taken every year as ship's stores. This seems capable of further expansion.

Imports of eggs and egg products into India are practically negligible. The supply position would, indeed, indicate on the other hand that there is ample scope for the development of an export trade from India in the way of egg products such as frozen, liquid or dried eggs, etc. This could be easily managed in certain selected areas by organisation and the encouragement of production.

CHAPTER II.—UTILIZATION AND DEMAND.

A.—Consumption of eggs.

(1) ABROAD.

Estimates of per capita consumption for a few countries based on official figures, are shown below* and it will be noticed that although in Canada, Germany and the United States of America, a slight decline has occurred, the consumption as a rule is high.

				Consumption of eggs per capita.	
				1930.	1936.
United Kingdom	..	..	..	154	158
Canada	..	..	..	296	260
Irish Free State	..	..	..	283	283
Denmark	..	..	..	14.1 (lb.)†	14.6 (lb.)†
Germany	..	..	..	140	114
United States of America	..	..	..	267	236

The people of these countries are non-vegetarians and eggs generally form a regular part of their diet, as would be seen, for example, from the table below relating to the United Kingdom :—

Annual consumption per head of certain food-stuffs in the United Kingdom.‡

	1924-28.	1934.	Percentage of increase.
	lb.	lb.	
Fruit	91	115	26.4
Vegetables (other than potatoes).	78	98	25.6
Butter	16	25	10.2
Cheese	9 } 37	10 } 43	
Margarine	12 }	8 }	
Sugar	87	94	8.0
Meat	134	143	6.7
Potatoes	194	210	8.2
Flour	198	197	—0.5
Eggs	120 (eggs)	152 (eggs)	26.7

*Imperial Economic Committee's Report, 1937.

†14 lb. weight of eggs may vary from 90 to 110 eggs.

‡The Statist—March 28, 1936.

From the above figures it would be noticed that of all groups of food-stuffs, the consumption of eggs shows the highest rate of increase in the diet of the British people in recent years, and that fruit and vegetables show a somewhat similar increase.

(2) INDIA.

(a) *On the basis of total population.*—In India the bulk of the people are vegetarians and the per capita consumption works out to only 8 eggs per annum. In other words one person in Canada eats as many eggs as 30 or 35 people in India.

From the table below it would be observed that the variation in consumption in the different provinces and States, ranges from less than one egg per annum to about 22 eggs. It would also be noticed that the highest rate of per capita consumption, viz., 21.6 eggs is found in *Travancore*, where the production of eggs is most concentrated. On the other hand, the lowest consumption is in *Rajputana* and *Western India States* (less than one egg per annum) which are areas of sparse production.

*Per capita consumption of eggs.**

Kashmir	9.5	Travancore	21.6
North-West Frontier Province ..	10.0	Madras States (excluding Travancore and Cochin) ..	4.2
North-West Frontier Province Agency Areas	6.1	Madras Presidency	10.7
British Baluchistan	12.4	Nizam's Dominions	15.0
Baluchistan States	10.7	Central Provinces	4.4
Punjab	7.6	Central Provinces States ..	9.0
Patiala State	0.9	Eastern States (excluding Central Provinces States) ..	4.2
Punjab States (excluding Patiala State)	3.7	Bundelkhand Agency	0.9
Delhi Province	6.7	United Provinces	8.5
Rajputana	0.8	United Provinces States ..	8.4
Central India States	3.0	Bihar	6.6
Sind	8.0	Orissa	5.1
Khairpur State	13.8	Bengal	5.4
Western India States	0.8	Bengal States	8.6
Gujarat Agency	2.6	Assam	3.5
Baroda State	1.9	Assam States	1.9
Bombay Presidency	15.3	India	7.8
Deccan States	4.4		
Mysore State	11.0		
Coorg	5.1	Burma	12
Cochin	10.5		

*To arrive at the consumption of eggs in different areas, the inter-provincial imports are added to the balance of eggs available in each area, and the inter-provincial exports deducted.

(b) *On the basis of egg eaters in urban and rural areas.**—Many people in India are vegetarians from religious motives and only certain communities generally partake of eggs, e.g., Muslims, Christians, Jews, Sikhs, Zoroastrians (Parsees) and the tribal populations. The combined number of these is only about a third of the total population. The Hindus, as a class, may be considered as non-egg eaters. The rate of consumption, it is observed, is not the same in all the communities. Generally Europeans, Anglo-Indians, Parsees and Jews, consume more eggs than Muslims or others. Further the consumption varies considerably between rural and urban population on the whole, and also within the same communities.

In the *Punjab*, the consumption of eggs is found to vary even with the different parts of the province, both in respect of urban and rural population as under :—

	Annual consumption per capita.	
	Urban.	Rural.
(i) Eastern zone (Ambala Division and Kangra district).	19	Less than one.
(ii) Central zone (Hoshiarpur, Jullundur, Ludhiana, Ferozepur, Lahore, Amritsar, Gurdaspur, Sialkot, Gujranwala, and Gujrat districts).	34	3
(iii) Canal colonies (Lyallpur, Sheikhupura, Jhang, Montgomery, and Sargodha districts).	18	3
(iv) North-west zone (Partly Rawalpindi and partly Multan Divisions).	80	7

In *Delhi province*, it is observed that in the urban areas the annual per capita consumption (on the basis of the total population) is 7 eggs, whereas in the rural part it is only 2 eggs. On the other hand, on the basis of those communities that normally eat eggs, the urban consumption per head is 53 eggs, and the rural 16 eggs per annum. In *Bombay Presidency*, the Jews, Christians and Parsees consume many more eggs than Mohammedans or tribal populations. The estimates of annual per capita consumption in the urban and rural areas also vary considerably and are as under :—

	Urban.	Rural.
Jews	600	200
Zoroastrians (Parsees)	400	100
Christians	350	100
Muslims	50	20
Hindus	12	12
Tribal	..	20

In *Madras Presidency* two-thirds of the population have no objection to eating eggs. Only about 13·6 per cent. of the population live in the urban area, and the per capita consumption per annum in this area is 16 eggs and in the rural only 9. In the *Nizam's*

*According to the Census Code, any place inhabited by 5,000 persons is classified as *urban*, and that less than the above number as *rural*.

Dominions the consumption per capita in *Hyderabad city* is estimated to be 78 eggs per annum. In other towns in the State it is much less. In *Bengal*, 50 per cent. of the urban population are estimated to be egg eaters, whereas in the rural districts only 25 per cent. of the people eat eggs.

On the all-India basis, the position is as follows :—In Appendix XX are given the annual figures of arrivals of eggs by rail, for consumption at some 27 towns and cities*. These amount to about 1·22 lakhs maunds (gross weight) or about 980 lakhs eggs. From the footnotes given under the Appendix it would, however, be observed that the figures do not represent the *total* arrivals by rail at the above places. They also do not include those eggs that are brought loose (unpacked) from the surrounding villages, say on bicycles, head-loads or motor-buses, nor do they include those that may be produced within the above towns and cities. These items are estimated to cover an additional number, equal to about 50 per cent. of the recorded figures, and thus the annual consumption in the 27 centres is estimated to be about 1,470 lakhs eggs. The population at these centres is about 61 lakhs persons (1931). On this basis the consumption in the entire urban area in India (374 lakhs persons) would be about 9,035 lakhs eggs, so that the per capita consumption works out to about 24 eggs per annum. The balance of the eggs 17,389 lakhs may be taken to represent those that are consumed amongst the rural population of about 3,007 lakhs persons, or a consumption of 6 eggs per capita per annum. On the other hand, if only the egg eaters in the urban and rural areas are considered, the per capita consumption works up to about 75 eggs and 20 eggs respectively.

The consumption on the different bases may be summarised as under :—

Summary of consumption of eggs in India.

On the basis of :—	Persons† (lakhs, approx- imately).	Eggs con- sumed annually (lakhs).	Per capita consumption of eggs.
1. Entire population	3,381	26,424	8
(a) In urban	374	9,035	24
(b) In rural	3,007	17,389	6
2. Persons who eat eggs	973‡	26,424	27
(a) In urban	120‡	9,035	75
(b) In rural	853‡	17,389	20

*Rawalpindi, Lahore, Delhi, Saharanpur, Dehra Dun, Allahabad, Benares, Lucknow, Agra, Karachi, Hyderabad, Sukkur, Baroda, Bombay, Porbandar, Morvi, Navagadh, Bhavnagar, Hyderabad (Deccan), Secunderabad, Kamptee, Mhow, Bangalore, Madras, Patna, Dinapore and Calcutta.

† The figures (population and eggs) exclude Burma. The population figures relate to 1931 Census.

‡ These figures represent the total number of Muslims, Christians, Jews, Parsees and Tribal population according to the Census returns.

(3) BURMA.

The position in *Burma* is different from India, so far only a few people do not eat eggs there. The Burmans themselves do not object to eating of eggs so long as they are preserved or pickled, in other words, life must be extinct before they break and eat them. But of late years some of them have taken to eating fresh eggs also. On the basis of the total population, the per capita consumption is about 12 eggs per annum.

B.—Utilization and types in demand.

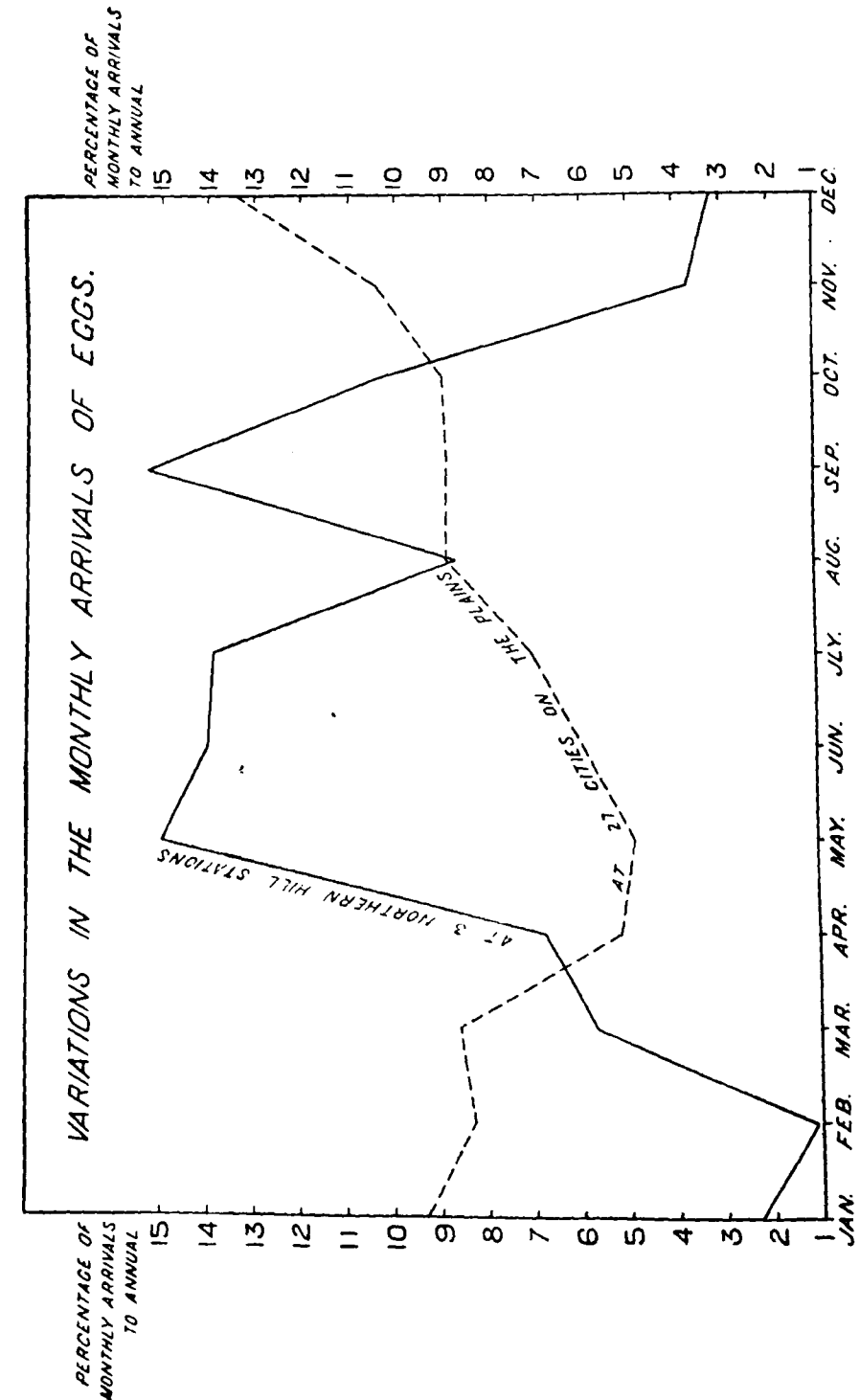
(1) INDIA.

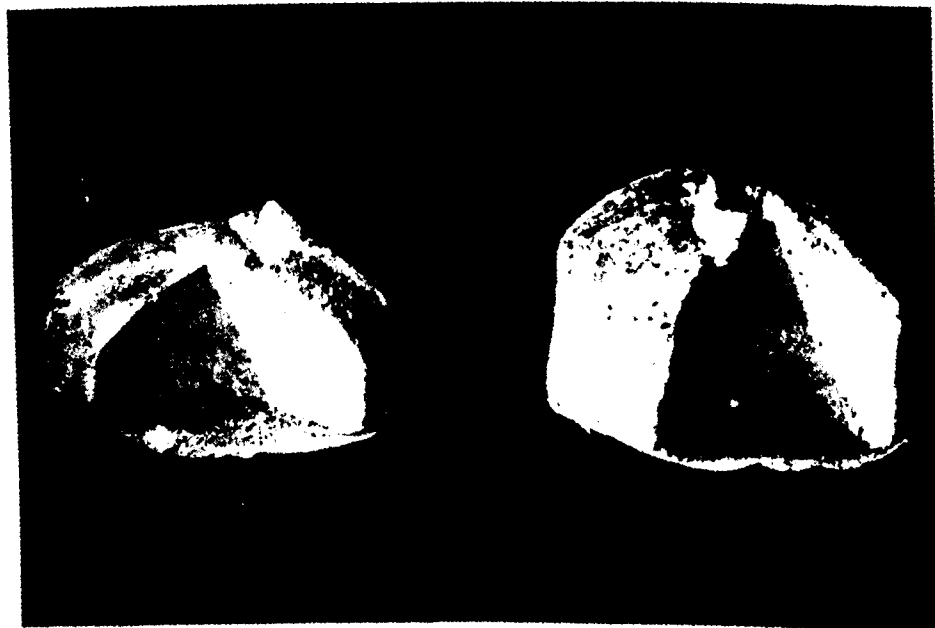
The demand of eggs is subdivided into three types, viz., (a) for household use, (b) for confectionery, and (c) for other purposes.

(a) *For household use*.—Almost 95 per cent. of the eggs consumed in India are used for cooking and table purposes.

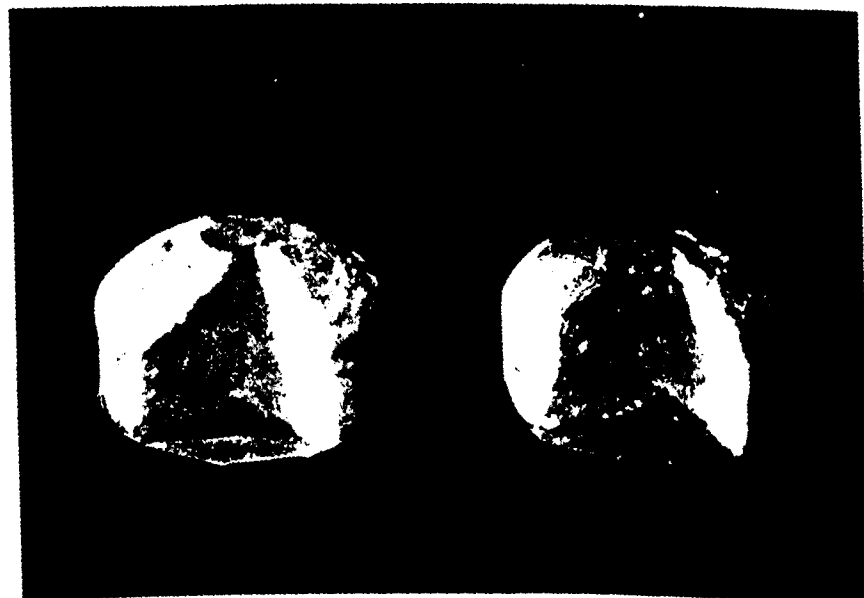
(i) *For cooking*.—In Indian households, eggs (fowls, duck, guinea-fowl, goose and turkey) are served and eaten in a variety of ways, but the most common form is, first to hard boil them and then to re-cook them in spiced curries, which are generally well seasoned. They are also cooked and served with rice and meat. Hard boiled, fried and scrambled eggs, and egg omeletts are also used. Of these, the last preparation is rather common and it is fairly well spiced with onions, greens and other ingredients. Various sweet dishes are also prepared out of eggs in which flavouring and other ingredients are used. It is, therefore, important to note that the indigenous methods of utilization are such that by the time the great majority of eggs are served, there is hardly any of the original flavour left. The delicacies of fresh egg flavour (or the differences of flavour in English new laid eggs, Danish eggs and Irish eggs) to which the palate of the western consumer is so sensitive, could be said to be a matter of indifference to the majority of egg consumers in India.

(ii) *For table*.—By this is meant those eggs that are required to be served in *lightly* cooked dishes—mostly at breakfast—and which do not materially alter their general appearance, etc. Quarter, half or hard boiled eggs, and poached or fried eggs may be cited as examples. Even in western countries this demand is limited, but it is still more so in India, for it is generally confined to Europeans, Anglo-Indians and Indians living in western style. Since in the above method of serving, the interior quality cannot be disguised by cooking, only larger and fresher eggs are needed to meet this demand. It is met (a) by the improved eggs, (b) by the selected large and fresh *desi* eggs, and (c) by eggs from poultry kept by the consumers themselves. For the use of children also, the





From Duck eggs. From Hen eggs.
Cakes made from equal weight of duck and hen eggs (whole).



From Duck yolks. From Hen yolks.
Cakes made from equal weight of duck and hen yolks only.

table quality of eggs are preferred. Duck eggs are, however, not used for table purposes.

Since table eggs sell at a premium, the improved eggs from the poultry farms are generally sold for this purpose. Appendix XVIII shows the demand for certain farm eggs. It would be observed that about 80 per cent. of their production is sold off for consumption. The rest may be taken as retention for hatching purposes on the farms or for sale of eggs for hatching. It would be seen that, on the whole, the monthly demand is practically constant and ranges within narrow limits, viz., 7.4 per cent. to 9.7 per cent. of the annual sales. This is attributed to the fact that the class of persons who are the customers of these farms, are regular consumers of eggs, and their habit of eating table eggs at breakfast, is also regular. It is, therefore, indicated that in any scheme for the supply of table or fresh eggs, considerable attention has to be paid to regularity in the daily supply if success is to be achieved, or the demand is to be increased.

(b) *For confectionery.*—This demand is from bakers and confectioners who make cakes, biscuits, pastries, etc. The use of these articles is also confined generally to the same class of people who require table eggs. On account of X'mas, this demand is greatest during the month of December in large cities, though it begins to rise generally from the middle of November. In large towns and cities, some of the Indian tea-shops and restaurants also deal in the western type of confectionery for which eggs are required.

Duck eggs are generally not used for confectionery as such, but sometimes a few along with the hen eggs are not refused. In *Burma*, however, Chinese confectionery is generally made out of duck eggs. It is the general experience of local bakers and confectioners of western types of confectionery, that duck eggs are not as "light" as the hen eggs, and the cakes, etc., do not rise sufficiently. So far as the flavour goes, there is no appreciable difference between confectionery made from hen eggs and duck eggs, even in a plain sponge cake.

In the top plate facing this page are reproduced photographs of two cakes made out of hen and duck eggs. The weight of duck and hen eggs used in both of these was equal. The other ingredients, the size of the tins, as well as the time taken for baking were also identical. It was, however, observed in the finished cakes that while the one with hen eggs rose about 3 inches in the centre, the other with duck eggs rose only 1½ inches. The texture of the duck egg cake was inferior and had holes in it as are apparent in the photograph. So far as the outside finish, taste and flavour are concerned, there was practically no difference at all. By reducing or minimising the proportionate weight of duck eggs in the cake, better results could not be obtained. By using only the yolks instead of the whole eggs, the results were, however, satisfactory (see Appendix XIX).

The extent of the demand for eggs for confectionery has been estimated as follows. It is confined to the urban area only :—

Demand for eggs for confectionery.

	Percentage of total urban consumption.
North-West Frontier Province	5
Punjab	3
Delhi Province	5
Sind	2.5
Baroda State	2
Bombay Presidency	11
Mysore State	6
Cochin	5
Travancore	1.5
Madras	10
Central Provinces	5
United Provinces	2
Bihar	2
Bengal	3
Burma	1

(Note.—In the other areas the demand for eggs for confectionery is negligible.)

It is reported that although only a small percentage of the urban consumption is utilized for confectionery purposes, eggs of defective quality, such as chipped, leaky, small and even partially stale eggs are in demand by professional confectioners and bakers. In fact, it is doubtful whether first quality eggs are much in demand for this purpose at all. It is reported that the cheaper class of tea shops and restaurants,—which are stated to be on the increase—have often to supply a tea cake for a quarter or half anna, and on that account have to resort to the use of cheaper and defective eggs. If the price for good eggs is say 6 annas per dozen, the bakers would generally clear off the "rejections" at about 2½ to 3 annas per dozen only. Most of the egg merchants in cities have permanent arrangements with the bakers and confectioners whereby such eggs from a damaged consignment of eggs, as cannot be disposed of for household use, are sold by the merchants to them.

(c) *For other purposes.*—Besides the above, there is very little demand for other purposes. Reports show, however, that a few eggs are used for glazing purposes in book binding, and for medicinal purposes for dogs, horses, and cattle. Sometimes a few are used in the tanning industry also, and on occasions used for sacrificial purposes, as an egg is regarded as an object possessing life.

Industrial egg products such as frozen yolk or white, or dried eggs are not manufactured in India as yet. In her evidence (4th February 1927) before the Royal Commission on Agriculture, Mrs. A. K. Fawkes, the then Secretary of the United Provinces Poultry Association, stated* that Messrs. Pulvo, Limited, one of the largest

*Royal Commission on Agriculture, Vol. VII, Evidence taken in the United Provinces, page 292.

British firms dealing in dried eggs and having extensive factories in China, were in negotiation with her for starting similar concerns in India. Although several years have passed since this was recorded, nothing happened until recently when there is again a move in this direction. Certain firms have shown considerable interest in the possibilities of developing this branch of the industry, and it appears that *Eastern Bengal, Cochin or Travancore* might ultimately be selected as suitable areas.

(2) BURMA.

In *Burma*, the breaking of a fresh fertile egg is taken by the Buddhists as equivalent to killing an animal and in the past only pickled eggs imported from India, were consumed. Within the last 4 or 5 years the demand for fresh infertile eggs has, however, increased. In fact, now they prefer to use fresh duck eggs which have better flavour than the preserved ones. The consumption of such fresh eggs is, however, confined to *Lower Burma* where these can be easily obtained. But eggs do not constitute a regular article of the Burman's diet. They generally take two meals a day, one in the morning and the other in the evening. The food is similar at both the meals, mainly rice cooked in the Chinese fashion. A soup of some kind, mostly made of vegetables, is used with the rice. In addition to this, there may be one or two dishes of pork, chicken, duck, fish, beef, eggs, etc., prepared in a variety of ways in the form of curries. These are, however, consumed only in very small quantities. No food value is attached to them, and they are merely regarded as an accompaniment to rice.

Eggs are generally not preferred for making of curries, and as such they are used only when the other articles referred to are not easily available. But it is reported that the labourers and agricultural classes would be only too glad to have eggs for their curries. They cannot, however, afford eggs so that these are mostly consumed by the middle classes. This is the case with some of the Bengal Hindus and Chinamen as well.

For confectionery purposes duck eggs are mainly used by the Chinamen. Europeans and other confectioners use them only when fowl eggs are not available. Only the fresh (unpreserved) eggs are required for the purpose, and it is estimated that about one per cent. of the marketable eggs are so used.

C.—Seasonal variation in demand.

It is observed that there is a difference in the seasonal demand of eggs on the plains and on the hill stations. These are therefore treated separately.

(1) ON THE PLAINS.

This is indicated by the variations in the monthly arrivals of eggs at some 27 towns and cities on the plains. The details of the monthly arrivals at each place are given in Appendix XX. The

total arrivals, expressed in terms of percentages to the annual, at all the 27 cities are reproduced below :—

Monthly arrivals of eggs by rail.

	Monthly arrivals per cent.	Deviation from monthly average.
January	9.3	+1
February	8.3	Nil.
March	8.6	+ .3
April	5.2	—3.1
May	4.9	—3.4
June	6.0	—2.3
July	7.1	—1.2
August	8.9	+ .6
September	8.9	+ .6
October	9.0	+ .7
November	10.4	+2.1
December	13.4	+5.1
	(100)	

From the above figures and the diagram opposite page 44, it would be observed that the demand of eggs in February and March is nearly at par with the monthly average of 8.3 per cent. to the annual. It then suddenly drops in April. With a further slight decrease, it touches the lowest level of the year in May. Thereafter, although it begins to rise steadily during summer and monsoon, it rises only a little above the monthly average. From October onwards there is a very sharp rise, and it reaches the highest peak in December when it is about thrice as much as the lowest in May.

At places like *Delhi, Lahore* and a few others, the exodus of persons* to hills during April, affects the demand of eggs in summer. The demand at cities like *Calcutta, Bombay* and *Madras*, is also affected, and the clubs, messes, hotels, etc., have generally a slack season during this time of the year. All the 27 cities for which monthly figures are available, however, are not generally affected by the above factors. In their case the demand is governed by two main reasons, firstly, that the Indians generally believe that the eggs produce heat in the body and their use should therefore be restricted during the summer, and secondly, that it is difficult to obtain fresh eggs during summer, and the egg merchants indent for only sufficient eggs at one time to avoid risks of spoilage. It is noticed that the second reason bears the greatest influence on the demand for eggs. For instance, at *Delhi* it is observed that during winter eggs are received from 68 places with an average distance of 231 miles, whereas during summer they are had from only 35 places, with an average distance of 124 miles. The number of stale eggs during summer

*Generally the class of persons who move between plains and hills are regular consumers of eggs.

sometimes goes up as high as 30 per cent. against only 5 to 7 per cent. during winter. For these reasons many persons are unable to get fresh eggs and they either reduce the consumption or stop it altogether.

The consumption increases from October onwards, as people prefer to eat more eggs, both on account of the cooler weather and the availability of fresh eggs. In fact, there are several indigenous tonic* preparations in the form of preserves and foods, that are made from eggs and are eaten only during the winter months. The demand of eggs is at its maximum in December due mainly to the X'mas holidays and the general festivities of the season.

(2) AT HILL STATIONS.

There are in India about a dozen leading hill stations† where the temperature during summer is much lower than in the plains. The offices of the Government of India, and those of various provincial governments go up for summer to the hills. Many non-officials and others also go up to the hill stations during summer. The season usually commences from mid-April and continues up to mid-October. During winter, only the permanent residents are left behind, though some of these also go down to the plains, due to severe weather (snow, etc.), in the months of December and January.

The monthly variations in the arrivals of eggs at these hill stations are given below :—

Monthly variations in the arrivals of eggs at some of the Northern hill stations.

(Indicated in terms of percentages to the annual.)

	Simla 1937.	Naini Tal 1935-36.	Darjeeling 1935-36.	Average. (total arrivals).	Deviation from the monthly average.
	Per cent.	Per cent.	Per cent.	Per cent.	
January	3.4	0.3	1.8	2.3	—6
February	1.1	0.9	1.2	1.1	—7.2
March	5.1	5.8	7.1	5.7	—2.6
April	4.9	8.9	9.7	6.8	—1.5
May	15.7	15.4	12.6	15.0	+6.7
June	13.5	15.4	13.7	14.0	+5.7
July	14.2	16.6	9.7	13.9	+5.6
August	7.0	11.4	10.0	8.7	+ .4
September	18.3	12.9	10.1	15.3	+7
October	9.0	10.3	14.0	10.3	+2
November	4.0	1.7	5.2	3.7	—4.6
December	3.8	0.4	4.9	3.2	—5.1
Total	(100)	(100)	(100)	(100)	..
Total annual quantity in maunds.	3,440	1,567	1,273	6,280	..

*Ande-ka-halwa, etc.

†Murree hills, Mussoorie, Naini Tal, Simla, Ranchi, Darjeeling, Pachmarhi, Shillong, Mahabaleshwar, Ootacamund, Mount Abu, Kodaikanal, etc.
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From the preceding table and the diagram facing page 44, it would be seen that the seasonal demand at the northern hill stations is practically the reverse of the demand in the plains. With the exodus to the hills in April-May, it rises suddenly to nearly the peak in May, and remains practically so till September, with only one sharp and short lived decrease in August. This is generally due to the excessive rains and bad weather in the hills during this month, when some of the people go down to the plains. The demand is lowest during the month of February and at this time it is about one-fifteenth of the maximum in September.

(3) IN BURMA.

The demand of eggs in *Burma* is studied from the table below showing the monthly imports from India, which comprise about 26 per cent. of the number of locally marketed eggs.

Monthly variations in the imports of eggs into Burma.

(Expressed in terms of percentages to the annual.)

	Duck eggs.			Hen eggs.			Average of duck and hen eggs.
	1933.	1934.	Average.	1933.	1934.	Average.	
January	8.6	10.8	9.7	9.1	19.5	12.9	9.8
February	11.2	5.1	8.2	17.1	10.8	14.7	8.4
March	8.6	11.2	9.8	10.0	9.8	10.0	9.4
April	9.0	9.5	9.3	7.3	3.0	5.7	9.2
May	9.8	8.1	9.0	1.8	2.0	1.9	8.8
June	7.4	7.8	7.6	..	0.5	0.2	7.4
July	10.1	10.6	10.4	2.7	..	1.7	10.2
August	9.8	10.9	10.3	3.4	1.0	2.5	10.2
September	10.3	8.9	9.6	7.6	1.7	5.4	9.6
October	7.4	8.5	7.9	7.6	12.8	9.5	8.1
November	4.7	3.2	4.0	20.7	16.5	19.1	4.4
December	3.1	5.4	4.2	12.7	22.4	16.4	4.5
Total	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Total quantity in maunds.	49,579	47,104	48,342	1,343	796	1,069	49,411

It would be observed that there is also a variation in the demand of duck and hen eggs. The supplies of hen eggs are greater between October and March, the highest being in November. They, however, form but a small proportion (about 2 per cent.) of the quantity of duck eggs, and therefore the demand might best be studied from the latter. It would be seen that the demand is greater during January, March and April and also during July, August and September. The reason for the rise is that both in *Lower* and *Upper Burma* the consumption of duck eggs is highest during the Burman festivals of *Thingyan* in April, *Buddhist Lent* from August to October and *Tabaungpwe* in March. On these occasions the Burman Buddhists use only the best kind of food for religious offerings, and also for feasting, and eggs comprise an important item in their diet.

As compared with India, the X'mas season does not seem to affect the demand for eggs in *Burma*; in fact during November and December the imports are only about half of what they are during the other months. This is partly due to the increase in local production during this time of the year.

D.—Correlation of demand with production.

From the maps facing pages 10 and 11 it has already been noticed that except for a few areas, the production of eggs on the whole is sparse and scattered all over the country. This is due to the fact that fowls are kept only by a relatively few on a fragmentary basis, each producer having only a small number of birds. The number of eggs laid per bird is also small. It may be mentioned that the bulk of the production is in the villages where about 89 per cent. of the population live.

On the other hand, it is noticed that the per capita consumption of eggs in the urban area is four times as much as in the rural districts (see page 43). Although the population living in the urban area is only about 11 per cent. of the total, the urban consumption of eggs annually is about 9,035 lakhs eggs, which represents 27.5 per cent. of the total production of eggs in India, equivalent to 34 per cent. of the balance available for consumption, or 43.5 per cent. of the eggs actually marketed.

Although over a half of the marketable eggs are disposed of in the rural area, in actual fact the rural per head consumption is one egg in 18 days; or, say a family of four would need one egg every fourth or fifth day. It is obvious, therefore, that eggs do not occupy any significant place in the daily requirements of the rural people, and as such it would not matter if due to variation in production, a family had an egg, say every sixth or seventh day, instead of on fourth or fifth. Most of the rural consumers live in villages of small sizes

(see table below*), and their mode of living is such that, under the existing conditions of low per capita consumption, they would adjust themselves according to the circumstances, and would eat less eggs if the production decreased or eat more if at any time the market requirements were relatively low.

The position with regard to urban demand is, however, somewhat different, although its effect is minimised by the fact that on the whole only about 11 per cent. of the population live in urban areas. The proportion of the urban population ranges from 3.4 per cent. in Assam to 22.6 per cent. in Bombay Presidency. Compared with the most urbanised of the major provinces of India, the proportion of the urban population in France is 49 per cent., in Northern Ireland 50.8 per cent., in Canada 53.7 per cent., in United States of America, 56.2 per cent. and in England and Wales it is 80 per cent.†

It has already been pointed out that the urban demand is less during summer months and is greater during the winter. From such figures as are available, it would appear that during the warmer months (March-August) the consumption is about 41 per cent., whereas during the remaining six months, it is about 59 per cent. of the annual total. On the other hand, the peak of production generally occurs in most of the areas during the early part of the warmer months. The lowest level of production also occurs during these months, but at the very end of the period. In cooler months when the urban demand is greater, the production is only 46 per cent. against 54 per cent. during the warmer months. From the fact that the urban demand is only 27.5 per cent. of the total production, it would appear that the production was capable of meeting any exigencies that might arise in the variation of demand. The seasonal variations in the prices, however, indicate that such is not the case.

The position may be better studied in light of the figures produced on the opposite page. The figures of production are only approximate and are based generally on the *Production Calendar* at page 19. Those of demand are the actual percentage of arrivals of eggs at some

* Rural population in India (1931).

Village having.		Number of villages.	Population (in millions).	Percentage to total rural population.
Population under 500	..	509,786	97.5	32.1
„ 500—1,000	..	113,541	79.1	26.0
„ 1,000—2,000	..	53,908	73.7	24.3
„ 2,000—5,000	..	18,836	53.5	17.6
Total	..	696,071	303.8	(100)

†Census of India, 1931, Vol. I—India, Part I Report.

27 consuming centres (see figures at page 48). The indices of prices are the averages of 11 major provinces and States (see Appendix XXI).

Relation of production, demand and prices.

		Production (Approximate percentage to annual).	Urban demand (percentage to annual).	Indices of monthly prices (annual average—100).
Warmer and wet months.	March ..	18	9	89
	April ..	12	5	92
	May ..	10	5	94
	June ..	6	6	100
	July ..	4	7	108
	August ..	4	9	106
Cooler and dry months.	September ..	6	9	107
	October ..	8	9	101
	November ..	6	10	104
	December ..	8	14	106
	January ..	10	9	100
	February ..	8	8	95

It would be seen from the average of the first six months that the low range of prices is due to greater production and lower demand. However, if the monthly figures are considered, it would appear that the lowest price level of the year in March is due to the maximum production during that month, and not perhaps to the lower demand. Similarly, during the later half of the year the high prices are due to greater demand and smaller production. But when the demand is at its highest in December, the monthly prices are by no means the highest. Actually, the highest price is in July when the production is lowest. The seasonal difficulty in assembling and distributing fresh eggs at this time of the year, no doubt causes the prices to go up.

The fact that the data are for one year only, limits the interpretation but it would appear that as the production increases, the prices go down significantly. Similarly, with the increase in the urban demand the prices go up. There appears, however, no correlation between production and urban demand, due to the fact that the figures relating to the urban demand represent only about 27 per cent. of the production.

E.—Possibilities of developing an export trade from India.

(1) EGGS IN SHELL.

Except for small quantities taken by *Burma* and *Ceylon*, other countries are not at present taking eggs from India. In the past, however, some of the egg merchants have tried to establish an export trade with other countries also, and one of them from *Bombay* (at the instance of the *United Provinces Poultry Association, Lucknow*), sent an experimental consignment to London in 1930. He, however, gave it up on account of the loss suffered in the trial. The *United Provinces Poultry Association, Lucknow*, also sent a consignment of 72,000 eggs in the same year, and are said to have suffered a loss. It is reported that a merchant from *Surat* sent small consignments to *Naples* (Italy) also.

The shipment sent by the *Bombay* merchant was of 14,400 hen eggs and was consigned to a commission agent in London. The eggs were marked on the shell with the word *EMPIRE*. The details are as under :—

Expenditure.

	Rs.	A.	P.
14,400 hen eggs at Rs. 3-10-0 per 100	522	0	0
Packing charges (10 cases)	40	4	0
Transport charges to the docks	8	0	0
Other charges	8	15	0
Freight (by mail steamer)	103	10	0
Total	682	13	0

Receipts.

	£	s.	d.
14,400 eggs were sold in London at 5s-3d. per 120*	31	10	0
Less 5 per cent. commission	1	11	6
	29	18	6

or Rs. 403-14-0. Loss on the consignment Rs. 278-15-0

The eggs were packed in wooden cases of 5 ft. long, 1½ ft. wide and 10 inches deep, with a capacity of 1,440 eggs each. In making the cases, a space of about one inch was left between the planks, for ventilation. Before placing the packing material, they were lined with thick brown paper. Well dried rice husk was used as packing material. In the 10 inches depth of the case, only two layers of eggs were placed and the rest of the space (below, in between and on the

*In the wholesale market in the United Kingdom, eggs are quoted and sold in great hundred or long hundred which equals 120 eggs.

top) was filled with rice husk. The packing was greatly appreciated and the commission agent reported as under :—

"The eggs arrived in excellent condition, both regarding packing and quality. The packing is really excellent and in my opinion could not be improved in any way".

Details regarding the net weight of eggs are, however, not known, but it might be taken as not less than 10 lb. per 120. The then prevailing prices in London, and the price realised for the Indian eggs are compared below. The 1936 prices are also given for comparison :—

Prices of eggs in London*.

	1930-31 per 120 eggs.	Per ton.	1936 per 120 eggs.	Per ton.
English National Mark Special 16 lb. 14 oz.	17s-5d.	£115-10s.	16s-9d.	£111-2s.
English National Mark Standard 15 lb.	14s-11d.	£111-5s.	15s-9d.	£117-10s.
Danish 18 lb.	14s-1d.	£87-12s.	12s-8d.	£78-16s.
Danish 15½ lb.	12s-1d.	£87-5s.	11s-3d.	£81-4s.
Dutch Best Mixed 15½ lb.	10s-8d.	£77-0s.	10s-7d.	£76-9s.
Indian 10 lb. (hen)	5s-3d.	£58-14s.	..	..

It would be seen that in this particular consignment the Indian hen eggs fetched only about £58-14s. per ton. The difference between their price and the lowest price of other eggs in the London market, viz., that of Dutch Best mixed was £18-6s. per ton. On the face of it, this appears to be a wide margin even allowing for differences in qualities. At any rate, the merchant at *Bombay* has shown the cost of the eggs at Rs. 3-10-0 per 100 *ex-Bombay*, or £72-4s. per ton, and the cost of packing and freight, etc., at £22-5s. per ton, or a total of £94-9s. per ton. He has therefore calculated his loss to be at about £35-15s. per ton.

Conditions have changed since, and it would appear that it is now possible to send hen eggs to London at about the same prices as above, but without suffering any loss. For instance the wholesale prices of eggs in 1937 at centres where large number of eggs could be collected and delivered at nearest ports, were as under :—

Hen eggs—per 120.			Approximate weight per 120 eggs, lb.
Bengal	..	Ex-Calcutta Rs. 2-4-0 or 3s.-5d.	10
Cochin and Travancore†	..	Ex-Cochin Rs. 2-1-0 or 3s.-1d.	10
Average			3s.-3d. 10
Duck eggs—per 120.			
Bengal	..	Ex-Calcutta Rs. 2-1-0 or 3s.-1d.	14
Cochin and Travancore†	..	Ex-Cochin Rs. 2-1-0 or 3s.-1d.	14
Average			3s.-1d. 14

*Imperial Economic Committee—Dairy Produce, 1937.

†The latest information shows that the prices have further decreased by about 15 to 20 per cent. and it is possible to collect large lots of eggs at the reduced prices.

On the basis of £22-5s. per ton as the cost of packing and transport charges*, etc., to London, the Indian hen eggs (weighing say 10 lb. per 120) could be delivered in London at about £58-11s. per ton. The duck eggs (weighing 14 lb. per 120) could, however, be delivered much cheaper, viz., at about £46-18s. per ton. Since there is no duty on the import of eggs into United Kingdom from Empire countries, the figures show that even compared with the cheapest eggs in shell (Dutch Best mixed), in the London market, there is a margin of £18-9s. per ton in the landed price of Indian hen eggs, and £30-2s. per ton in the case of Indian duck eggs. The above differences are based on the average annual prices in London, but from the table below it would appear that during the months of October, November and December the prices are 30 to 40 per cent. above the average, and the difference per ton would be proportionately greater. Although there is a slight rise in the price of Indian eggs also during the above months, the difference is not equal to the rise in the English prices, and there appear to be favourable prospects of doing business if the Indian eggs in shell could reach there during these months.

Before suggesting any scheme to the trade, however, it is necessary that several trial consignments should be sent with a view to studying the actual conditions of market and prices abroad, for eggs in shell. In this connection it is difficult to over-emphasize the great necessity of maintaining a standard quality with regard to the appearance of the eggs, the freshness and the methods of packing. Unless this is done with proper control and as an organized business, the attractive price margins, as indicated above, are not likely to be realised.

Monthly average prices of eggs in London during 1936.†

(In shilling and pence per 120.)

	English National Mark Specials.	English National Mark Standards.	Danish 15½ lb.	Dutch Best Mixed 15½ lb.	Average.
January	17-5	15-9	13-3	12-11	14-10
February	16-4	15-5	11-7	10-11	13-7
March	11-7	10-7	9-0	8-5	9-11
April	10-4	9-8	8-2	7-11	9-0
May	11-9	10-9	8-8	8-2	9-10
June	13-1	12-1	8-6	8-3	10-6
July	16-2	15-3	9-8	9-1	12-6
August	17-7	16-8	10-8	10-1	13-9
September	18-6	17-6	12-8	11-8	15-1
October	23-2	21-6	14-9	13-8	18-4
November	23-0	20-11	15-6	14-3	18-6
December	21-11	19-9	13-0	11-9	16-7
Average	16-9	15-6	11-3	10-7	13-6

*This is rather high and the details on page 54 indicate, that it could be considerably reduced, if the consignments were larger.

†Imperial Economic Committee—Dairy Produce, 1937.

(2) Egg PRODUCTS.

Egg products consist of liquid eggs, white (albumen) and yolk of eggs, prepared and preserved in various ways, for example, frozen or dried. United Kingdom is an important consumer of egg products, where the liquid eggs and the yolks are used mainly for confectionery and cooking, and the whites for industrial purposes.

The following table shows the increased quantities that are imported into various countries from China, which is the source of about 95 per cent. of the total world exports of egg products. Other countries play a small part in the trade, the most important being Russia and Egypt, with Australia occasionally shipping small quantities. On account of the recent disturbances in China, it appears that enquiries are being made by the manufacturers into the possibilities of making the products outside China. This seems to indicate a fruitful line of action for local enterprise in India with its comparative nearness to the consuming markets of Europe.

Imports of egg products from China, 1930-36.*

(Thousand cwt.)

Into :—	1930.	1931.	1932.	1933.	1934.	1935.	1936.
United Kingdom	896	821	744	842	729	812	887
Germany ..	135	93	132	103	84	92	149
United States of America.	103	58	33	25	30	89	81
France ..	100	89	55	53	24	24	33
Netherlands ..	53	56	38	35	39	31	29
Japan ..	36	22	10	27	24	21	27
Belgium ..	19	23	28	33	30	20	31
Italy ..	17	11	15	21	23	9	5
Spain ..	2	7	5	2	3	3	2
Denmark ..	3	3	4	3	..	..	..
Other countries ..	5	1	2	2	3	3	..
Total ..	1,369	1,184	1,066	946	989	1,104	1,244

*Imperial Economic Committee—Dairy Produce, 1937.

The above figures show that the quantities of egg products imported annually in United Kingdom alone are equivalent to over 50 per cent. of the eggs in shell consumed in India.

From the table below it would be observed that there has been a considerable fall in the price at which China has been delivering the frozen eggs in London during the last few years. Official market quotations for the prices of egg products are not available, but the trend of declared values of the egg products imported from China into the United Kingdom (excluding customs duties) have been as follows :—

Average declared value of egg products imported from China into the United Kingdom.*

Year.	Frozen or liquid (whole, yolk and white).	Dried albumen.	Dried yolk except albumen.
	£ Per cwt.	£ Per cwt.	£ Per cwt.
1930	3.7	12.7	12.6
1931	3.4	9.0	11.9
1932	3.2	10.6	10.6
1933	2.5	12.1	9.9
1934	2.1	12.4	8.4
1935	2.1	12.0	6.6†
1936	2.4	10.7	7.5‡

It would be noticed that during the year for which latest figures are available, viz., 1936, the c. i. f. price at London for Chinese frozen eggs was £48 per ton. To this must be added the import duty of $\frac{1}{2}$ d. per lb.‡ levied on all foreign frozen eggs, i.e., £4-13s.-4d. per ton. Thus the landed price of the Chinese frozen eggs should be at least £52-13s.-4d. per ton.

It has been said that the current average price of Indian *hen* eggs in shell weighing about 10 lb. per long hundred (120) at the Indian ports, is 3s. 3d. From this about 11 per cent. may be deducted for the weight of the shell. This works out to be £40 6s. per ton of liquid hen eggs (without shell but unfrozen), delivered at Indian ports. Similarly, the price of *duck* eggs weighing about 14 lb. per 120,

*Imperial Economic Committee, Dairy Produce Supplies, 1936.

†Whole £9.7 per cwt. and yolk £3.9 per cwt.

‡Whole £10.4 per cwt. and yolk £4.0 per cwt.

§Imperial Economic Committee, Dairy Produce Supplies, 1937.

delivered at the Indian ports is 3s. 1d. After deducting the weight of shell, the cost of liquid duck eggs (unfrozen) works out to £27-7s.

In the absence of accurate figures, from such information as is available, the hypothetical cost of freezing and transporting a ton of Indian egg products may be calculated as under :—

	Rs. A. P.	Per ton of product. £ s.
1. Cost of processing, including breaking, freezing, labour and depreciation on a plant having daily freezing capacity of 2 tons and 70 tons* storage capacity. ..	35 0 0	
2. Cost of packing in 30 lb. containers	37 8 0	
	72 8 0	
or say		5 4
3. The transport charges to London under frozen conditions ..		2 16
Total for processing, packing and transporting, per ton ..		8 0

Thus our frozen hen eggs could be landed in London at (say) £48-6s. per ton and the frozen duck eggs at £35-7s. per ton. Compared with the Chinese frozen eggs, the prices of Indian frozen eggs would in such case be less by £4-7s.-4d. per ton in the case of hen eggs, and £17-6s.-4d. in the case of duck eggs.

Taking those hypothetical figures, it would be seen that a factory handling say 2 tons of hen egg products per day, would have a net annual margin of over £3,000 or over Rs. 40,000 to work upon, which is nearly 75 per cent. of the initial capital outlay. On the other hand, the processing of duck eggs leaves a much wider margin per ton to work upon, and the development of this branch of the industry is worth a special study. In India already, of all branches of poultry keeping, the keeping of ducks is most specialised, inasmuch as in concentrated areas of production the keepers have large flocks ranging from 500 to 1,500 ducks. They also lay more eggs per bird than hens and are less susceptible to poultry diseases. Therefore it would be easier to increase the production of duck eggs in areas where conditions are generally favourable.

It has, however, been mentioned (see page 45) that the baking results obtained with whole duck eggs are not as good as those obtained with the whole hen eggs. This is perhaps due to the special nature of the white in the duck eggs. A small baking experiment carried out recently showed that when the baking is done only with the yolks, there is not much difference in the size, flavour or texture of the cakes made from yolks of hen and duck eggs. The yolks of duck eggs are generally of a deeper shade than the yolks of hen eggs, and on this account the colour of the cake was no doubt darker than the usual light lemon shade. A photograph of the two different cakes is seen at the bottom plate facing page 45. The details of the experiment are given in Appendix XIX.

*1 ton storage equals roughly 200 cubic feet gross capacity.

The above observation suggests an important line of work, viz., that instead of freezing the yolk and white of the duck eggs together, it may be advantageous to freeze or dry them separately, so that the yolk may be used for confectionery and the albumen for other purposes, e.g., industrial.

The composition of a number of eggs was analysed with the following results :—

	Proportion of the total weight of eggs (in shell).		Percentage of moisture*.	Percentage of dry matter.*
	Hen (per cent.).	Duck (Per cent.).		
Yolk	40.6	39.2	49	51
White	48.4	49.8	84	16
Shell	11.0	11.0	..	..
	(100)	(100)		

It would be noticed that there is not much difference in the proportionate weight of the yolk, white and shell between the duck and hen eggs. In the edible part of the egg (i.e., other than the shell) the proportionate weight of yolk and white may be taken to be 45 and 55 per cent. respectively.

It would also be noticed that in the natural state the white contains more moisture than the yolk, and as such the outturn of dried products would be comparatively less in the case of albumen. The outturns are, however, said to vary with different methods of manufacture.

Information regarding the actual yields of products obtained in other countries is not available, but at the American factories the average yields of the dried product from whole egg, yolk and white, obtained under factory conditions are reported to be as follows :—

Yield of dried products.*

	Dried whole egg.	Dried yolk.	Dried albumen.
Moisture	4—5 %	3½—4 %	16—18 %
Solubility	40—45 %	27—30 %	95—100%
Weight of liquid obtained from 30 dozen eggs of normal size.	34—36 lb.	15 lb.	20 lb.
Weight of product obtained from above ..	9—10 lb.	7. 7½ lb.	2—2½ lb.
Weight obtained from 100 lb. liquid ..	30 lb.	45 lb.	13 lb.

*Since this information is not available for Indian eggs, the figures are taken from Marketing Poultry Products—Benjamin and Pierce.

On the above basis of outturns, viz., 45 per cent. of dried yolk and 13 per cent. of dried albumen from the respective liquid product, and on the basis that liquid hen eggs (i.e., excluding shell) could be delivered at Indian ports at about £40 6s. per ton, and liquid duck eggs at £27-7s. per ton, the cost per ton of the dried products works out as under :—

Cost of Indian dried egg products at ports, exclusive of processing, packing and transport charges to London.

		(Price per ton).	
		Hen.	Duck.
		£ s.	£ s.
Dried yolk		89 11	60 10
Dried albumen		312 10	210 10

Information regarding the initial cost of setting up an egg drying plant and its working charges is not available, but if anything, the charges may not be greater than those for freezing the eggs. The transport charges are also likely to be less, as dried egg products need not be carried under frozen conditions. Provisionally, therefore, a hypothetical charge of £8 per ton may be added to the above figures to cover the cost of processing, packing and transport. Accordingly the Indian products could land in London as under :—

		(Price per ton.)	
		Hen.	Duck.
		£ s.	£ s.
Dried yolk		97 11	68 15
Dried albumen		320 10	218 10

The landed prices of Chinese dried yolk and albumen in London during 1936, were as follows :—

		(Price per ton)*.		
		Price ex-duty.	Import duty.	Total Landed price.
		£ s.	£ s.	£ s.
Dried yolk		80 0	14 0	94 0
Dried albumen		214 0	25 13	239 13

It would be seen that, so far as the drying of yolk and albumen from hen eggs is concerned, costs would have to be studied closely before Indian manufactured products could compete. On the basis of the hypothetical costs which have been taken, our prices are likely to be more than the Chinese prices by about £3-11 per ton in the case of dried yolk, but by about £80-17 per ton in the case of dried albumen. With regard to the products made from duck

*Imperial Economic Committee—Dairy Produce Supplies, 1937.

eggs, the position is different and there is a definite margin as would be seen from the figures below :—

*Approximate difference per ton in the landed price, in favour of Indian eggs and products.**

	(Price per ton).	
	Hen.	Duck.
	£ s.	£ s.
Eggs in shell	18 9	30 2
Frozen eggs. .. .	4 7	17 6
Dried yolk .. .	..	25 5
Dried white .. .	..	21 3

The freezing or drying of eggs requires a suitably equipped factory and scientific control of conditions. The figures, although only approximate, show that the business has considerable potentialities, and efforts in this direction are likely to bear useful results. The drying of duck eggs affords special price margins. The estimated cost of a factory having, say, 2 ton freezing capacity per day and suitable cold storage space, is about Rs. 65,000. But this could be reduced considerably if the work could be taken up by some of the already existing cold stores or ice factories at the ports. To produce daily 2 tons of frozen products a regular supply of about 60,000 fresh hen eggs or 45,000 duck eggs is necessary. This should be readily forthcoming from concentrated areas of production such as the *Eastern Bengal* and *Travancore* and *Cochin States*, if the producers could be assured of a regular demand and the collections were properly organized.

Estimates for costs of a factory for de-hydrating the eggs are not available, but since the processing is not to be done under frozen conditions, the plant would be comparatively cheap. The same would be the case with the transport charges in ordinary conditions.

Egg products, frozen, dried or liquid, are mainly used in large bakeries and hotels; and commercial manufacturers of foods, for example, ice-cream, candies, confectioneries, food beverages, mayonnaise, etc., utilise them for making up large receipts by weight or volume. The whites are also used in industries for clarifying wines, leather tanning, preparation of adhesives, and of photographic films, etc. As such, it is of utmost importance that the products should be of the right quality and properly processed. For instance, the inclusion of one bad egg, or an infection from dirty utensils, is sufficient to spoil the wholesome quality of a 50 lb. container of liquid eggs.

Sufficient study of the qualities of Indian eggs and their proper selection and collection on the one hand, and practical experience in the management of the factory on the other, appear to be necessary, if the enterprise is to be successfully undertaken in India.

*See also the second foot-note on page 55.

[Utilization and demand.]

INTER-CHAPTER TWO.

In non-vegetarian countries eggs form a regular part of the diet and the rate of consumption per head of population is sometimes very high, *e.g.*, in the United Kingdom 154 and in Canada as much as 296 eggs are consumed per head per annum. This is equivalent to each person of the population in the United Kingdom having one egg every second day and in Canada every day except Sundays.

In India the position is entirely different since the bulk of the people are vegetarians and the per capita consumption works out at only 8 eggs per annum, so that in effect one person in Canada eats as many eggs during the year as 30 or 35 people in India. If only the non-vegetarian members of the population are considered, however, the average rate of consumption is about 80 per head in urban districts, and about 20 per head per annum in the rural areas.

The urban population represents only about 11 per cent. of the total, but the people in the cities and towns consume over 9,000 lakh eggs in the course of a year which represents more than one-fourth of the total production and over 40 per cent. of the available market supply. The urban demand, therefore, is of primary importance from a marketing point of view.

It is observed that the urban demand is high during the cool, dry months and at its highest in November|December. Production, it may be recalled, is at its peak in March|April. It is, therefore, not surprising that producer's prices are at their lowest in those months and high during the cold weather. In actual fact, however, urban prices are at their peak in the hot monsoon months from July to September mainly owing to the difficulty of obtaining supplies of fresh eggs at that time of

the year. It may be noted that the seasonal demand for eggs in many cities is affected by the annual migration of a part of their population to the hill stations where the demand naturally rises during that period of the year.

Eggs are used in three main ways, namely, for household use, for confectionery and for other (e.g., industrial) purposes. Over 95 per cent. of the eggs consumed in this country are used for the table and cooking purposes in the households. The delicate flavour of a fresh new-laid egg is, however, seldom tasted on account of the method of cooking in vogue. Generally the eggs are hardboiled and then re-cooked in spiced, well-seasoned curries or along with rice and meat. Omelettes are also a favourite dish but these too are generally well spiced with onions and other ingredients. Sweet dishes prepared from eggs are also strongly flavoured. It seems clear, therefore, that the question as to whether or not an egg is "new-laid" is a matter of indifference to the majority of egg consumers in India.

The demand for table purposes, that is in the form of lightly cooked dishes, such as half-boiled and poached eggs, is confined mainly to western style households. For this purpose "improved" eggs or selected large, fresh *desi* eggs are naturally most in demand and sell at a premium as compared with the ordinary class of eggs.

In making confectionery the Chinese in *Burma* are experts in the use of duck eggs. Indian bakers and makers of western type of confectionery are inclined to avoid duck eggs as they are supposed to be not as "light" as hen eggs for making cakes, etc. Experiments show, however, that by using the yolks only instead of the whole duck egg excellent baking results are obtained, certainly quite as good as those achieved by using hen eggs. The whites can, in such cases, very well be used

in making sweetmeats of the *marzipan* or *paira* type. The utilisation of eggs for confectionery purposes is apparently highest in *Bombay* and *Madras*. It may be observed that for this purpose chipped, leaky, small and even partially stale eggs can be put to good use by professional confectioners and bakers who normally expect to obtain their requirements at something under half the usual market rate.

For industrial and other purposes, e.g., glazing, book-binding, preparation of medicines and tanning, a very small number of eggs is used. So far, however, in India none have been used for the preparation of industrial egg products such as frozen, liquid or dried yolks or whites (albumen). China at present is the source of about 95 per cent. of the total world exports of egg products but enquiries indicate that this would be a fruitful line of action for local enterprise in India, particularly in *Bengal* and in the *Cochin-Travancore* areas. So far as can be calculated, frozen hen eggs from this country could be landed in London at £4 or £5 per ton less than the Chinese product, and duck eggs at £17 or £18 less per ton. Adequate supplies are evidently available to run a factory on economic lines in the areas referred to, and in both cases the industry would be capable of rapid expansion if this additional demand arose.

The demand for eggs for export to *Burma* and *Ceylon* has fallen off enormously and it seems necessary to explore the possible demand for Indian eggs in shell in other countries. Trial consignments have already been sent with results which indicate the desirability of proceeding with further experimental consignments with a view to developing a regular trade.

CHAPTER III.—PRICES.

A.—Trend of prices in recent years.

Only a few reliable records of prices are available for inspection or scrutiny. The recorded figures at some of the municipalities are not of much use as they are generally of retail prices at a particular market and merely give a general indication of the price ranges, *e.g.*, 7 annas to 9 annas per dozen. They sometimes do not vary during the course of a whole year, *e.g.*, in the records of a municipal market at *Calcutta*, the prices of duck eggs are shown to be stationary throughout the year (1937), without a single change.

The method of quotation also varies from merchant to merchant, and as the price may be governed by so many factors, a strict comparison of prices has not always been practicable. It may be further mentioned that in the wholesale trade hardly any sorting is done and as such, separate prices are not available on the basis of quality, *e.g.*, for large, medium or small eggs. There are however two main classifications in the wholesale trade, *viz.*, hen eggs and duck eggs. Between these eggs there is some difference in the prices.

(1) HEN EGGS.

It is observed that prices often vary for the same type of eggs between different merchants operating at the same centre and are also subject to seasonal variations. The annual averages reproduced below are representative of the prevailing prices in fairly large areas surrounding important collecting and despatching centres. They should therefore be taken as representatives of the tract. The quotations represent generally the prices at which eggs are sold by the dealers at important centres of assembling, to merchants in the consuming centres.

Trend of wholesale hen egg prices in important producing tracts.
(In Rs. and annas per thousand.)

	North-West Frontier Province.	Gujarat (Bombay Presidency).	Eastern Bengal.	Southern Madras.	Cochin and Travancore.	Average.
1929	32 4	38 5	30 15	..	..	33 13
1930	30 3	41 7	23 9	..	..	31 12
1931	22 4	35 0	17 2	24 0	22 9	24 3
1932	20 3	22 6	16 6	23 8	21 8	20 13
1933	21 5	26 4	14 10	23 12	19 8	21 1
1934	18 12	27 7	15 3	22 0	18 12	20 7
1935	17 12	26 4	14 3	21 0	18 1	19 7
1936	16 15	26 4	16 1	22 4	18 0	19 14
1937	20 0	26 8	16 4	22 0	18 0	20 9

From the above figures as well as the diagram facing page 68, it would be seen that, except for the past two years or so, there has been

a steady decline of prices at all the important producing tracts, although not with the same degree of uniformity.

For instance, during the period of 7 years (1931—37, for which figures for all the areas are available) the prices in *Gujarat* have dropped the most, *viz.*, by Rs. 8-8-0 per thousand eggs. In *Travancore* and *Cochin* the drop has been Rs. 4-9-0 per thousand eggs and in the *North-West Frontier Province*, it has been Rs. 2-4-0. The *Madras* prices have fallen by Rs. 2 but the *Bengal* prices only by 14 annas per thousand. The drop in the average for the reporting areas has been Rs. 3-10-0 per thousand or about 40 per cent. between 1929 and 1935 with a rise of 5 per cent. in the following two years.

Notwithstanding the heaviest drop, eggs from *Gujarat* occupy the best position in the ruling prices of 1937. They command better prices to the extent of about 63 per cent. over *Bengal* eggs; 47 per cent. over *Travancore* and *Cochin* eggs; 33 per cent. over *North-West Frontier Province* eggs; and 20 per cent. over *Madras* eggs.

It has already been said that the above series refer to prices prevailing in the districts. As such the overhead charges, of which the packing and freight, etc., are important items, are to be added to these prices. The distance from the consuming markets should therefore have considerable influence on the prices at producing centres. Eggs from *Gujarat*, with large consuming centres near at hand (within 200 miles), *e.g.*, *Bombay*, *Baroda*, *Ahmedabad*, *Surat*, etc., are therefore better placed, and can afford to maintain a higher price level. On the other hand, eggs from *North-West Frontier Province* have to reach distant markets at *Karachi*, *Delhi*, *Simla* and *Bombay*, and cannot enjoy the same benefit of less freight. Similarly, *Bengal* eggs have to reach distant markets in *Burma*, and *Travancore* and *Cochin* eggs have to come up all the way to *Bombay* and *Madras*. Distances have also an indirect effect on the percentage of staleness, etc., and other factors being equal, the merchants consider it a better proposition to get eggs from a nearer place and thus minimise losses due to the above causes.

The figures below are a series of 24 years' prices for supply of hen eggs on contract to an institution at *Bombay*.

Trend of contract prices at Bombay.
(Per thousand hen eggs).

		Rs. A.			Rs. A.
1914	..	20 0	1920	..	60 0
1915	..	20 0	1921	..	55 0
1916	..	22 8	1922	..	50 0
1917	..	22 8	1923	..	46 4
1918	..	32 8	1924	..	45 0
1919	..	46 4	1925	..	42 8

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(Per thousand hen eggs.)

			Rs. A.				Rs. A.
1926	..	..	40 0	1932	..	..	33 12
1927	..	..	40 0	1933	..	..	30 0
1928	..	..	40 0	1934	..	..	26 4
1929	..	..	40 0	1935	..	..	26 4
1930	..	..	40 0	1936	..	..	26 4
1931	..	..	40 0	1937	..	..	26 4

It may be noticed that the highest prices were during the 4 or 5 years following the Great War, the maximum being in 1920. It may also be noticed that although during the last 4 years the prices have been lowest of all the post-war years, they are still more than 30 per cent. above the prices prevailing before the war.

(2) DUCK EGGS.

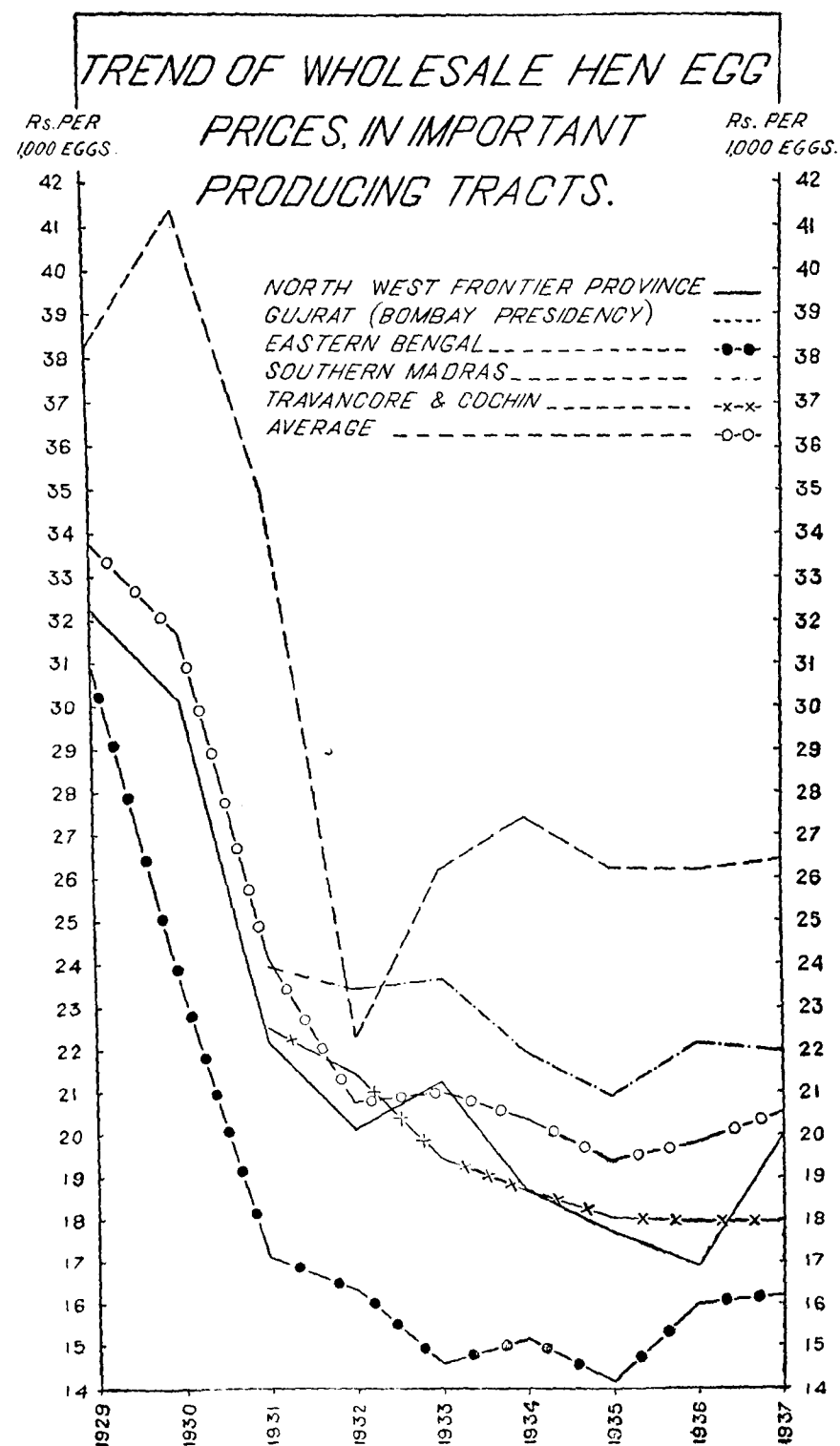
The table below and the diagram facing page 69 deal with the trend of wholesale duck prices in important producing tracts including *Lower Burma*.

Trend of wholesale duck egg prices in important producing tracts.

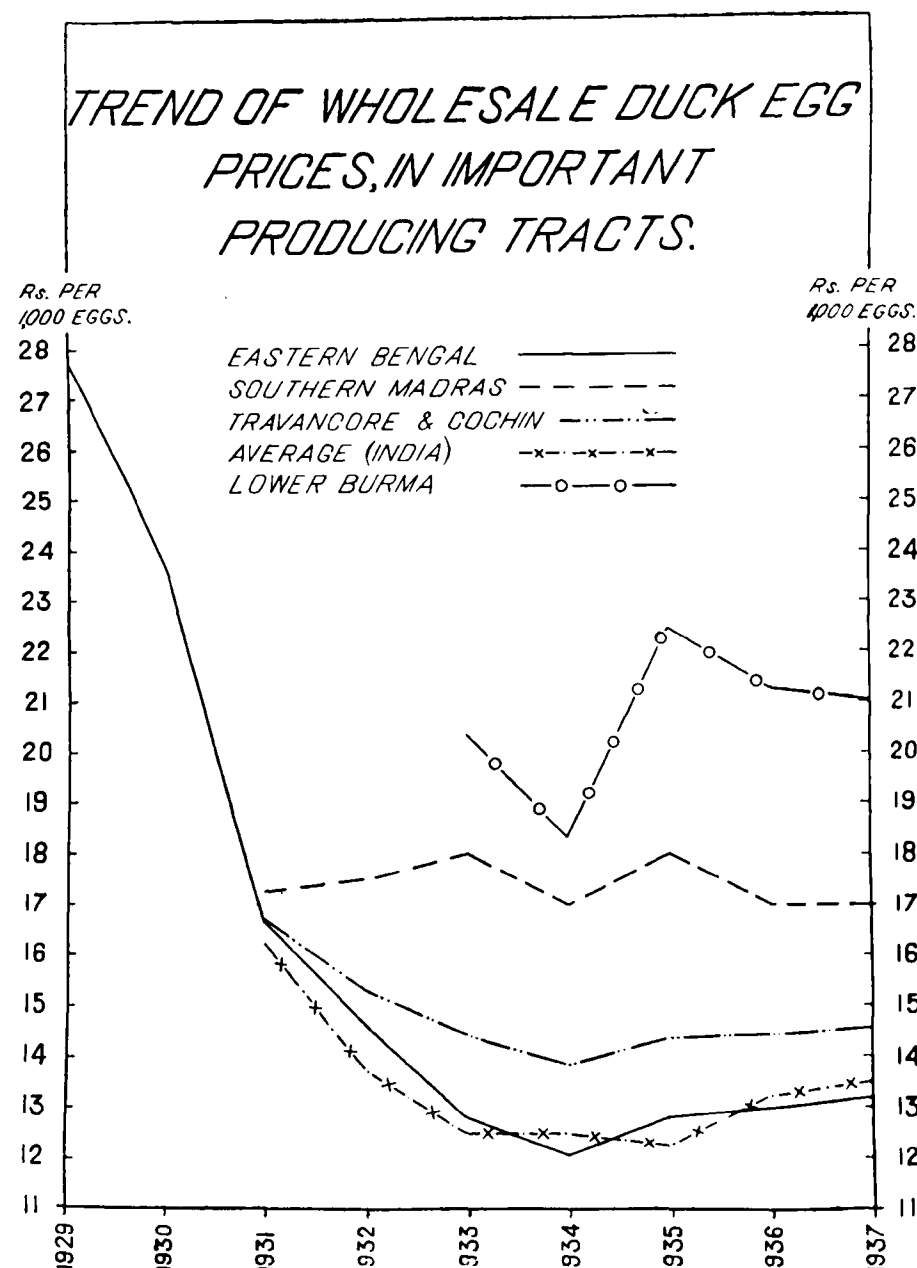
(In Rs. and annas per thousand.)

	Eastern Bengal.	Southern Madras.	Travancore and Cochin.	Average (India).	Lower Burma.
1929	27 11	..	..	27 11	..
1930	23 9	..	..	23 9	..
1931	16 10	17 4	16 3	16 11	..
1932	14 10	17 8	13 12	15 5	..
1933	12 13	18 0	12 8	14 7	20 6
1934	12 1	17 0	12 8	13 14	18 5
1935	12 13	18 0	12 4	14 6	22 7
1936	13 0	17 0	13 4	14 7	21 4
1937	13 3	17 0	13 8	14 9	21 0

It would be noticed that in this case also the prices have improved for the past four or five years, although the 1937 prices were still below those of 1931. From 1931 to 1937 the drop in the price of hen and



Facing page 69.]



duck eggs in the areas of concentrated production* has been as under :—

Drop in prices of eggs for 1931—1937.

(In Rs. and annas per thousand eggs.)

	Eastern Bengal.	Southern Madras.	Travancore and Cochin.	Average.
Hen eggs ..	0 14	2 0	4 9	2 8
Duck eggs ..	3 7	0 4	2 11	2 2

It may be observed that the drop in the price of duck eggs has been the greatest in *Bengal*, viz., Rs. 3-7-0 per thousand eggs. During the same period (1931—37) the drop in the price of hen eggs has been only 14 annas per thousand. But in *Southern Madras*, *Travancore* and *Cochin*, the drop in duck egg prices has been much less, compared to that in the price of hen eggs. If the average price of these areas is considered it is noticed that the fall in the price of hen eggs and duck eggs has nearly been equal, the difference being only 5 annas per thousand eggs, between the two.

(3) OTHER EGGS.

The eggs of geese, turkeys and guinea-fowls, as said before, do not enter the market on a commercial scale and as such their wholesale prices are not available. Guinea-fowl eggs are despatched from *Patiala State* and the *United Provinces* to *Bombay*, and are quoted either at a flat rate with hen eggs or at a reduced rate, generally 4 to 8 annas per hundred below the price of hen eggs. In retail trade, the goose and turkey eggs have no fixed prices, and they may or may not have a relation with the prices of hen or duck eggs.

B.—Spread of prices.

(1) *Desi* HEN EGGS.

There are generally three main stages of marketing through which the eggs pass, viz., (i) the village egg collectors, (ii) the dealers or wholesale merchants, operating also in the rural assembling (and despatching) centres, and (iii) the distributors or retailers in the consuming markets. The table below summarises the general price spreads in 18 areas, reporting the averages of 56 towns and cities. The averages of three places in *Burma* are treated separately.

It must, however, be pointed out that in the face of numerous variations, seasonal, regional and individual, it is difficult if not impossible, to compile a table that could satisfy all the factors and conditions of trade. The figures given in the table are only averages, and could be applicable, at the very outside, to only about

*Of Eastern Bengal, Southern Madras, and Travancore and Cochin.

two-thirds of the trade in the respective towns. The table is not meant to cover any exceptional cases.

General spread in the price of desi hen eggs.

(In annas and pies per dozen.)

	Number of reporting towns.*	Producer's price.	Collector's price.	Dealer's price.	Retail Price.		
					Large eggs.	Small eggs.	Rejections, e.g., chipped, leaky, etc.
Kashmir ..	2	2 0	2 9	4 3	6 0	5 0	2 6
North-West Frontier Province ..	3	2 11	3 6	4 11	5 1	5 1	3 0
Punjab ..	3	3 3	4 0	5 1	6 6	5 6	2 6
Patiala State ..	2	3 0	3 6	5 3	7 0	6 0	2 6
Delhi Province ..	1	2 6	3 0	4 0	7 0	5 0	2 0
Sind ..	3	4 0	4 0	5 6	7 8	6 8	3 4
Baroda ..	1	3 9	5 0	5 6	7 6	5 6	2 6
Bombay Presidency ..	6	3 5	4 11	5 5	8 0	5 10	2 2
Mysore ..	3	3 0	3 9	5 0	6 6	4 10	3 0
Cochin ..	2	2 9	3 0	3 4	4 6	4 0	1 0
Travancore ..	2	2 7	2 10	3 1	4 7	2 10	1 0
Madras Presidency ..	4	3 10	4 1	4 8	7 1	5 1	2 0
Nizam's Dominions ..	4	3 4	4 2	4 6	6 2	5 2	3 0
Central Provinces ..	4	3 5	4 4	5 0	5 7	5 7	2 9
United Provinces ..	5	2 7	3 1	4 4	5 8	4 8	2 0
Bengal ..	5	2 0	2 5	3 4	6 0	4 4	2 6
Bihar and Orissa ..	3	2 9	4 6	5 3	6 6	5 6	1 9
Assam ..	3	1 6	2 0	2 1	3 6	2 7	0 9
Average ..	56	2 11	3 8	4 5	6 2	4 11	2 3
Burma ..	3	8 0	10 0	10 7	12 0	10 0	4 0

(a) *Producer's price.*—Most of the producers are in the rural areas, and the prices indicated in the above table are applicable to them. Urban producers, who are able to dispose of their eggs without the eggs collectors, get a better return. It would be seen that the rural producers on the average get about annas 2 pies 11 per dozen or say one pice per egg. Since in the initial stages no sorting is done,

* Kashmir—Srinagar, Pahalgam; North-West Frontier Province—Peshawar, Pabbi, Mardan; Punjab—Lahore, Murree, Jullundur; Sind—Karachi, Sukkur, Hyderabad; Baroda State—Baroda; Bombay Presidency—Mahabaleshwar, Panhagani, Bombay, Poona, Bhusaval, Dharwar; Mysore State—Bangalore, Mysore, Chintamani; Cochin State—Trichur, Ernakulam; Travancore State—Trivandrum, Chengannore; Madras Presidency—Madras, Calicut, Coimbatore, Berwada; Nizam's Dominions—Hyderabad, Secunderabad, Aurangabad, Jalna; Central Provinces—Khandwa, Seoni, Jabulpore, Rampur; United Provinces—Agra, Lucknow, Cawnpore, Bareilly, Musaffarnagar; Bihar and Orissa—Ranchi, Dinapore, Patna; Assam—Gauhati, Shillong, Sylhet; Bengal—Daulatganj, Gouripur, Shrirajganj, Calcutta, Darjeeling; Burma—Rangoon, Mandalay, Maymyo.

the producer's price is generally based on a flat rate for all sizes of eggs. Eggs that are definitely stale or are badly cracked are of course not accepted by the collectors. The lowest price is received in Assam (half a pice per egg) and the highest in Sind (4 annas per dozen). In Bengal, which is an important producing province, the producers get about 2 annas per dozen or about Rs. 10-8-0 per thousand.

(b) *Collector's price.*—The collectors of eggs from the villages have generally connections with the assembling merchants to whom they sell the eggs, and the selling price is called collector's price. Several collectors may operate for one merchant or vice versa. It would be seen from the table that the average difference between their purchase price and selling price to the assembling dealers is about three-fourths of an anna per dozen eggs. It would be seen that in areas where production is concentrated, e.g., Bengal, Travancore and Cochin, on account of which collection is better organised, the share of the collectors is comparatively less, being 5 pies per dozen for Bengal and 3 pies for the other two areas. The egg collectors generally do no sorting, but dispose of the eggs as they get them. They deal in loose (unpacked) eggs. If a collector gathers and sells say about a hundred eggs per day, his average daily earnings would be about 5 to 8 annas.

(c) *Dealers' price.*—By the term "dealers" is meant merchants who operate at important assembling or collecting centres for eggs. These centres are generally in the rural areas, situated near a convenient rail or river service station. They are also situated at important market places, e.g., hats, shandies, etc., as is the case in the South. Generally at each centre there are two or three merchants (dealers) who assemble eggs and comply with the orders of the distributing merchants at the consuming markets. The rate at which they sell the eggs to the merchants at the consuming centres is termed as dealers' price. After the eggs reach the dealers they receive their first packing since laid by the birds—generally in baskets. On the whole, they also do not do any appreciable sorting, although sometimes they dispose of the leaky or badly broken eggs for local sales. They generally sort out duck and fowl eggs, if the proportion of either is large. In the concentrated areas of production for duck eggs, e.g., Bengal, Travancore and Burma, they are packed separately.

The average difference, as would be noted from the table, between the dealers' purchasing and selling price, is about three-fourths of an anna per dozen. This difference works out to about Rs. 3-14-6 per thousand eggs. A few of the dealers are fairly large and handle as many as 30,000 eggs per day, although 5 to 10 thousand may be taken as the average. The method of quotation of the dealer's prices varies in different areas, and in the same area with different dealers. Some sell eggs f. o. r. destination, while others charge all the expenses and a commission over the bare price of eggs. As such the difference in the dealer's prices (Rs. 3-14-6 per thousand) may be taken generally to cover partly the railway freight and packing charges, etc. It also covers fully the interest on the capital investment which is said to be

locked up in large outstanding accounts with the distributors at the consuming centres.

(d) *Retail price.*—When the eggs are received at the consuming markets by the wholesale distributors, they may or may not pass through a petty retailer. Most of the wholesale distributors are however retailers also. For instance, a very important wholesale merchant at *Bombay* handling about 50,000 eggs per day, sells 30,000 eggs in retail through some 80 restaurants. As a matter of fact, on account of unavoidable factors, such as breakages, stale eggs, etc., they have to do retail business to dispose of these eggs, even if they did not want to. In the retail trade, however, invariably a sorting for quality is done. Firstly, the rejections, *e.g.*, chipped, broken and leaky eggs are sorted out. Those that appear to be definitely stale, are also sorted out through a crude method of candling. These eggs are disposed of to the bakers for confectionery purposes and also to cheaper type of restaurants for cooking purposes. The average retail price for these eggs (rejections) is about Re. 0-2-3 per dozen or less than 1 pice per egg. Sometimes the eggs have leaked out or are smashed to such an extent that less than a quarter of the original content is only left in the damaged shell. The retail price of such eggs is about one anna per dozen.

The uncracked—and so-called fresh—eggs may be further sorted out, generally in two sizes. There is however no hard and fast rule regarding the sizes or the proportion obtained in each class. Consumers, who want slightly larger eggs or prefer to pick them out themselves, are charged slightly higher price. The average retail price of these so-called larger* eggs is a little over 6 annas per dozen. The comparatively smaller ones are sold at an anna less, or about 5 annas per dozen.

It would be noticed that while a retailer receives the eggs at a flat rate, he sells them after sorting at different rates. To work out the difference in his price, the gross sales on the basis of, say, 10 dozen eggs, may be considered. The figures below explain the position which may be taken as an average example of the quality of eggs:—

Analysis of retail sale.

Expenses.	Receipts.				Difference.
To the wholesale merchant at a flat rate of Re. 0-4-5 per dozen.	Large eggs at 6 annas per dozen.	Small eggs at 5 annas per dozen.	Rejections at Re. 0-2-3 per dozen.	Total.	
For 10 dozen.	For 5 dozen.	For 3 dozen.	For 2 dozen.	For 10 dozen.	Extra per dozen.
Rs. 2 12 0	Rs. 1 14 0	Rs. 0 15 0	Re. 0 4 6	Rs. 3 1 6	6 pies.

*On a rough basis the larger eggs may be taken as 1½ oz. and above, and the smaller ones to be less than 1½ oz. in weight.

It would be seen that after getting the eggs at a flat rate, the retailers have a margin of about 6 pies per dozen eggs. This works out to about Rs. 2-10-0 per thousand eggs.

(e) *Contract price.*—In larger towns and cities some eggs are supplied in lots varying from 100 to 500 at a time, to institutions such as hotels, hospitals, clubs, troops, messes, etc. These eggs are generally of the smaller size and sometimes a small percentage of cracked eggs may also be tendered. The flat contract rate for these eggs varies according to the terms of individual tender, but is generally about 4½ annas to 5 annas per dozen.

(f) *Burma prices.*—From the averages of three cities and towns, namely, *Rangoon*, *Mandalay* and *Maymyo*, it appears that in *Burma* the prices of eggs are definitely much above the average of India. For instance, even the producers get as much as 8 annas per dozen, which is more than the realisations at any stage in the marketing of eggs in India. The retail price for larger eggs is 12 annas per dozen or about double of the average of India for similar eggs. Even the rejections sell there at 4 annas a dozen, which is also about the double of the average of India.

(2) IMPROVED EGGS.

(a) *For eating.*—These eggs are larger than the *desi* eggs, their average weight per hundred being about 12 lb. against 9 to 10 lb. of the *desi* hen eggs. The estimated daily production of improved eggs in India is about 2 lakhs against 75 lakhs of *desi* hen eggs. Even out of these, over two-thirds are produced in the *United Provinces* alone. When the improved eggs are produced on private or departmental farms, the system of marketing them is different. For instance, in such cases, they are sold direct to consumers without passing through the usual egg collectors, merchants or distributors. On the other hand, when they are produced in small numbers in the villages, they generally get mixed up with the *desi* fowl eggs and are sold at a flat rate with the *desi* eggs. For all practical purposes, the spread of prices for village produced improved eggs may therefore be considered to be the same as of the *desi* hen eggs.

Even in the *United Provinces*, where their production is concentrated, because of the fact that they are produced in the villages, it is reported that except for a few producers residing near *Etah*, *Cawnpore*, *Lucknow*, *Kathgodam*, *Naini Tal* and *Dehra Dun*, the other producers do not generally get any premium for the improved quality of their eggs. The improved eggs are generally mixed with the *desi* eggs, and are sold at a flat rate, and pass through the usual channels of marketing. Although there is an Egg Sale Union at *Etah*, which tries to sell improved eggs at higher prices, the number of eggs handled by it is very small. It would therefore appear that due to lack of development of the marketing side of the improved eggs, the majority of producers have not been able to reap full benefit from keeping improved poultry. At present their profit is confined to their being able to sell more eggs from an improved hen than from a *desi* hen, though at the same price.

It is noticed that the improved eggs are sorted out at the farms generally in two grades but they are styled in different ways. For instance, some farms call them large and small, and others large and medium. Some again class them as "A" and "B" eggs. On the other hand, a few farms classify them into three grades, as large, medium and small. The weight standards of these grades are however unfixed and eggs of the same grade, from two different farms, are generally not the same. Since the trade in these eggs is a specialised one, and the delivery is made by the farms direct to the consumers, in the usual sense of the term, there is no spread of prices with respect to these eggs. Some of the farms may dispose them of through a provision store or a grocer's shop, in which case a commission ranging from 5 to 12 per cent. is allowed on the sales.

In the table below are given the retail prices of improved eggs, as are realised by the farms, and persons keeping the improved birds in urban or semi-urban areas.

Retail prices of improved eggs for eating purposes.

	Price per dozen.	
	Large.*	Small.*
	Rs. A. P.	Rs. A. P.
Muree Hills	1 0 0	0 8 0
Lyalpur	0 10 0	0 8 0
Delhi	0 12 0	0 9 0
Baroda	0 9 0	0 7 0
Poona	1 0 0	0 14 0
Bangalore	0 9 0	0 8 0
Trivandrum	0 15 0	0 12 0
Madras	0 12 0	0 8 0
Coimbatore	0 10 0	0 8 0
Jubbulpore	0 8 0	0 7 0
Hyderabad (Nizam's Dominions)	0 8 0	0 6 0
Lucknow	1 0 0	0 12 0
Patna	0 9 0	0 7 0
Calcutta	0 12 0	0 10 0
Average	0 11 7	0 8 10
<i>Burma.</i>		
Rangoon	1 0 0	0 14 0
Mandalay	0 14 0	0 13 0
Maymyo	0 15 0	0 13 0
Average	0 15 0	0 13 4

*The large eggs may be taken as about 2 oz. and above, and the small below 2 oz.

(b) *For hatching.*—Since improved birds are also kept by many for hobby and since these birds are originally imported from abroad, their eggs are often in demand at high prices for hatching purposes. The prices vary between different farms and even on the same farm between the different breeds and strains within a breed.

Such eggs are purchased mainly from the recognized farms, which maintain pedigree birds, at about Rs. 9 to Rs. 14 per dozen. For distribution purposes to the villagers and others, the Government farms generally supply them much cheaper, being about Rs. 3 per dozen or even less. Sometimes the farms supply them even free.

(3) DUCK EGGS.

The table below deals with the general spread in prices of duck eggs, from 42 reporting towns in India and 3 in *Burma*.

General spread in the prices of duck eggs.

(In annas and pies per dozen.)

	Number of reporting towns.*	Producer's price.	Collector's price.	Dealer's price.	Retail price (whole eggs).	Rejections, etc.
Kashmir	2	2 0	3 1	4 3	5 0	2 6
North-West Frontier Province	2	3 0	3 7	4 0	4 6	2 0
Punjab	1	2 6	3 6	5 0	5 6	2 9
Delhi	1	2 6	3 0	4 0	6 0	2 6
Bombay	3	4 6	6 0	6 3	6 8	2 6
Mysore State	3	3 0	4 0	5 0	5 6	2 6
Cochin and Travancore States	4	2 3	2 6	3 0	3 6	1 0
Madras Presidency	4	3 3	3 11	4 3	4 9	2 0
Nizam's Dominions	5	4 0	4 6	4 9	5 6	2 0
Central Provinces	4	4 6	5 6	6 0	6 6	3 0
United Provinces	5	2 6	3 0	3 3	4 0	2 0
Bihar and Orissa	2	2 6	3 0	3 6	4 0	2 0
Bengal	3	2 0	2 3	3 0	5 0	1 6
Assam	3	2 3	2 10	3 0	3 9	1 0
Average	42	2 11	3 7	4 3	5 0	2 1
Burma	3	4 3	4 6	4 9	5 9	2 6

*Kashmir—Pahalgam, Srinagar; North-West Frontier Province—Peshawar, Mardan; Punjab—Jullundur; Delhi Province—Delhi; Bombay—Poona, Bhusaval, Dharwar; Mysore—Bangalore, Chintamani, Mysore; Cochin—Trichur, Ernakulam; Travancore—Trivandrum, Chengannoor; Madras—Madras, Calicut, Coimbatore, Beswada; Nizam's Dominions—Hyderabad, Secunderabad, Nanded, Aurangabad, Jalna; Central Provinces—Seoni, Jubbulpore, Jubbulpore Cantt., Kamptee Cantt.; United Provinces—Agra, Lucknow, Cawnpore, Bareilly, Musaffarnagar; Bihar and Orissa—Dinapore, Patna; Bengal—Calcutta, Dacca, Darjeeling; Assam—Shillong, Gauhati, Sylhet; Burma—Rangoon, Mandalay and Maymyo.

(a) *Producer's price.*—From a comparison of the spread of prices for hen eggs, with that for duck eggs given in the table on the preceding page, it would be seen that the producers on the average get about the same price for duck eggs (*i.e.*, about 1 pice each), as they get for the hen eggs. In the areas of concentrated production; however, *e.g.*, *Madras*, *Travancore* and *Cochin*, the producers get slightly less (one to two pice per dozen) for the duck eggs, compared with the hen eggs. In *Bengal*, both types are purchased from the producers at about the same price, *viz.*, 2 annas per dozen or about Rs. 10-8-0 per thousand.

(b) *Collector's price.*—On the average there is only a small difference of 1 pie per dozen or about 7 annas per thousand eggs between the price realised by the collectors for hen and duck eggs. This would mean that in areas where the production of duck eggs is not great, they are generally marketed, mixed with the hen eggs and sold at a flat price. In the concentrated areas, where the duck eggs may be handled separately, they sell slightly cheaper than the hen eggs. For instance, in *Bengal*, the collectors deliver the hen eggs to the dealers at about Rs. 12-9-0 per thousand against duck eggs which are delivered at Rs. 11-11-0 per thousand. In *Travancore* and *Cochin*, the difference between the two is about Rs. 2-3-0 per thousand, the duck eggs being cheaper of the two. In *Madras Presidency* the difference is about 14 annas per thousand, where also the duck eggs are cheaper.

(c) *Dealer's price.*—On the basis of the average of 56 reporting towns for hen eggs and 42 towns for the duck eggs, the difference between the price of the two is about Re. 0-14-0 per thousand eggs, the duck eggs being cheaper. As is the case with hen eggs, the dealer's price of duck eggs may include in certain instances the price *f. o. r.* destination, whereas in some instances it may be the bare price of eggs, on which are chargeable all the other expenses.

(d) *Retail price.*—It has been pointed out that the hen eggs up to the time they reach the retailers are not sorted for size or quality. So is also the case with the duck eggs, but it is noticed that in their case they are generally not sorted even in retail trade, and all are sold at a flat price. The rejections, *e.g.*, broken, cracked, leaky and stale ones, are however sold separately at a reduced rate, which is about a third to a half of the retail price of the sound eggs.

(e) *Burma prices.*—It has been pointed out that in *Burma* the hen eggs are expensive. Actually they are about double the price of hen eggs in India. The previous table would show that such is not the case with the duck eggs which are only slightly higher in price than the Indian average.

Of course, the production of hen eggs in *Burma* is only about a quarter of the whole, the rest being duck eggs. There does not seem to be any reason, however, why, with such attractive prices, the production of hen eggs should not be increased.

C.—Producer's share in the price paid by consumers.

From the table on spread of prices for hen eggs (page 70) it would be seen that on an average the producers in India get Re. 0-2-11 per dozen of mixed hen eggs. At this rate the price of say 10 dozen is Rs. 1-13-2. From the table on page 72 is seen that when the consumers purchase in retail the same eggs, as large, small and rejections, they pay Rs. 3-1-6. Thus there is a difference of Rs. 1-4-4 per 10 dozen in the producer's and consumer's prices. In other words the producers get about 58.7 per cent. of the price paid by consumers or about Re. 0-9-5 from consumer's rupee.

Similarly on the basis of figures given in the table dealing with the spread of prices for duck eggs (page 75) it is observed that the producers get about 66 per cent. of the price paid by the consumers or about Re. 0-10-7 from the consumer's rupee.

It is further observed that the producer's share of the prices paid by consumers varies in the different areas as well as in the sale of hen and duck eggs. The figures are summarised below :—

Producer's share in the price paid by consumers.

	Proportion of producer's share in the price paid by consumers.		Producer's share in consumer's rupee.	
	Hen eggs.	Duck eggs.	Hen eggs.	Duck eggs.
	Per cent.	Per cent.	As. p.	As. p.
Kashmir	40.1	44.8	6 5	7 2
North-West Frontier Province	66.7	77.1	10 8	12 4
Punjab	60.4	50.5	9 8	8 1
Patiala State	51.6	*	8 3	*
Delhi Province	48.4	47.4	7 5	7 7
Sind	61.5	*	9 10	*
Baroda State	63.5	*	10 2	*
Bombay Presidency	55.2	77.1	8 10	12 4
Mysore State	59.4	61.4	9 6	9 10
Cochin	75.5	75.0	12 1	12 0
Travancore	78.1	75.0	12 6	12 0
Madras Presidency	70.3	77.6	11 3	12 5
Nizam's Dominions	63.5	83.3	10 2	13 4
Central Provinces	68.2	77.6	10 11	12 5
United Provinces	55.7	69.3	8 11	11 1
Bihar and Orissa	52.6	69.3	8 5	11 1
Bengal	41.7	46.4	6 8	7 5
Assam	56.3	70.3	9 0	11 3
Average	58.9	66.1	9 5	10 7
Burma	81.8	83.3	13 1	13 4

*Duck eggs are not of any importance in these areas.

It may be seen from the preceding table that the producers of duck eggs get more out of consumer's rupee, than the producers of hen eggs. The explanation for this seems to be that the number of duck keepers is small and hence competition is less.

So far as the ranges are concerned, the producers of hen eggs in Kashmir get the least; about 40 per cent. against the maximum of Travancore, where they get 78.1 per cent. of the consumer's price. Difficulty in transport in the former, and the better organised state of marketing in the latter, may account for this. In either case, the producers of Burma are fortunate in having a very large share of consumer's price, viz., about Re. 0.13-1 for hen eggs and Re. 0.13-4 for duck eggs, for every rupee that the consumers pay.

D.—Seasonal variation in prices.

(1) INDIA.

A mention has already been made that during the summer the consumption of eggs decreases, firstly because the Indians generally believe that eggs produce heat in the body and their use should therefore be restricted, and secondly, because of the absence of cold storage facilities, it is difficult to obtain fresh eggs during summer.

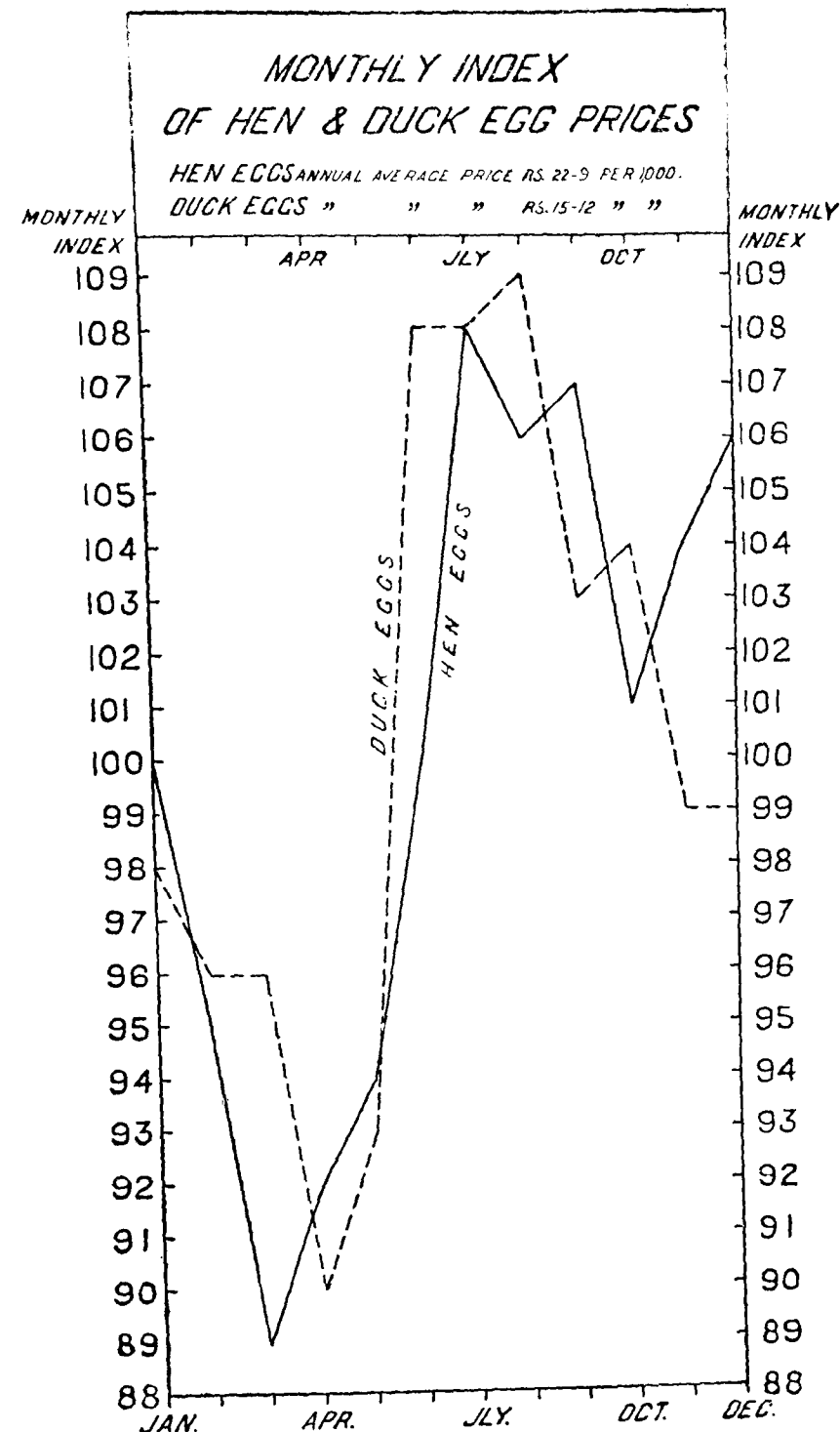
The available information on the monthly variation in the prices of hen eggs in different areas is given in Appendix XXI. The figures for duck eggs are given at page 83. The averages for these two types of eggs are represented below in terms of monthly index of prices.

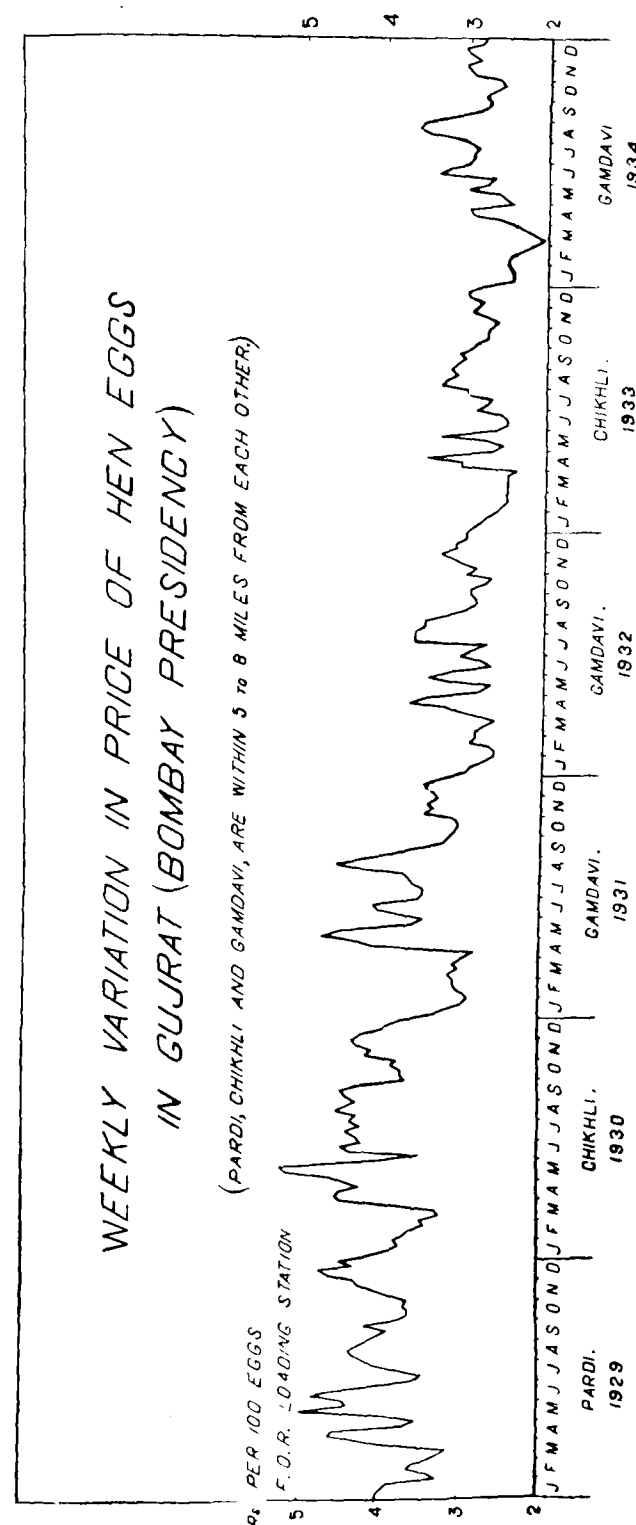
Monthly indices of price.

(Annual average = 100.)

		Hen eggs.		Duck eggs.	
Warmer months	March	89	98	96	100.6
	April	92		90	
	May	94		93	
	June	100		108	
	July	108		108	
	August	106		109	
Cooler months	September	107	102	103	99.8
	October	101		104	
	November	104		99	
	December	106		99	
	January	100		98	
	February	95		96	

It would be seen that in the seasonal variation in the prices of the two types of eggs there is not much difference. The position is also illustrated in the diagram facing this page.





It is also significant that the difference between the lowest and highest price ranges, for either type is identical, namely, 19 per cent. From the curves in the diagram under reference, it would be further observed that the lowest and highest ranges for both the types of eggs, also occur side by side, viz., during the months of March and April for the lowest level, and July and August for the highest level, for the hen and duck eggs respectively.

The index figures representing hen eggs show that the prices are lowest during March by about 11 per cent. below the annual average, whereas they are highest during July, but the rise above the annual average is only 8 per cent. These monthly fluctuations are no doubt due to the effect of production, which is generally highest about the months of March and April and is lowest during the month of July. For similar reasons the duck egg prices are lower in April by about 10 per cent. below the average. During the month of December on account of X'mas demand for eggs, the index figure for the price of hen eggs is 106, or 6 per cent. above the average. Here the behaviour of duck egg prices is greatly different, and the index figure is only 99 or 1 per cent. below the average. This confirms the fact already mentioned, that duck eggs are generally not used for confectionery purposes in India and as such the X'mas demand has no bearing on them.

(a) *Hen eggs.*—From the figures given in Appendix XXI the range of lowest and highest monthly prices for hen eggs, together with the annual averages, are summarised below :—

Range of prices in hen eggs.

(In rupees and annas per thousand.)

	Month.	Lowest price.	Month.	Highest price.	Annual average.
North-West Frontier Province	March-May	15 9	January ..	20 13	17 10
Punjab	June ..	20 0	December ..	25 0	22 0
Delhi	May ..	19 13	January ..	31 9	24 4
Baroda	March ..	24 9	August ..	33 15	28 7
Bombay	February ..	22 14	August ..	29 2	26 2
Cochin*	March ..	16 0	September ..	26 0	19 13
Travancore*	March ..	15 5	July ..	24 11	18 1
Madras	June ..	19 8	April-July ..	22 14	20 7
Nizam's Dominions	March-May	27 14	December ..	32 2	30 0
Bengal*	April ..	12 15	September ..	24 3	18 8
Assam	March-April	18 0	August-Sep-tember. ..	27 8	23 3
Average	March ..	20 3	July ..	24 4	22 9

*Concentrated areas of production.

From the above figures it would be seen that in areas of concentrated production, such as *Cochin*, *Travancore* and *Bengal*, the range of fluctuations (from the annual averages) is quite pronounced. The annual average price of these areas (Rs. 18-12-0 per thousand) is also below the average of all the reporting provinces and States (Rs. 22-9-0). It would be further noticed that even the average highest level of price in these areas, is only slightly above the average of all the reporting provinces and States, being Rs. 24-15-0 per thousand against Rs. 24-4-0. This would show that there was a certain amount of glut and if a demand for eggs could be created in these areas by developing, say, the manufacture of egg products, etc., there was every likelihood to improve the prices, at any rate, they would not drop to such low levels as they do now.

In the *North-West Frontier Province*, it is reported that on account of the severe summer, the eggs cannot be kept fresh beyond a week, and as such the producers and others try to dispose them off quickly. This accounts for the lower range of prices during the summer. The maximum price is realised in the month of January, viz., Rs. 20-13-0 per thousand eggs, against the annual average of Rs. 17-10-0. This is said to be partly due to temporary decrease in production owing to intense cold, and partly to increased demand.

In the *Punjab* during the months of December and January, the prices remain about 14 per cent. above the annual average. In other months they are generally less by Rs. 2 per thousand than the average of Rs. 22 per thousand.

Delhi is a small province and has to depend for its supplies mainly upon other provinces. The local production is also small and has no reflection on the prices. It is said that since the majority of the regular type of consumers leave for *Simla* during the summer, the prices are low during these months. The highest price, Rs. 31-9-0 per thousand, against the annual average of Rs. 24-4-0, is obtained in December due to the X'mas demand.

Baroda and Bombay (Gujarat) are alike in conditions of egg trade, as the British and *Baroda State* districts are inter-mixed in the production area of *Gujarat*. The prices are highest in these areas during August when the production is generally lowest (*vide* Production Calendar on page 19).

Conditions in *Travancore* and *Cochin* are also alike and here the prices are markedly above the annual average during the months July to September, being Rs. 24-11-0 per thousand in *Travancore* and Rs. 26 in *Cochin*, against the average of Rs. 18-1-0 and Rs. 19-13-0 respectively. In these months the production is less on account of the heavy rains. The difficulty in assembling eggs during the rains, further helps the prices to go up. On the other hand, the prices are low from March to May (about Rs. 16-7-0 per thousand) as the production is high. The apprehensions of the importers in other provinces regarding the quality at this time of the year are also said to reflect on the prices.

In *Madras Presidency*, the prices remain steadily a little below the annual average, for about ten months of the year, but in the months of April and July, they rise fairly above the average, which is due to the low production during those months. The highest production and lowest prices no doubt coincide during June, but the figures show that the intensity of both is short lived.

Nizam's Dominions.—Of all the areas for which information is available, the range of fluctuations in this State is noticed to be the least. The prices range from Rs. 27-14-0 per thousand in March, April and May to Rs. 32-2-0 in December, January and February. The annual average is Rs. 30 per thousand.

Bengal has the lowest price range in April, which is generally the period of highest production. The prices are highest in September, because of the difficulty in collecting the eggs on account of the rains, etc. The collecting charges are also said to be higher at this time, as labour remains busy in the agricultural operations. The monthly variations in the prices of hen and duck eggs in *Bengal* for eight years from 1929 to 1936 are given in Appendices XXII and XXIII respectively.

In *Assam* the months of August and September command highest prices, viz., Rs. 27-8-0 per thousand against the annual average of Rs. 23-3-0. This is generally due to the same causes as in *Bengal*, viz., difficulty in the collection of eggs, etc. The lowest range of price is during the months of March and April, being Rs. 18 per thousand due to increased production.

For some of the other areas, actual monthly figures are not available but it is reported that in *Kashmir State* the prices are generally higher during the winter, due to greater demand. In *Patiala State*, it is noticed that prices go up by 3 to 6 pies per dozen, due to decrease in production during the seasons of excessive cold or heat. In *Sind*, the prices generally rise from November to January, due to increased consumption. Due to hatching season in November, the prices in *Mysore State* are said to rise during this time by about 6 pies per dozen. Although a comparatively small area, the province of *Coorg* feels the reduction in price during the adverse months of June to August, as the eggs do not keep so well and have to be disposed of soon. The prices are also low in *Central Provinces* during summer and the reasons given are (a) greater production, (b) unsuitable season for hatching, (c) want of storage facility and knowledge of preservation and (d) reduced consumption due to heat. In the *United Provinces*, the prices are higher in winter due to a rise in the demand. On the hill stations however the prices are higher during the summer. In addition to the reasons given for the fluctuations in the *Central Provinces*, in *Bihar* and *Orissa*, the difficulty in collecting eggs during monsoon also helps the prices to remain lower.

Variation in daily prices.—Only a few reliable records of daily prices are available. Daily figures for six years are summarised on the weekly, monthly and annual basis and are given in Appendix XXIV. The diagram facing page 79 shows the weekly and monthly trends. The series relate to *Gujarat tract* in *Bombay Presidency*, L2410AR

but since continuous figures from one merchant or one place are not available, figures of neighbouring places (*Pardi, Chikhli* and *Gamdavi*) have been collected. These places are within a few miles distance from each other, and the prices relate to consignments despatched to one merchant only, at *Mhow* in *Central India*.

It would be seen that the figures show week to week variations. The prices in *Gujarat* are generally controlled from the *Bombay* market where they vary according to the daily arrivals of eggs from different centres.

It is also observed that there is a difference in price, between two merchants at the same place, for the same quality of eggs and for despatching to a common consignee. The figures as abstracted from two merchants' books are reproduced below :—

Daily prices (per hundred hen eggs) during July, 1934 at Chikhli (Gujarat—Bombay Presidency).

	Mr. E. E.				Mr. A. F.			
	Rs. A. P.				Rs. A. P.			
1st	4	2	0		4	2	0	
2nd	4	2	0		4	2	0	
3rd*	4	4	0		4	2	0	
4th*	4	4	0		4	2	0	
5th*	4	4	0		4	2	0	
6th*	4	4	0		4	2	0	
7th*	4	6	0		4	8	0	
8th	4	8	0		4	8	0	
9th	4	8	0		4	8	0	
10th*	4	9	7		4	10	0	
11th	4	10	0		4	10	0	
12th	4	8	0		4	8	0	
13th*	4	3	2		4	6	0	
14th*	4	3	2		4	4	0	
15th	4	2	0		4	2	0	
16th	4	2	0		4	2	0	
17th	4	2	0		4	2	0	
18th	4	2	0		4	2	0	
19th*	4	4	9		4	4	0	
20th	4	4	0		4	4	0	
21st	4	4	9		4	4	9	
22nd	4	4	9		4	4	9	
23rd*	4	4	9		4	6	0	
24th*	4	6	4		4	8	0	
25th	4	6	4		4	8	0	
26th*	4	6	4		4	8	0	
27th*	4	6	4		4	8	0	
28th*	4	6	0		4	6	4	
29th	4	6	4		4	6	4	
30th	4	4	9		4	4	9	
31st	4	4	9		4	4	9	

It would be seen that out of 31 days, for 14 days (marked *) the prices between the two merchants were different. The difference in the quotations is no doubt not great, but when it is considered that a consignment may sometimes be of, say, five thousand eggs, the difference would be appreciable. For example, even a difference of 2 annas per hundred eggs amounts to Rs. 6-4-0 on five thousand eggs.

Here also perhaps the influence of consuming markets is the reason, but it indicates that it would be a better plan for the trade to standardise the quality and encourage the quotations on the basis of quality, so that such unnecessary variations (which must lead to unhealthy competition and lowering down of the prices paid to producers) may be minimised.

(b) *Duck eggs*.—The arguments about the hen egg prices are generally applicable to the duck eggs also. The actual figures of monthly variations in the important areas for production of duck eggs are reproduced below :—

Monthly variation in the wholesale price of duck eggs.
(Per thousand.)

	Cochin (1936).	Travan- core (1936).	Bengal (1929- 36).	Burma (1936)	Monthly average.	Monthly index to annual.
				Local fresh.		
	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs. A.	Rs.
January	14 0	13 4	17 3	17 5	15 7	98
February	11 0	11 14	18 4	19 8	15 3	96
March	13 0	11 0	16 1	20 8	15 2	96
April	13 0	11 4	14 15	17 5	14 2	90
May	12 0	12 8	15 9	18 8	14 10	93
June	18 0	13 4	15 7	21 0	16 15	108
July	17 0	13 0	16 1	22 0	17 0	108
August	16 0	13 12	16 10	22 0	17 2	109
September	13 0	11 14	18 15	21 0	16 3	103
October	12 0	11 8	19 12	22 5	16 6	104
November	13 0	11 12	16 12	21 0	15 10	99
December	13 0	12 4	14 11	22 5	15 9	99
Average	13 12	12 4	16 11	20 6	15 12	(100)

It has however been stated (page 80) that in the areas of concentrated production of hen eggs, the range in fluctuations is comparatively longer than in the areas of less concentration. That this observation is not applicable to the prices of duck eggs in the con-
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centrated areas is seen from the table below, and its comparison with the table on page 79 for hen eggs, would show that the prices of Jack eggs do not fluctuate so widely.

Range of prices in duck eggs.
(In rupees and annas per thousand.)

	Month.	Lowest price.	Month.	Highest price.	Average.
Cochin	February ..	11 0	June ..	18 0	13 12
Travancore	March ..	11 0	August ..	13 12	12 4
Bengal	December ..	14 11	October ..	19 12	16 11
Burma	January ..	17 5	October ..	22 5	20 6
	April ..		December ..		
Average ..	April ..	14 2	August ..	17 2	15 12

(2) BURMA.

Since duck eggs are of greater importance to *Burma*, reliable figures in respect of them only are available and are reproduced in the table below :—

Monthly wholesale price per thousand duck eggs at Rangoon.
(In rupees and annas per thousand.)

	Madras pickled eggs.				Rangoon fresh duck eggs.				Chittagong pickled eggs.			
	1933	1934	1935	Average.	1933	1934	1935	Average.	1933	1934	1935	Average.
January	29-0	25-0	27-0	27-0	15-8	16-8	20-0	17-5	20-0	16-0	16-0	17-5
February	30-0	25-0	28-0	27-11	20-0	18-8	20-0	19-8	21-0	19-0	17-0	19-0
March ..	30-0	25-0	28-0	27-11	21-8	19-0	21-0	20-8	17-0	19-0	16-0	17-5
April ..	30-0	26-0	30-0	28-11	16-0	16-0	20-0	17-5	16-0	18-0	17-0	17-0
May ..	30-0	27-0	26-0	27-11	21-8	15-0	19-0	18-8	18-0	18-0	18-0	18-0
June ..	29-0	27-0	..	28-0	21-0	18-0	24-0	21-0	20-0	16-0	18-0	18-0
July ..	34-0	26-0	..	30-0	20-0	21-0	25-0	22-0	19-0	16-0	20-0	18-5
August ..	32-8	25-0	30-0	29-3	20-8	20-0	25-8	22-0	20-0	20-0	21-0	20-5
September	29-0	25-0	27-0	27-0	19-0	20-0	23-0	21-0	21-0	20-0	20-0	20-5
October	28-0	24-0	28-0	26-11	23-0	20-0	24-0	22-5	20-0	20-0	19-0	19-11
November	28-0	26-0	27-0	27-0	22-0	18-0	23-0	21-0	21-0	20-0	20-0	20-5
December	29-0	26-0	27-0	27-5	24-8	18-0	24-8	22-5	21-0	17-0	20-0	19-5
Average	29-14	25-9	27-13	27-12	20-6	18-5	22-7	20-6	19-8	18-4	18-8	18-13

It will be seen from the above table that in the *Rangoon* market, the pickled eggs from *Madras* fetch the highest price. The three years' average price for *Madras* eggs has been Rs. 27-12-0 per thousand against Rs. 20-6-0 for *Rangoon* fresh duck eggs and Rs. 18-12-0 for *Bengal* pickled eggs.

It is noticed that the seasonal variation in the demand has an effect on the prices. For instance, although the supply of fresh duck eggs from *Kayan* and *Pyapon* area is greater during the rains, from the table it would appear that the prices are actually higher. This is due to the increased demand in connection with the Buddhist *Lent* (August to October). In the case of imported preserved eggs also, the price is found to be highest during the rains. The reduced imports in November and December have no appreciable effect on the prices during these months, probably because of a restricted consumption.

E.—Relation between the rural wholesale price and the urban retail price.

It is noticed that in a majority of cases the urban merchants dictate the prices at which the rural dealers should consign eggs to them. The rural dealers, in turn, indicate to the village collectors a price at which they would purchase the eggs from them (collectors) or the price at which the collectors should purchase eggs from the producers. It is only in rare instances that the rural dealers have any voice in dictating or even fixing the price. Reproduced below is a true translation of a typical letter from a merchant at a consuming centre (*Lahore*) to a dealer in the producing area (*Peshawar*), which illustrates the position.

“ For a basket of 400 eggs we can pay Rs. 8 to Rs. 9 f.o.r. *Lahore*. Should you care to send us at this rate, please do so otherwise we cannot take them.”

The table below illustrates a concrete example of prices paid to a merchant at *Bilimora* (*Baroda State*) by a merchant at *Bombay*, and the prevailing retail prices at *Bombay* :—

Relation between the rural wholesale price and urban retail price.
(In Rs., annas and pies per thousand.)

	Price paid to a rural dealer at Bilimora (Baroda State).	Ruling retail* price at Bombay.	Difference in price.
January	25 15 7	36 6 8	10 7 1
February	24 12 6	33 13 4	9 0 10
March	24 9 6	33 13 4	9 3 10

*For the sake of comparison the retail price per dozen has been converted in rupees per thousand.

Relation between the rural wholesale price and urban retail price—contd.

(In Rs., annas and pies per thousand.)

	Price paid to a rural dealer at Bilimora (Baroda State).	Ruling retail* price at Bombay.	Difference in price.
April	27 11 6	36 6 8	8 11 2
May	29 15 0	36 6 8	6 7 8
June	31 4 0	37 12 0	6 8 0
July	29 4 0	37 12 0	8 8 0
August	33 15 0	39 0 0	5 1 0
September	28 9 0	39 0 0	10 7 0
October	26 10 4	39 0 0	12 5 8
November	29 7 0	39 0 0	9 9 0
December	29 9 0	41 10 8	12 1 8
Average ..	28 7 7	37 8 1	9 0 6

The figures indicate that the monthly price margin between what the merchant at *Bombay* has paid to the rural dealer, and the price he has received in retail, has a wide range of variation from Rs. 5-1-0 to Rs. 12-5-8 per thousand eggs. There have been however well defined variations in the retail prices during the year, namely, for three months of January, April and May there has been one price, Rs. 36-6-8. For two months of February and March the prices have also been alike, Rs. 33-13-4. Again for the two months of June and July they have been Rs. 37-12-0. For the four months of August, September, October and November also, they have been constant at Rs. 39. For the one month of December, the price has been Rs. 41-10-8. On the other hand, the prices paid to the rural dealer have never been alike in any two months of the year.

It may be noted that the production of eggs in *Gujarat* is lowest during the month of August (page 19) and accordingly the prices have been highest in this month, viz., Rs. 33-15-0. Barring this singular instance when the margin of the *Bombay* merchant has been only Rs. 5-1-0, the tendency has been to keep the rural prices as low

*For the sake of comparison the retail price per dozen has been converted in rupees per thousand.

as possible. During September, the prices in the rural areas were lower by about Rs. 5-6-0 per thousand, but the consumers did not have the benefit and the retail prices were not reduced. In October the rural prices further went down, but again the consumers were not benefitted. On the other hand, owing to the increased X'mas demand during the month of December, the consumers were no doubt charged the highest price, but the producer was not benefitted at all.

This indicates that if the producer's share of prices is to be improved, and if he is to reap sufficient benefit of the fluctuations in the prices at the consuming centres, or if the consumers are to be benefitted through the variations in supply, the rural dealers must adapt themselves to standardise the quality of eggs they send to the urban merchants. In other words they should adopt to grading of eggs, described later. Unless this is done, they are always likely to be excessively dependent upon the urban dealers in regard to price quotations, who more often than not take shelter under various factors and point out to the rural dealers the excessive staleness, breakages, smaller sizes, etc., in the eggs they send. Thus the position of the rural merchants would always be that of a subjective and a defensive party.

For obvious reasons, in any well thought out plan for the improvement of marketing, the grading of eggs is an essential feature. But apart from this the above discussion shows that there is room for stabilising the day-to-day prices and consequently reducing the margin of price risks, by means of cold storage and transport. For instance, the annual average difference between the rural and urban prices has been Rs. 9-0-6 per thousand eggs, whereas the monthly variations from the average have fluctuated from Rs. + 3-5-2 in October, to Rs. —3-15-6 in August, and the normal monthly variation due to price risk has been Rs. 1-13-2. Therefore, the urban dealer's margin at present is excessive by over 25 per cent. on account of the price risks alone. It should therefore be worth while either for urban merchants or rural dealers or both together, to take steps to eliminate this large element of price risk by controlling the daily supplies better, e.g., through the use of cold storage, etc., so as to even out the course of daily and weekly supplies and prices.

On account of these factors the urban business is also confined to only a few merchants, and well financed or organised business firms do not take to the egg trade. The risks due to unstandardised quality and prices are considered too great by them. This has hampered the trade, but if there are proper grades and if the purchases and sales are done on the basis of these grades, the prices are bound to be stabilised and the full benefit would accrue to both the producer and the consumer.

F.—Prices in relation to quality.

Since eggs are generally bought on a flat rate basis, relative prices on quality basis are absent. Cracked or chipped eggs have

already been dealt with on page 72. In retail trade (mainly urban) small and large eggs are also sold separately, and these too have been dealt with.

Recently, however, efforts have been successfully made to sell the produce on the basis of quality. Consequently, eggs have been graded in accordance with the newly enacted law, the Agricultural Produce (Grading and Marking) Act, 1937. Although work in this direction is only of a recent origin, eggs in India are no more just eggs; they are now the AGMARK eggs and the bazaar quality eggs. Reliable daily records on the basis of quality are therefore available only for those eggs graded at the first egg grading station in India, situated in the *North-West Frontier Province*.

In accordance with the rules for grading and marking eggs, the definition of the standard quality for all the AGMARK grade hen eggs, is as follows:—

“The eggs must not have been preserved by any process and must be free from taint; the shell must be clean, free from stain, sound, of normal texture and shape. The contents must be free from blemish, the yolk central and translucent, or faintly but not clearly outlined and freely mobile; the white must be translucent and clear, and the air space must not exceed three-eighths of an inch in depth.”

The marking for each grade is done on the basis of minimum weight of each egg, and for hen eggs they are as follows:—

“Special” = $1\frac{1}{4}$ oz.; ‘A’ = $1\frac{1}{4}$ oz.; ‘B’ = $1\frac{1}{4}$ oz.; ‘C’ = $1\frac{1}{4}$ oz.

For duck eggs the specifications are different, but since the trade has not yet taken to grading them, the prices of graded duck eggs are not available. The grades for these are discussed under the Chapter on Grading and Standardisation.

Since the commencement of the scheme, the merchants concerned have commenced selling and quoting the eggs on the basis of quality, as specified in AGMARK grades. The proportion of AGMARK “Special” grade (minimum weight per egg— $1\frac{1}{4}$ oz.) is found to be small in the areas concerned, and therefore these eggs are generally not marked as such, but are marked as AGMARK ‘A’.

The details of the monthly prices, according to the different grades, as well as the monthly prices of ungraded eggs, are given in the table below. The monthly grading results are given in Appendices XXXIV and XXXV.

Monthly variation in prices of hen eggs at the grading station in the North-West Frontier Province.

(In rupees, annas and pies per 100 eggs.)*

	Agmark A Grade.	Agmark B Grade.	Agmark C Grade.	Small.	Ungraded.
1937					
January ..	2 12 7	2 10 3	2 8 4	2 5 6	2 5 6
February ..	2 11 5	2 9 1	2 8 6	2 3 5	2 3 4
March ..	2 15 4	2 8 6	2 5 6	1 10 7	1 13 0
April ..	3 2 0	2 9 8	2 5 6	1 9 0	1 13 3
May ..	3 2 0	2 9 8	2 5 6	1 9 0	1 13 2
June ..	2 9 8	2 5 6	2 1 4	1 9 0	1 12 0
July ..	2 9 8	2 5 6	2 1 4	1 9 0	1 11 9
August ..	2 6 11	2 6 3	2 3 2	1 3 0	1 15 10
September ..	2 10 3	2 7 6	2 6 9	1 3 0	2 4 8
October ..	2 10 7	2 7 4	2 5 9	2 4 1	2 4 0
November ..	2 8 7	2 5 11	2 2 2	2 0 0	2 0 2
December ..	2 9 4	2 6 5	2 5 3	1 12 8	2 0 2
Annual average	2 9 0	2 7 8	2 4 11	1 11 10	2 0 1

It would be observed that if the eggs were sold ungraded, they would have fetched a flat price of Rs. 2-0-1 per hundred. Upon

*The prices are for eggs delivered at the grading station, excluding packing or freight.

grading them and selling them on quality basis the realisations have been as under :—

Comparative returns by grading for quality.

	Number of eggs obtained of different grades from hundred ungraded eggs.	Rate of sale (per hundred).	Amount realised.
(Marked)—		Rs. A. P.	Rs. A. P.
AGMARK A	25.6	2 9 0	0 10 6
„ B	49.5	2 7 8	1 3 8
„ C	21.5	2 4 11	0 7 11
(Unmarked)—			
Small	1.1*	1 11 10	0 0 4
Cracked, etc.	0.6	1 0 0	0 0 4
Stale	1.7		
	(100)	..	2 6 9

It may, therefore, be seen that the aggregate return from the sale of hundred eggs after grading them is Rs. 2-6-9, against Rs. 2-0-1 only from the sale of ungraded eggs. This amounts to a gross increase of about 20 per cent. over the price of ungraded village eggs, and indicates the prospects that lie in grading. This aspect of the matter is however treated more fully in the chapter on Grading and Standardisation.

In the table below are given the working figures of the *North-West Frontier Province* egg grading station for full 12 months, commencing from 1st January 1937*. During this period, 27,36,015 hen eggs were brought to the grading station, and after candling and grading them with the help of a machine, the eggs were sold on the basis of AGMARK grades, and were despatched to merchants at *Lahore, Karachi, Delhi, Simla, Aligarh, Bombay, Mhow, Indore*, etc.

*Actually the station commenced working on 27th November, 1936.

Analysis of the prices of 27,36,015 AGMARK graded eggs.

	Proportion obtained from total eggs brought for grading.	Price realised at the station, per hundred eggs (excluding packing and freight).	Minimum weight per egg.	Minimum calculated weight per hundred eggs.	Calculated price per lb. of eggs.
	Per cent.	Rs. A. P.	oz.	lb. oz.	As. p.
AGMARK A ..	25.6	2 9 0	1.75	10 15	3 9
„ B ..	49.5	2 7 8	1.50	9 6	4 3
„ C ..	21.5	2 4 11	1.25	7 13	4 9
Small ..	1.1	1 11 10	1.0	6 4	4 5½
Cracked, etc. ..	0.6	1 0 0	..	..	..
Stale ..	1.7				
	(100)	..	..	..	..

For the sake of comparison the prices for different sizes are worked out in the last column, per lb. basis. It would be seen that the C grade eggs fetched the highest price of Re. 0-4-9 per lb. The A grade eggs which are much larger to look at, on the basis of weight actually fetched the least value, bringing only Re. 0-3-9 per lb. Even the small eggs, below 1½ oz. fetched a better price. During the course of the experiment, these facts were repeatedly pointed out to the merchants so that the prices may be adjusted on the calculated basis of weight and there may be no difference per pound between the prices of different sizes of eggs. They also made attempts to raise proportionately the price of 'A' and 'B' grade eggs and bring it to the weight level of 'C'; but it was observed that owing to the ignorance and indifference of buyers, the retail market did not react sufficiently and the sales were threatened. When the chances of obtaining higher prices even for the best eggs that sell at 6 to 7 annas per dozen, are so limited, the reason why the production and market-

*These eggs have no statutory minimum weight, but are below 1½ oz. For the purpose of calculation they are taken as 1 oz. each.

ing of eggs of improved fowls that have to be sold at 9 to 12 annas per dozen are so restricted, is not difficult to see.

Nevertheless, from the reception which the AGMARK eggs have received and the keen interest the trade has shown in expanding the grading scheme, it might be mentioned that because of their uniformity, pleasant appearance and freshness, it pays to grade eggs, but the difference in size does not attract a commensurately higher price. This gives rise to the important issue of introducing a method of selling the eggs on the basis of weight, provided the interior quality is reliable. In the absence of a weight basis it is difficult to see how buyers are to be brought to appreciate the fact that it is actually cheaper to buy the larger eggs.

G.—Units of sale and basis of price quotation.

Except for one single instance that has come to light for the supply of eggs to a restaurant at *Calcutta* on the basis of weight (per maund), it may be said that in India and *Burma* the eggs are always sold by count, ranging from one to thousand. The basis of price quotations also ranges similarly, being per egg in some cases and per thousand eggs in others.

The eggs that are marketed for the supply to urban areas are generally sold about four times before they are consumed. Firstly, the producers in the villages sell the eggs to the egg collectors. Secondly, the egg collectors sell them to the dealers or merchants at the assembling centres. The dealers or assembling merchants sell them to the merchants at the consuming centres. This is the third time they are sold. Fourthly, they are sold by the retailers to the final consumers. In some instances they may be sold even six to seven times, but these are exceptions rather than the rule. When the producers are situated in the urban area itself or when the eggs are sold for consumption in the rural areas, they are generally sold only once, directly to the consumers.

The units of sale vary with all the occasions of sale, as well as in the different areas. During the first three stages, irrespective of the size or quality of eggs, the quotation of prices is generally on a flat rate basis. In the retail trade, however, quality factors, such as large and small eggs or rejections, etc., are taken into account.

There is no difference in the basis of quotation or units of sale between hen eggs, duck eggs or improved eggs produced in the villages. Such improved eggs however as are produced at the farms, when sold for eating purposes, are generally quoted per dozen, whereas those sold for hatching may be quoted per dozen or per setting of 7, 9, 11 or 15 eggs.

The table below describes the position, showing the differences in some of the areas, together with the general system that is prevalent in the remaining areas.

Units of sale and basis of price quotation.

Area.	When sold by :—			
	Producers.	Collectors.	Dealers.	Retailers.
North-West Frontier Province (Peshawar district only).	Number of <i>muthies</i> (handfuls) of 8 eggs per rupee.	Number of <i>muthies</i> (handfuls) of 8 eggs per rupee.	Per 100 eggs in lots of 400 (1 basket).	Per 12 eggs.
Baroda and Mysore States.	Per 1 egg ..	Per 100 eggs ..	Per 1,000 eggs	Per 12 eggs.
Bombay Presidency ..	Number of eggs per <i>chowli</i> (i.e. 2 annas) (in Gujarat only).	Per 100 eggs ..	Per basket of 650 eggs (in Deccan). Per 100 eggs in Gujarat).	Per 12 eggs.
Bengal	Per lots of 2, 4, 12 or 20 eggs.	Per 100 or 1,000 eggs.	Per 100 or 1,000 eggs.	Per 20 eggs.
Assam	Per <i>jora</i> (pair) or 2 eggs or per <i>hali</i> or 4 eggs.	Number of eggs per rupee.	Per 1,000 eggs	Per (<i>hali</i>) of (4) or 20 eggs.
Burma	Per 12 eggs ..	Per 100 eggs ..	Per 1,000 eggs	Number of eggs per 4 annas.
In other areas ..	Per 12 eggs ..	Per 100 eggs ..	Per 100 or 1,000 eggs.	per 12 eggs.

The above position shows that during the first purchase from the producers, not only the unit of sale varies greatly in the different areas but is also small ranging from 1 egg to 12. This is due to the small numbers that are produced per household and are available for sale each time. Because of its concentrated production, *Bengal* appears to be the only place where the producers are able to sell the eggs in lots of 20 at a time. Apart from the areas of concentrated production, in the remaining areas the producers quote them per dozen, but the unit of sale may be anything from 1 egg upwards.

At the time of second sale, *viz.*, by the village collectors, the collected number of eggs is more and the unit of sale and the basis of price quotation is generally hundred eggs. In *Peshawar* district of *North-West Frontier Province*, and *Assam*, the eggs are sold per rupee, but the method of count differs. While in *Assam* a straight count is made, in *Peshawar* district the count is indicated by the number of *muthies* (handfuls) per rupee. One handful contains 8 eggs, but the eggs are actually held in both the hands, four in each. In *Bengal*, again on account of the highly concentrated production, even the collectors sometimes sell and quote per thousand eggs.

At the time of the third sale by the assembling merchants the number assembled is the largest, and the unit of sale and the basis of quotation is generally per thousand eggs. In the *Peshawar* district

and in *Deccan*, however, the sales are sometimes made on the basis of a basket of 400 or 650 eggs respectively.

At the time of retail sale to the final consumers, once again the sales are reduced to small numbers and in most of the areas, the eggs are sold on the basis of a dozen. In *Bengal*, the practice is however to sell and quote on the basis of a score. In *Assam*, besides the use of score as a unit, the eggs are sold per *hali** or 4 eggs. In *Burma*, they are retailed on the basis of so many eggs, per 4 annas.

Mention has already been made regarding the AGMARK graded eggs. In places where such eggs are available, the dealers quote for these eggs per hundred, but on the basis of the different grades (Special, A, B, C), and in retail trade also they are sold per dozen on the basis of grades.

H.—Market news service regarding prices, supplies, etc.

There appear to be various reasons which have been responsible for a proper market intelligence service not being developed in the Indian egg or poultry industry.

As indicated before, the demand for eggs in the urban area consists of only about 27 per cent. of the production. Even in the urban area there are only a few large towns and cities where the trade in eggs is really concentrated. As such no great efforts of any kind have been made for obtaining or maintaining regular information on supplies or prices. The fragmentary nature of the trade may be better judged from the fact that in the whole of India there are perhaps not more than a dozen wholesale merchants who handle over, say, 30,000 eggs per day, and perhaps not even half of that number who handle over 50,000 eggs daily.

The trade is restricted between only a few merchants at a consuming centre and those in the producing areas. There are no associations to control the various customs of the trade and the merchants generally manage their affairs in their own individual ways. There are again no large capitalist concerns dealing in eggs, nor are there any large co-operative societies. Most of the individual wholesale merchants handle on an average three to five thousand eggs per day and their daily turn-over would be about Rs. 60 to Rs. 100. It is also observed that a merchant does not know even the names and addresses of merchants in areas, other than where he generally operates, and this often handicaps the extension of business†.

The trade being mainly in fresh eggs, no processing or elaborate preparation for marketing is done regarding the eggs, e.g., preservation, cold storage, etc. Therefore the usual necessity of knowing the stocks, etc., does not arise. Finally the absence of imports, exports

*In *Assam* and also in *Dacca* and *Chhittagong* divisions of *Bengal*, a unit of 4 is called in local terms a *hali*.

†As a first step towards meeting this omission, a list of names and addresses of important egg merchants and dealers in all the provinces and States is under preparation.

or international trade in eggs, has precluded the merchants from maintaining a proper market intelligence service, regarding prices, arrivals, demand, stocks, etc. Even the *Burma* export trade is equal to only 9 per cent. of the production in *Bengal* (the province which mainly meets it) and only 0.5 per cent. of the production of India.

(1) THE PRESENT ARRANGEMENT.

Newspapers, price bulletins, radio service, or other public services do not deal with egg prices. Some of the municipalities, however, mention daily or weekly prices of eggs, and other foodstuffs, at the local markets, but these prices are generally above the actual prevailing rates at which the eggs are sold, and as such no one pays any attention to them.

In some of the towns of the *Punjab*, however, the *Tehsildars* maintain the records of weekly retail prices of eggs, along with other foodstuffs. The information is obtained from the egg dealers, but it is collected for the use of Prison and Military Departments and is not published. At *Bombay*, *Calcutta*, *Madras*, *Delhi* and other large consuming centres where eggs are received from different areas, the wholesale prices fluctuate according to the total arrivals of consignments each day. The merchants at such centres accordingly inform the respective loading centres by personal correspondence, of the local arrivals and the ruling prices. They may also indicate the price at which they would be prepared to accept further consignments and their future requirements. For this purpose the post card is used commonly, but in urgent cases telegrams are also issued.

With most of the merchants at the despatching centres, it is a practice to enclose with each consignment a *parcha* (packing note) which may indicate the prevailing prices, or a reminder for sending money, besides the number of eggs and baskets in the consignment. Any other important piece of news may also be scribbled thereon.

It would at first sight appear that the present arrangements are primarily designed to satisfy individual requirements. But actually this is not so. For instance, they do not give any indication of what the supplies and prices would be from any district, say a week hence. For example, a merchant at *Delhi* gets his supplies from *North-West Frontier Province* at market rates. On account of rush of demands or better prices at *Karachi* or *Lahore*, the *North-West Frontier Province* merchants may sometimes (without giving notice) reduce or temporarily stop the supplies to *Delhi*. Under such circumstances the merchant at *Delhi* loses considerable time or business in trying to replenish his requirements from other centres.

(2) THE TYPE OF SERVICE REQUIRED.

The local requirements of each place or area may vary slightly but it appears possible to disseminate the market intelligence news or service on a more or less standardised basis from one central place

Something in the nature of a Bureau would be required and some of the objects of such a Bureau would be :—

- (a) To register, as members, important egg merchants, both at the assembling and consuming centres, by charging a nominal admission fee and an annual subscription, in the form of a small voluntary cess of say 2 annas per basket of 400 eggs handled.
- (b) To supply from time to time to its members at the consuming centres, a list of important assembling centres with names of merchants operating there.
- (c) Similarly to supply to the members at the assembling centres with the names of merchants at the consuming centres.
- (d) To indicate the number of eggs assembled and consumed at the centres, together with a monthly forecast of the supplies and demand for each centre.
- (e) To communicate the range of prevailing prices for hen and duck eggs, with a price forecast for the following month.
- (f) To introduce the system of quotation of prices on the basis of the AGMARK grades, as laid down in the Rules under the Agricultural Produce (Grading and Marking) Act, 1937. This would greatly reduce the fluctuations in prices, which are often personal between two merchants and may not have anything to do with arrivals of eggs at any market.
- (g) To communicate the freight, etc., per maund, and the time taken in transit, from important places of assembling to centres of consumption.
- (h) To indicate every month to each assembling centre, a loading schedule, so that they may reap full benefit by despatching eggs to suitable centres. This would help to prevent any possible gluts that may occur, and at the same time indicate to the carrying agencies, e.g., railways, to provide special rates or other facilities, such as quicker transport between any two points.
- (i) To maintain proper statistics and data of the egg and poultry industry, etc.
- (j) In case local agencies are formed to deal with the above points, then the Central Bureau may act as a co-ordinating body.

Such a service should not be expensive to function, but is likely to give the trade considerable information of practical value, which must result in obtaining proper prices and preventing wastages, etc. The Bureau may even assume for itself the functions of a trading body or a clearing house for eggs, and might even arrange for cold storage and their suitable disposal on behalf of rural merchants.

[Prices.

INTER-CHAPTER THREE.

The general price level of eggs fell steadily from 1929 to 1935 by which time it had fallen by 40 per cent. The subsequent two years, however, saw a recovery by 5 or 6 per cent. and the general level still stands about 30 per cent. above the pre-war figure, so that producers of eggs in India are somewhat more fortunate than those concerned with the production of many other agricultural commodities.

Different methods of quoting prices are in vogue not only in the various districts but also at different parts of the marketing chain. Retailers generally quote per dozen (12) eggs but in *Bengal* and *Assam* the retail price is generally quoted per score (20). Collectors and wholesale dealers usually quote at so much per 100 or 1,000 but in buying from producers smaller units are observed and the basis may be so many hand-fuls (8 eggs) per rupee or so many pairs or single eggs per anna. In other parts the price may be quoted per lot of 4, 12 or 20 eggs.

The comparison of prices in different parts is therefore not a simple matter and particularly when calculating price spreads it is necessary to allow for broken and for different rates being quoted for cracked and stale eggs, etc. The producer's price may be taken roundly as 1 pice an egg, i.e., he sells them at the rate of 4 for an anna.

The price spread between producer and consumer is over 40 per cent. so that the producer gets only a little more than 9 annas of the consumer's rupee in the case of hen eggs and about two-thirds of the retail price in the case of duck eggs. In some cases the wholesale distributors in the main consuming centres sort out their eggs and

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have a higher rate for the larger eggs than the smaller, generally the difference is about 1 anna a dozen. Cracked and rejections are also disposed of at less than half the price. In all other stages of marketing, however, it is customary to quote a flat rate regardless of the size or quality of the eggs. This seriously affects the position of the quality producer.

In the case of eggs graded under the Agricultural Produce (Grading and Marking) Act, 1937, although it has been possible to secure a premium over a year's working of about 20 per cent. more for graded than ungraded eggs, the margin between A grade (*i.e.*, over $1\frac{3}{4}$ oz.) was, on the average, only about 4 annas per 100 more than the price of C grade (over $1\frac{1}{4}$ oz.). Having regard to the weight and food value of the respective *grades* it is obvious that the premium on the top grade is inadequate. This difficulty of getting an adequate premium becomes more evident in the case of "improved" eggs which on an average can only make about $11\frac{1}{2}$ annas a dozen retail. This indicates the need for putting on the market a larger proportion of properly graded eggs so that they could be sold on the basis of weight and not merely of count. At the moment the discriminating consumer should have no difficulty in realising that although he pays more per dozen for the large eggs in actual fact he is getting them cheaper than the C grade eggs when weight is taken into account.

The seasonal variation in prices is about 20 per cent. in the case of hen eggs and slightly less in the case of duck eggs. On the average run, egg prices are at their lowest in the month of March and are high during the cold weather months, although the highest point is actually reached in July owing to the difficulty in obtaining supplies at that time of year. Duck eggs are at their lowest in April and highest during the five months, June to October. The normal seasonal fluctuation is not, how-

ever, the same in every district. For example, although hen eggs are at their lowest in *Gujarat (Bombay)* during the month of February, the lowest point is reached in June in the case of both the *Punjab* and *Madras Presidency*. Prices are at their highest in the *North-West Frontier Province* in January, in *Cochin* and *Bengal* in September, and in *Delhi* and *Nizam's Dominions* in December.

The varying seasonal fluctuation in different parts of the country makes it essential for sellers to be in close and constant touch with their markets so as to be able to divert supplies to the most profitable centre. As things are at present, however, the flow of supplies is stimulated or checked by the daily variation in prices which may be as much as 10 or 12 per cent. This leads to sudden and unexpected diversion of trade from one centre to another to the detriment of both the buyer and seller. More needs to be done, therefore, to improve the present system of market news and at the same time to control supplies by the proper use of cold storage.

It would be useful to have some kind of Central Bureau or organisation for providing buyers and sellers with adequate information regarding supplies and prices and also, if possible, for co-ordinating the movement of supplies. This may have to wait until many more grading and packing stations are established throughout the country and thereafter a combined Association might be formed somewhat on the lines of the Egg Central in England, constituted by the National Mark egg packing stations. Such a service should also prove useful to any cold storage concern, which might desire to trade in eggs.

CHAPTER IV.—PREPARATION FOR MARKET.

A.—General.

In this country, as also abroad, the preparatory processes in the marketing of eggs are among the services rendered by the dealers, distributors or retailers. The village producers do precious little besides gathering them from the nests. Cleaning, sorting, packing, testing, mixing, and processing, *e.g.*, preserving (in certain districts) are generally done by other agencies. Eggs generally reach the rural consumers as the birds lay them (although not always in a fresh state), without any form of preparation.

Gathering the eggs.—Except in the case of large flocks of ducks in the concentrated areas of production (*Bengal, Travancore, Cochin and Burma*), the looking after the birds and gathering of the eggs in the villages is chiefly done by the women folk. In fact, the fowls really belong to the housewife. As the number of eggs produced per house is small, there are no fixed hours for gathering them, but usually they are gathered in the afternoon. Ducks are reported to lay during the night and the collection is done in the morning.

Nests customarily vary from a hole in the ground made by the hen itself to a reasonably suitable nest, padded with straw or rice husk. Broken earthen pots, baskets, wooden boxes, palmyra leaves, etc., may be provided for the hens to lay their eggs. Where large flocks of ducks are kept, some kind of shelter or enclosure is provided for the birds. These are sometimes of a temporary nature, as the flocks may have to be moved from place to place in search of food. In *Bengal* there are small enclosures surrounded by mud walls. In *Travancore*, temporary rope enclosures with some kind of improvised shelter of palmyra leaves are more common. In *Burma*, small huts are provided and these are usually located near a creek, waterway or paddy field.

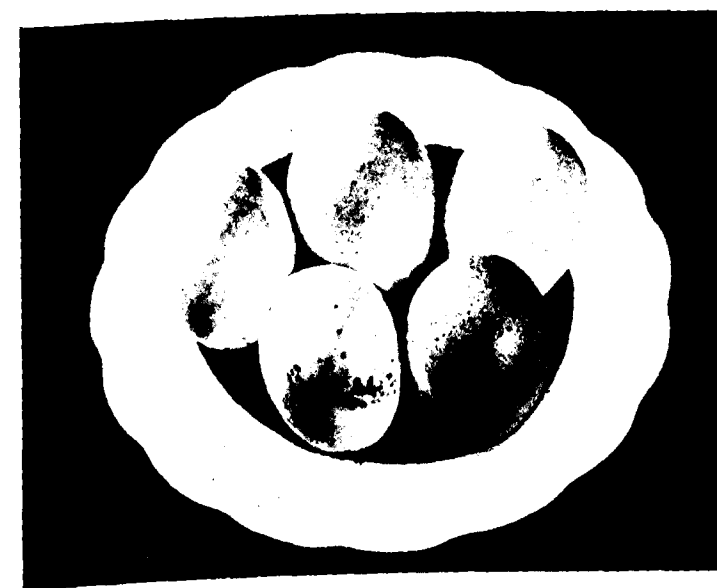
After the eggs are gathered, and until they are consumed in their households or sold to the collectors who call round the villages, the producers keep them in earthen pots, empty tins, or baskets. Ashes, straw, husk or old rags may be used for lining the receptacles.

The few farms that have improved poultry on them, ranging from a small flock of say 25 or 30 birds to larger flocks of 200 to 300 birds, are generally provided with better arrangements for laying the eggs. Proper trap-nests or wooden-boxes lined with straw, etc., are used. The gathering of eggs from the nests is done comparatively regularly, in a basket or a bucket, and the eggs are brought into the office of the farm or the residence of the owner and are kept in trays, etc. (see top plate facing this page).

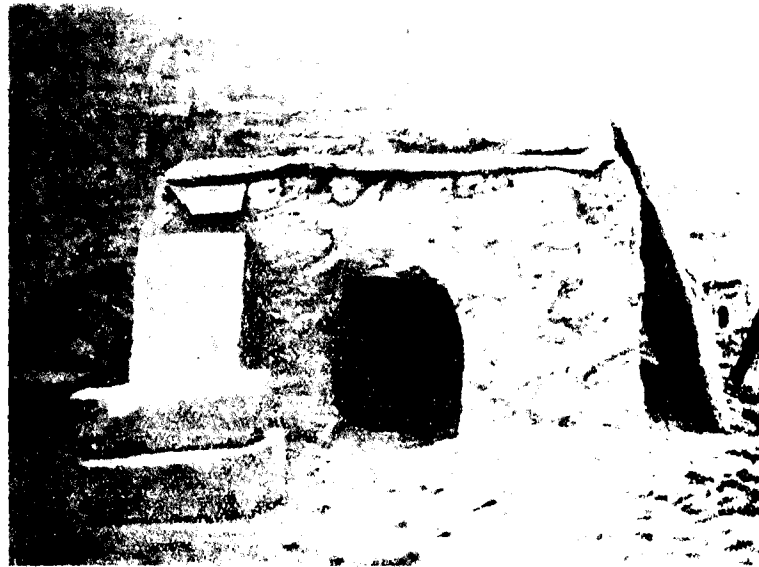
The chart on page 101 illustrates briefly the general position in which the different persons engaged in the production and marketing of eggs, help in their preparation for market. There is no difference in the preparation for market of fowl and duck eggs.



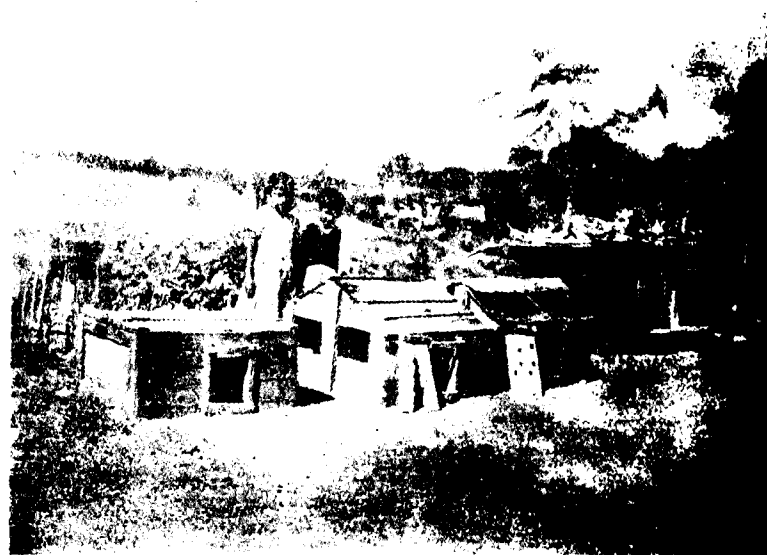
A method of keeping eggs at Farms.



Eggs stained with the juice of cashew and areca nuts.



An insanitary poultry house, made of mud.



Another type of fowl houses occasionally used in villages.

Preparation for market.

	Cleaning.	Sorting.	Packing.	Testing.	Mixing.	Processing.	
Village producers..		O					Village producers.
Poultry farms ..		G	O				Poultry farms.
Collectors ..				O			Collectors.
Rural dealers ..			G	O		O	Rural dealers.
Distributors or retailers.	G	G		G	G		Distributors or retailers.

G stands for carrying out these practices generally, and O for doing them occasionally.

B.—Cleaning.

It would be seen from the chart that the village or farm producers, collectors or the rural dealers do no cleaning of the eggs. This is left to the distributor or retailer. So far as the farms are concerned, on account of the better sanitary conditions, the eggs are fairly clean, and any occasional dirty or soiled egg may be cleaned by wiping it. They, therefore, require generally no cleaning. The eggs obtained from the village producers are invariably dirty; at any rate they do not always wear a clean appearance. This is due to the insanitary construction and the dirty condition of the poultry houses and the nests, where the fowls lay eggs (see plates facing this page). Sometimes it is observed, particularly in the South, that the producers keep the eggs or take them to the *shandies*, *hats* (market places) in the same basket with green areca nuts or cashewnuts. The coloured juices of these nuts stain the shells of the eggs with green or purple spots which are difficult to remove even with washing. They give an uncommon appearance to the eggs as is seen in plate facing page 100.

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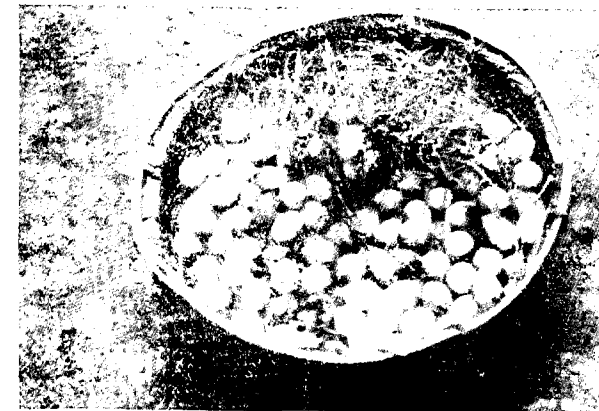
Forty-eight consignments of hen eggs and 19 of duck eggs were examined at various consuming centres and markets, with a view to studying the appearance of market eggs. The details are dealt with in the chapter on Grading and Standardisation, but the results are summarised below :—

Appearance of market eggs.

	Number of consignments studied.	Proportion of	
		Clean eggs.	Dirty eggs.
		Per cent.	Per cent.
Hen eggs	48	56	44
Ducks eggs	19	29	71
Total	67	42	58

The above figures are, if anything, below the average. By the term dirty is meant those eggs that have visible dirt, such as mud, ashes, or the shells and egg matter of the broken eggs sticking to them. Duck eggs are dirtier than hen eggs, because of the wet conditions under which they are usually kept (see top plate facing this page). The above sampling was done during the dry months of November, December and January. It is observed that during the monsoon, the conditions are much more favourable for soiling the eggs and the proportion of dirty eggs increases. One should have thought that in the circumstances a general cleaning of all the eggs was being done before they were sold ; but this is by no means the case. In actual practice the most unsightly of them alone are cleaned.

At the AGMARK grading stations, it was noticed that the egg collectors paid little or no attention to the cleanliness of the eggs, and tendered them as received from the villages. According to the grading rules the eggs have to be cleaned before they can be marked with the AGMARK seal. The cleaning is done with the help of a moist piece of felt and the eggs are dried instantly with a clean towel, or with a cleaning machine. An Australian machine was found most useful and economical. Its cost is about Rs. 200 ex-Indian ports. Hand cleaning of eggs costs about 1 anna per 400 eggs and a person at the most can clean about 1,500 eggs per day. There are a few breakages also. With the help of the machine, the cost is, however, reduced to about a fourth of the above charge, and the



A basket of dirty duck eggs.



Cleaning and sorting of eggs at consuming markets.

[Note the bucket of water used for dipping and cleaning the eggs.]



Testing and sorting of eggs by retailers.



A retail egg shop at Crawford Market—Bombay.

breakages to a negligible amount. The machine can clean 1,500 eggs per hour.

Collectors were instructed to advise the producers to change the nesting material more often and also to clean the dirty eggs before delivery. In fact, the collectors could actually see for themselves the difference between dirty village eggs and the same eggs cleaned at the grading station. It is surprising how penetrating a little propaganda could be, to improve matters in a short space of time, for although the dirty eggs have not ceased coming to the grading stations altogether, their proportion is considerably reduced.

As said before, the rural dealers who pack and send eggs to the consuming markets, also pay no attention to the cleaning of eggs. When the distributor or retailer receives them at the consuming centres, some of the dirtier eggs are cleaned for the first time. On account of the defective packing, some of the eggs break and the leaky ones further soil the others. In fact, often the eggs are not fit enough to be offered for sale unless they are cleaned. Usually a moist rag is used, but where they have stuck together, the mass is dipped in water and cleaned (see bottom plate facing page 102). In *Gujarat (Bombay Presidency)* the eggs are packed in earthen pots and when during transport some eggs break inside and on drying get jammed with others, water is put into the pot itself and the eggs are removed carefully one by one, after they are free.

It would be realised that two factors are mainly responsible for the supply of dirty eggs at consuming markets, (a) lack of attention on the part of the producers and (b) defective packing in transport which results in breakage of some and subsequent soiling of others. Much could be done by the producers, collectors and dealers to improve matters. Practical experience has shown that at least they can minimise the defects considerably, and save much trouble, delay and loss.

It must be further added that a dirty shell not only spoils the appearance of an egg and gives a doubtful indication of its interior quality, but bacteria from the dirt may permeate through the pores of the shell and affect the wholesomeness and flavour, particularly if, as is frequently the case, the eggs are also damp. Washing them with water—which is generally not changed until it is dirty and foul—impairs the keeping quality and destroys the bloom so characteristic of freshness and also gives an “eggish” smell to the washed eggs. Excessive handling also destroys the bloom, but it is difficult to hold any special body of persons responsible for this. For instance, in the absence of grades and standards or an assurance of the quality, even the final consumer may handle half a dozen eggs, before he actually buys one. He does not only pick or feel them, but may insist on dipping them in water, or might shake each one of them to feel the concussion, an excess of which is said to be characteristic of staleness.

C.—Sorting.

This term is applied in varying meanings at different stages. For instance, when applied to producers, it might mean just separat-

ing the duck eggs from the eggs of fowls. On the other hand, with a retailer it might be synonymous to a rough grading i.e., sorting for quality or size.

(1) BY VILLAGE PRODUCERS.

Badly damaged or definitely stale eggs may be occasionally sorted out by the producers. In areas of concentrated production both for fowl and duck eggs (*Travancore, Cochin, Bengal* and parts of *Madras Presidency*), the producers generally sort the fowl and duck eggs before sales. This they have to do because there may be a small difference in the price of the two. In other areas, this is not done and the few duck eggs, as said before, are sold to the collectors with the hen eggs.

(2) AT FARMS.

Most of the poultry farms do some kind of sorting or other. Since all eggs are gathered and marketed daily, they do not have any sorting for interior quality. Grading for size is, however, invariably done for selling them at different rates. This may be in two or more sizes which are decided upon by themselves. Besides this, some of the farms may even sort them for colour, as brown eggs and white eggs, if they are maintaining different breeds*. They may also sort and keep back eggs which have abnormal shapes or defective shells. Cracked or chipped ones may also be removed.

(3) BY CO-OPERATIVE ORGANISATIONS.

A few co-operative societies, etc., that exist also do the sorting of eggs on generally the same lines as do the poultry farms.

(4) BY DISTRIBUTORS OR RETAILERS.

These agencies operate at the consuming centres and receive the supplies from the dealers in the districts. They invariably sort and some even grade them for size or quality (see top plate facing page 103). A few again stamp and mark the eggs, with their own name and addresses. This is done because, between some of the retailers stale upon breaking would be replaced free of charge. As a check the consumers have however to preserve the shell bearing the stamp of the retailer, and sometimes even the contents to enable an exchange with good eggs.

If, however, the eggs are purchased unconditionally, as mostly is the case, the principle of *Caveat Emptor* applies, and the consumers cannot come back later and claim an exchange or a refund on a bad egg. Sometimes to get over this difficulty, particularly during the summer, in case only one or two eggs are purchased for immediate use, they are broken out of the shells at the shop of the retailer in a plate, etc., and only good ones with the yolk free from blemish are accepted. This system is common in *Bombay* during summer.

*The brown coloured eggs are laid by Rhode Island Reds and Australorps, and the white coloured eggs by Leghorns and Black Minorcas.

D.—Packing.

For meeting the urban demand the packing of eggs at all the rural centres is indispensable. The present methods of packing are, however, capable of considerable improvement, with a view to preventing breakages and wastage.

In this connection it might pertinently be asked if at present the eggs are packed at all. The eggs are literally placed in a rickety basket, with little or no packing material, and are covered with a thin and transparent piece of cloth. A shell of a broken egg may be tied over the cloth to indicate that the basket contains eggs. Thereafter, they are booked with a religious hope that the railways would convey them to their destination (which might often entail a transshipment at a junction), and that the overbusy station porters would give them the care of a new born babe. In some parts, e.g., *Gujarat (Bombay Presidency)*, instead of placing the eggs in a basket they are put in a highly fragile earthen pot. In this case the belief is that because it is a fragile earthen pot, the porters would give it all the necessary care and attention. In a few cases where boxes are used, they are not marked properly to indicate that they contain eggs.

If a further illustration of neglect was needed, there is the fact that instead of disposing of locally, a few cracked and badly damaged eggs are, as a matter of course, also placed on the top before packing the basket. Even the merchants at the AGMARK packing stations were at the beginning in the practice of doing this, but the practice was soon discontinued as the merchants were impressed of its futility. In other areas, there are repeated instances when the merchants at the consuming centres have to write and tell the rural dealers not to include any damaged eggs in the package.

It would however be unjust to the packers of *Travancore* and *Cochin States*, if a reference was not made here, about the comparatively satisfactory type of packing they adopt in the transport of eggs. This is no doubt greatly due to the availability of cheaper packing materials, such as bamboos, straw and coir, etc., all of which are used liberally. Their method of packing is described later. Even in these baskets occasionally there are breakages no doubt, but on the whole it could be safely said that the packing of eggs in these areas is much more satisfactory than in others and represents the best example in the whole country.

Particulars of the different types of containers used in the packing of eggs for long distance transport* are given in Appendix XXV.

(1) BASKETS.

It would be seen that the common type of container in use in India is the basket. They are generally not exclusively made for eggs, but are of the same type as used for other commodities as well. The baskets are mainly made of bamboo strips, but their rigidity, size,

*The actual distances travelled and the average proportion of loss through the breakages, are dealt with in the Chapter on Transportation.

shape and cost vary. Occasionally other materials as *pilchi* twigs may also be used for basket making. The same type of baskets or other containers are used for both duck and hen eggs.

It would also be seen that there is no standard pack for the whole country as such. Generally, it is observed that in the concentrated areas of production a larger pack is preferred, which is but natural. For instance, in *Cochin* and *Travancore*, 500 hen eggs are packed in a basket and in *Bengal* 800 hen eggs are packed in one. In other areas, 400 is the popular size, as the gross weight of such a pack is in the vicinity of 20 seers which is one of the units of railway freight.

For packing the duck eggs, although the same type and size of baskets are used, because they are bigger and heavier, a smaller number is accommodated. In *Cochin* and *Travancore*, for every 500 hen eggs only 300 duck eggs are packed, whereas in *Bengal* for every 800 hen eggs about 600 duck eggs are packed in the same size of basket.

Almost all the types of baskets in use are of a returnable type, but they are not always returned, and whenever they are, it is observed that they perform 5 or 6 trips before being discarded.

The three main types of baskets and the method of packing them are described below :—

(a) *North-West Frontier Province, Punjab, Sind, Rajputana and United Provinces*.—Shallow and light baskets made of thin bamboo strips are in use. No lids are used. The size may be 15 inches to 18 inches wide and 8 inches to 10 inches deep. The tare is from 1 to 2 seers and the cost from 1½ annas to 3 annas each. The popular size of pack is 400 hen eggs. In the above areas duck eggs are not available sufficiently to justify a separate pack. Whenever any packing material is used, it consists of hay or straw. In the *North-West Frontier Province* a special crisp quality of hay called *sargara* grass is used. About ½ lb. per basket of 400 eggs is used and its price is 12 annas per maund. The half pound grass per basket that is considered enough, can hardly cover the bottom and sides sufficiently. Sometimes during summer they use green leaves of *Shisham* (*Dalbergia Sissoo*) trees which are said to keep the eggs cool. A covering of wet gunny may also be used during summer.

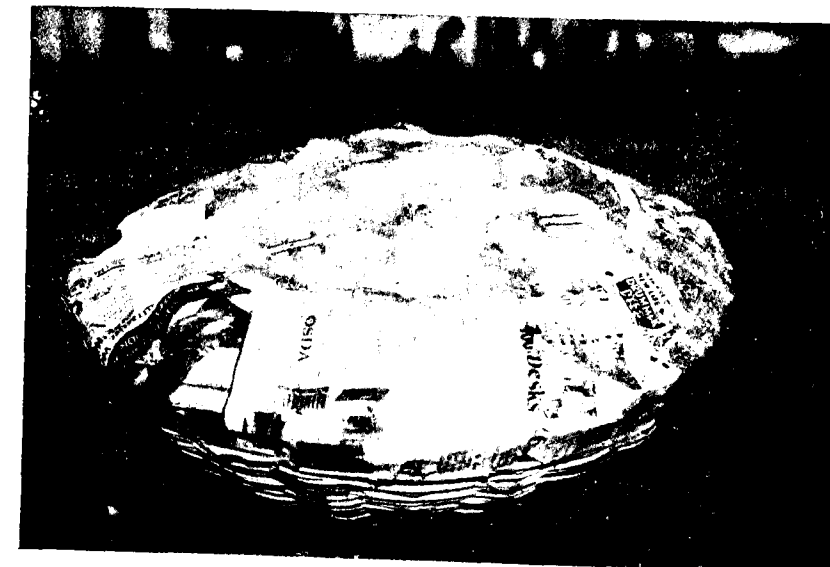
After counting and placing all the eggs in the basket, a muslin cloth (approximate cost, about 8 yards per rupee) is stitched on (see plates facing this page). The stitching of cloth is done with jute twine, and the packing could not be said to be proof against pilferage. Occasionally after stitching, the cloth is stained near the rim, so that any surreptitious attempt to open the basket may be detected. The merchants seldom put any label of their own, but with a brush write the address of the consignee in vernacular.

A packed basket of the above type is an unsafe parcel to handle. It gets easily distorted and under practical conditions it is nearly impossible to lift it without smashing a few eggs. Under ordinary circumstances the breakages range from 10 to 30 per cent. of the eggs contained. The bottom is equally unsafe and the examination of



Basket used in the North-West Frontier Province and the Punjab

[Note the flimsy muslin used for covering.]



A basket from Amroha—United Provinces

[Note the paper pasted to check pilferage.]

Facing page 107.]



Type of baskets used in Bengal.



A heap of 22,000 eggs being packed at Chengannur (Travancore State).

several baskets showed that the distribution of smashed eggs is all over, top, sides and bottom.

(b) *Bihar, Bengal and Assam*.—Compared with the first described zone, larger and reasonably stronger baskets are used in this area. The baskets measure about 24 inches across the top but are comparatively shallow, being only 5 to 8 inches deep (see top plate facing this page). They hold 600 to 800 eggs and the tare is about $2\frac{1}{2}$ to $3\frac{1}{2}$ seers. The cost is 3 to 4 annas each. The packers unfortunately do not use sufficient packing material, and the breakages range from 5 to 20 per cent. In these areas, the use of muslim cloth, in place of a lid, is not so common. Gunny cloth is used instead and sometimes even a bamboo lid may be used. Old newspapers are pasted on the stitches to prevent chances of pilferage. The pasting of paper is more common in *Bihar* where a slightly taller and pear shaped basket with a narrow top is used (see plate facing page 109). For carrying eggs on the hills in *Assam*, a special type of basket is used (see plate facing page 109).

(c) *Cochin, Travancore and Madras*.—In these areas, but particularly, in *Cochin* and *Travancore*, the indigenous method of packing is considerably improved and standardised. A deep tub shaped basket is used being about 18 inches across the top, and 12 inches deep. The tare is about 2 to 3 seers, and the cost is Rs. 20 to Rs. 25 per hundred or about $3\frac{1}{2}$ annas to 4 annas each. The baskets are generally made at *Salem (Madras Presidency)*, but the bamboo lids are made locally in the States. About $2\frac{1}{2}$ lb. of packing material (dry paddy straw) is used per basket for packing 500 hen eggs.

The method of packing is fairly uniform and where large numbers of eggs are to be packed daily in time, before the departure of the carrying train or motor bus, the packing is organised in the form of a drill. Usually the work is divided between three men. After lining the bottom and sides of the basket with straw, it is placed between two men who squat on the floor. They are surrounded with loose eggs piled on the ground or kept in baskets (see bottom plate facing this page). Each packer picks six eggs at a time (3 in each hand) and arranges them in the basket. After one layer of eggs is completed, straw is put in before another layer of eggs is laid. Five layers of eggs are put in each basket.

The merchants have also standardised the number of eggs in each layer, and this, they think, reduces the breakage. The arrangement of eggs in a basket is as under :—

Layers.		Number of eggs in each layer.
Bottom ..	..	72
2nd from bottom ..	..	96
3rd from bottom ..	..	102
4th from bottom ..	..	120
Top ..	..	110
Total ..	..	500

The above arrangement also ensures that each basket contains 500 eggs. The counting and packing up to this stage takes less than five minutes for a basket. Even here there is an unfortunate tendency to place damaged eggs in the top layer, with a view to passing them off as "damaged in transit", for which the sender is not responsible.

When the counting is over, the topmost eggs are covered with a thick layer of paddy straw. Before placing the lid two strong strips of bamboo are, however, placed at right angles. This is a very simple but extremely useful device in distributing any weight that might fall on the centre of the lid, to the sides of the baskets. The lid is then put on and is stitched to the basket with a needle. Two more strips of bamboo are put on the top of the lid at right angles but in between the quarters made by the first set of strips beneath the lid. This gives the effect of the spokes of a wheel and the strips enable the baskets to withstand side pressure also. Thin coir rope being cheap is tied closely round the basket. Any protruding ends of the bamboo strips are then sawed away and the overhanging straw neatly trimmed. Printed address labels are pasted on the lid and sides, and the basket itself may also be marked with coloured ink. Labels bearing the words "Fragile", "Eggs with care", etc., may also be pasted on.

It does not need much further explanation to realise the strength of this type of packing, and in actual practice 4 to 5 baskets are put one over the other in the brakevans without causing any damage (see plate facing this page). Breakages seldom exceed 2 to 3 per cent. or about a dozen eggs in a basket of 500 but even in these, a few may be packed as such. The cost of this type of packing is 3 annas per hundred eggs. The weight of the packed basket is 25 seers.

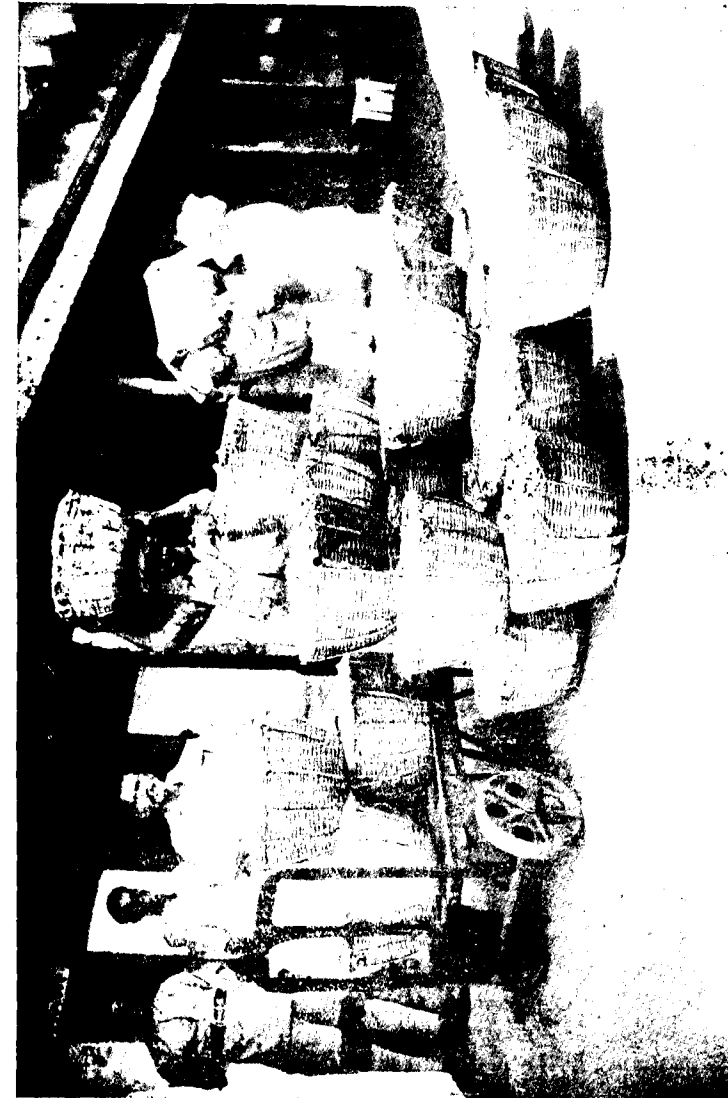
(2) BOXES.

It would be seen from Appendix XXV that, except in *Burma*, the use of boxes in India is not popular. They are reported to be occasionally used in the *Bannu* and *Dera Ismail Khan* districts of *North-West Frontier Province*, *Patiala State*, *Madras (Mylapore)*, *Chittagong* for export to *Burma* and in *Saharanpur* district of the *United Provinces*, but the number in use is extremely small.

Only a small amount of packing material (mainly straw) is used in the boxes at the bottom and top only. There is no uniformity of size, etc., as in the case of baskets. Usually, the boxes have a locking arrangement. Much information regarding breakages is not available, but it is said to be less than that in the case of baskets.

In the wholesale trade in *Burma*, boxes are the main type of containers. These are returnable and generally measure 20 inches long, 13 inches wide and 15 inches high, the tare being about 7 lb. (see plate facing page 110). The cost of each box is 12 annas, and a box with necessary repairs, performs about 10 to 15 trips before it is thoroughly renovated or discarded. Recently they have introduced the use of locks. The boxes hold 500 duck eggs and the gross weight

[Facing page 108.]



Egg baskets, being piled with safety, at Kottarakara (Travancore State).



Baskets used in Bihar.



Baskets used in Assam.

[Note the method of carrying them on the hills.]



Another type of baskets used in Assam.

is 25 viss or about 45 seers. Even in these boxes, besides having a thin layer of paddy straw, at the bottom and top, no packing material is used in between the layers of eggs or for the sides. When these boxes are conveyed by the country boats or steamers and there is not much rocking, the average proportion of breakages varies between 2 and 5 per cent. But when they are carried on carts, motor lorries or trains, the breakages are reported to be as high as 10 to 15 per cent.

(3) EARTHEN POTS AND JARS.

In inland trade the usage of earthen jars is confined to *Gujarat (Bombay Presidency)*. There is no variation in their shape or the method of packing, but occasionally a smaller pot may be used, the usual size containing about 350 eggs. The pots are made locally in the villages, are kiln-baked and are supplied with a lid at about 2 annas each. The pots are placed in a flimsy type of bamboo basket, with a little hay or straw in between. To prevent tipping, a ring made of hay is tied to the bottom of the basket and all the three (ring, basket and pot) are secured together with thin rope, made of a special dried grass, called *munj*. In tying up the ropes, two handles are also made for lifting the pot. The cost of the basket and tying, etc., is about 6 pies only.

The eggs are placed inside the pot by count. Here also a few damaged eggs are, as a rule, put on the top. The lid, which is also of baked earth, is then placed inverted and secured with string. To cover the visible string, strips of paper are pasted round. The address and contents are written on the pot itself.

Breakages are of course frequent, even a complete smash up being not uncommon, and sometimes it is difficult to have even 100 whole eggs from a lot of 350. The centre plate facing page 110 illustrates a pot which was damaged in transit, and on examination it was found that 30 per cent. of the eggs were either cracked or completely damaged. All the remaining eggs had to be soaked in water and washed before they could be sold. The cost of packing eggs in pots amounts to about 1 anna per hundred.

For packing and transport of eggs sent in lime pickle to *Burma*, from *Bengal* and *Madras*, large heavy earthen jars are used. They are about 40 inches high and have a diameter of about 28 inches, at the widest part in the centre. Those sent from *Bengal* are not so high, and are more round in shape. The sides are about $\frac{3}{4}$ inch thick. The neck has an opening of about 8 to 9 inches. The cost of the jar with a flat lid is about a rupee.

Before use the jar is soaked in water for an hour or two. This is done to prevent the jar from absorbing moisture of the lime pickle and rendering it dry. It is then covered from outside with coils of twisted paddy straw (in the form of a long rope) up to about 6 inches from the top. The covered jar is rested on a thick padding (ring shaped) of straw and this is secured to the jar by means of strong ropes. Two rope handles for loading and unloading at the docks are also provided. (See plate facing page 110.)

A jar generally contains about 3,500 hen eggs and 2,500 duck eggs. These eggs are packed in a lime pickle. They may also be packed in an earth and salt mixture. After the jar is full, the lid is tied on and is covered with a piece of gunny. The number of eggs inside the jar is indicated by the number of lime dots put on with finger prints, each representing 100 eggs.

When these jars reach *Rangoon*, they are often to be transported to markets inland. It is reported that on the average the percentage of broken eggs is usually higher than is the case with the boxes, which is for land transport 10 to 15 and water transport 2 to 5. Cases of the jar being completely broken with the contents are also not infrequent, especially in the case of motor lorry or rail transport.

Empty jars are usually not returned to India, but are disposed of at about 8 annas each and are utilised for storing water, etc.

The cost of packing eggs in a jar is as follows :-

			Rs.	A.	P.
Cost of jar	..	..	1	0	0
Gunny bag, etc.	..	..	0	0	6
Seat for the jar	..	..	0	2	0
Rope and straw, etc., for tying	..	..	0	8	0
Labour for tying, etc.	..	..	0	3	0
Total	..	..	1	13	6

(4) COMPARATIVE EFFICIENCY OF THE PACKINGS IN USE.

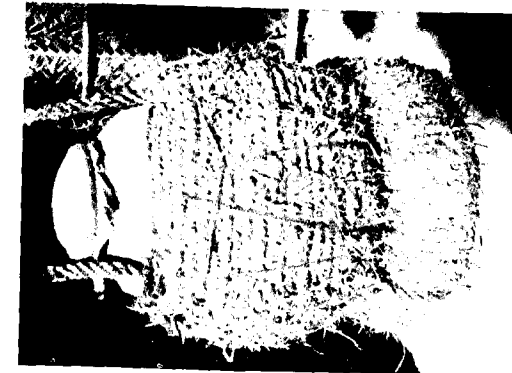
The table below summarises the cost of packing, the approximate tare and the usual breakages for the different types of containers and packings used in the trade :-

Comparative cost and efficiency of the different types of packing.

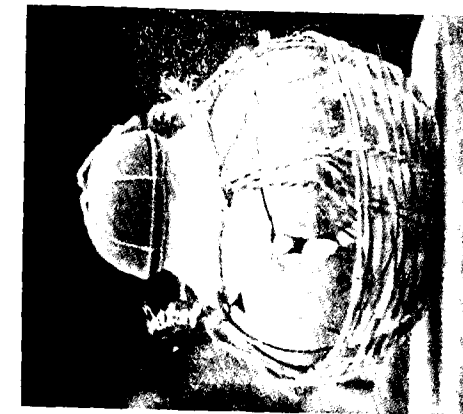
—	Type of container.	Standard contents.	Approximate cost of packing per hundred eggs.		Approximate tare of container, etc. per hundred eggs.	Gross weight (packed).		Approximate breakages in eggs.
			As	P.		Mds.	Srs.	
Northern Zone* ..	Basket ..	400	1	0	16	0	20	10 to 30
Eastern Zone* ..	Basket ..	800	1	6	22	1	0	5 to 20
Cochin and Travancore.	Basket with lid	500	3	0	26	0	25	2 to 3
Burma ..	Wooden box (returnable).	500	0	6	40	1	5	5 to 10
Gujarat (Bombay Presidency).	Earthen pot ..	350	1	6	18	0	20	10 to 25
Burma export trade	Earthen jars ..	3,000	1	0	42 (including the pickle).	5	0	5 to 10

*For the purposes of this chapter the Northern Zone stands for North-West Frontier Province, Punjab, Sind, Rajputana and United Provinces, and the Eastern Zone for Bihar, Bengal and Assam.

[Facing page 110.]



Earthen jars used for transport of preserved eggs to Burma.



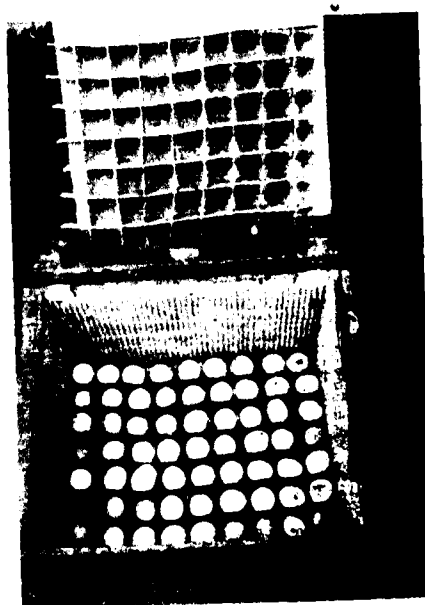
A damaged pot of eggs, used in Gujarat (Bombay Presidency).



Boxes used in Burma.



Basket used at some farms.



Box used at some farms.

It would be seen that the packing as used in the *Northern Zone* is no doubt cheap and of the lightest type, but it is most unsafe and the percentage of breakages is highest. Therefore in actual results it is the most expensive type of packing in use. The *Cochin and Travancore* packing, although it costs 2 annas more to pack per 100 eggs, is the most efficient packing employed, the breakages being next to nothing. The jar as used in the *Burma* export trade, has the heaviest tare (including the pickle), but its cost per hundred eggs ranks it amongst the cheapest type of containers. The extra tare cannot be helped, as a basket cannot take the place of a jar, where the eggs are to be packed in a liquid pickle.

(5) PACKING OF FARM EGGS.

Production of eggs on the farms being small, most of the eggs are sold locally without any packing. Some of the farms, however, have an out-station trade in improved table eggs. They also send out eggs for hatching, and these are generally sent by parcel post. Different methods are in use, but the common practice is to wrap each egg in tissue paper,* then in brown paper (or even in newspaper) and pack the lot in straw, in a bamboo-strip basket. As a precaution the eggs for hatching, which are expensive, are put in a card-board box and the box is packed in a basket amidst straw. Generally a basket with a handle on the top is used, as it not only facilitates its carrying about, but the handle prevents any other package being put on the basket while in transit. Suitable labels are also used (see top plate facing this page). Sometimes, two wooden frames are also fixed to the basket to serve as a protective crate. Some of the co-operative societies also adopt methods of packing eggs similar to those at the farms.

Some of the larger farms use a returnable wooden box with card-board partitions to hold individual eggs separately in position (see bottom plate facing this page).

E.—Testing.

By this is meant examining the eggs for interior quality, freshness, etc. It is, however, noticed that wherever it is practised, it is mainly done only during the summer months. During winter the buyers and sellers like to imagine that the eggs are fresh, testing being done only in exceptional cases, and they leave it to the consumer to find out the truth. The village producers of *desi* eggs do no testing at all. On account of the fact that the poultry farms generally sell away all their improved eggs within a day or two of production, they do not consider any testing necessary. Some of the more important farms, however, test the eggs when selling them for hatching purposes.

(1) BY COLLECTORS.

It is claimed by many collectors and egg merchants, who have long experience in handling eggs, that they can detect a bad egg at

*At *Martandam Co-operative Society (Travancore)*, papers of different colours are used for wrapping eggs of different grades.

sight without performing any test at all. This may be true to a certain extent, but it is noticed that the ideal of freshness varies with different persons. Only during the summer months, some collectors may occasionally test the eggs at the time of purchase from the villagers. For this, they generally adopt one of the two methods.

The more commonly used method for testing is a crude form of the conventional candling method. The difference is that artificial light is not used but the contents may be examined against sun light. Some hold 3 eggs in the hand while others hold one at a time and examine the contents against sun light, by closing one eye.

The second method in use, which though crude and slow yet comparatively accurate, is that of placing a few eggs in a dish of water. A new laid egg will lie nearly flat on the bottom of the dish, but if the contents of the egg are slightly evaporated, the large end (which has the air space) will rise up. This tendency to rise or tip increases with the degree of evaporation, and a badly evaporated egg will rise to the surface of the water. Increasing the density of water through addition of a little salt to it (which is done only occasionally) helps the eggs to rise easily.

It must, however, be pointed out that a partially evaporated egg is not always old, for if an egg remains in the sun even for a short while, the evaporation of the moisture content may be fairly rapid and it will rise when dipped in water. In this connection it is observed that at railway stations the egg baskets are occasionally left in the sun and the effect of this on the market quality is considerable. This seems to indicate the absence of proper instructions to the station staff in this direction.

According to certain authorities*, every hour during which an egg is held at incubation temperature (95° F. to 110° F.), seriously affects its quality. If the egg is fertile and has a white shell, a candler can ascertain, after only five hours of incubation, that the egg has been exposed to high temperature. He can detect a tiny embryo on the upper surface of the yolk, and the yolk would be noticed to float closer to the shell than in the fresh egg. When the egg is broken open, it will be noted that the yolk appears a little darker and that an indefinite ring is beginning to form around the germinal disk. This egg is, however, still suitable for food purposes.

(2) BY RURAL DEALERS.

During summer, the rural dealers who assemble the eggs may test them before they are packed for distant markets.† The general method is that doubtful eggs are first picked out, and only these are candled. On account of the time it takes, they do not apply

*Marketing Poultry Products—Benjamin and Pierce.

†By distant markets is meant a place reached by rail journey in 30 to 40 hours, or a distance of 800 to 1,000 miles.

the water test. Candling is done in slightly better conditions, inasmuch as they may have in a darkened room with an electric or kerosene light, the latter being more common. The operator squats on the ground with baskets of eggs around him and examines the doubtful eggs before the light. He can candle 800 to 1,000 eggs per hour, or about 5,000 to 6,000 eggs per day. He generally looks out for the meat spots or other blemishes, e.g., blood rings, etc., but does not generally take into account the depth of air space.

(3) BY DISTRIBUTORS OR RETAILERS.

They generally candle the eggs only during the summer months and any doubtful lot of eggs during winter also. Some times they keep a dish of water and show the quality of eggs before sales to the consumers.

One main and indispensable object, however, of candling or testing the eggs by the distributors at all the important consuming centres, is to adjust the daily issues to the retailers or large consumers. For example, they may receive large consignments from various districts. They, therefore, test each egg and sort them out into 2 or 3 grades according to interior quality. This helps them to quickly dispose of those eggs which do not admit of any storage, perhaps not even for a day. When they are being sorted out for interior quality, the operator might also sort them out for size, for which purpose he has several baskets kept around him.

F.—Mixing.

All the important distributors and sometimes even the retailers mix eggs from different areas to make up an assortment, with regard to size or interior quality. For instance at *Bombay*, comparatively small eggs from the South may be mixed up with the larger *Gujarat* or *North-West Frontier Province* eggs, to average the sizes. In retail trade, a few under-quality eggs may also be mixed up with comparatively fresh eggs, to make up a dozen of fair average quality. Duck and guinea-fowl eggs may also be occasionally mixed. Mixing is also done sometimes to adjust the price. If a consumer wants, say, 2 annas worth of eggs and for that sum wishes to have 3 or 4 eggs, then an assortment of different sizes and quality may be given to suit the purchaser's requirements.

The details of quality (interior and size) and the results of the various tests are dealt with in the chapter on Grading and Standardisation, but it may perhaps be realised that the absence of proper grades and standards, causes considerable loss of time and energy at various stages in the marketing of eggs.

G.—Processing.

The entire export trade to *Burma* is of preserved eggs, and except for meeting this demand, no processing of the eggs is generally done in India.

(1) LIME PRESERVATION.

In this particular trade, processing consists of preserving the eggs in a lime pickle. Sometimes earth and salt are also used, but this method is not very common and is used mainly for preserving hen eggs.

For preparing the lime pickle either ordinary lime or lime made from shells may be used. The exporting merchants at *Chit-tagong*, *Daulatganj*, *Cocanada* and *Madras*, which are the main places where this processing is done, generally possess small *pakka* tanks about 3 feet long, 3 feet wide and 2 feet deep. The lime is soaked in water for 4 to 5 hours in the tank. About 12 to 14 seers of lime is required for one jar holding about 2,500 eggs. As an alternative, 6 to 8 seers of salt with equal weight of earth (clay) may be used.

Sufficient water is put in and the lime mixture is worked up to the consistency of cream. Sometimes the eggs are put into the tank and smeared with the pickle before being put into the prepared jar (see top plate facing this page). Or they may be put into the jar in batches and the pickle poured in. The operation is repeated till the jar is full. Thereafter the lid is secured and the jar is ready for transport.

Before being preserved, the eggs are usually examined and no cracked ones are put in. The following is the cost of preserving a jar of about 2,500 eggs :—

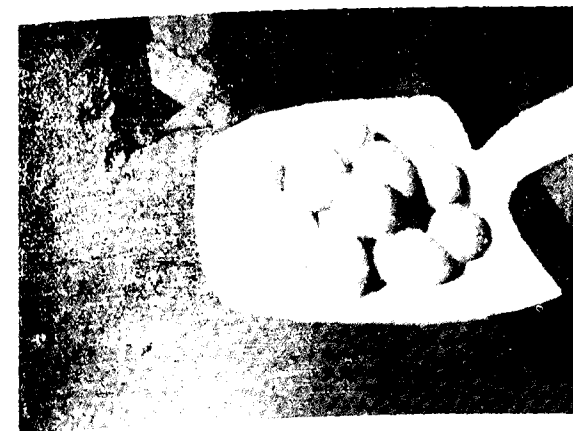
Cost of 12 seers of lime or 6 seers salt ..	Re. 0 12 0
Labour for making the pickle, etc., and filling the jar ..	Re. 0 3 0
	Re. 0 15 0

It is said that by the above method the eggs could be preserved for 2 to 3 months. By the time the jars reach *Burma*, the whole mass inside becomes a solid block, with lime acting as cement. For relieving the eggs water is poured into the jar and the eggs are taken out only as required for daily sales. The lime is scraped off the shell and the eggs are cleaned dry with a piece of coarse gunny (see bottom plate facing this page).

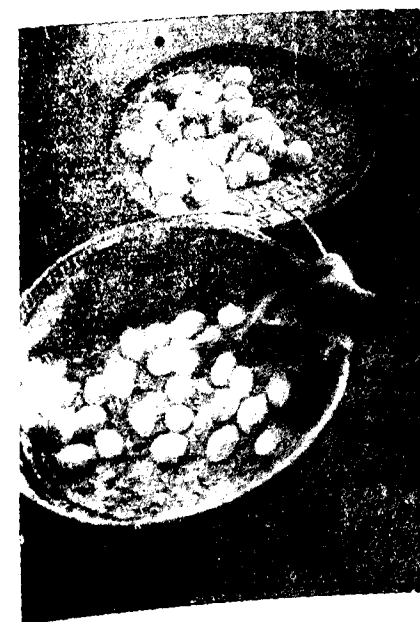
The lime pickled eggs have a distinct bleached appearance and chalky taste, but on cooking the taste is said to disappear.

(2) BOILED EGGS.

During winter, in most of the towns and cities of *Northern India* the tea shops and restaurants sell hard-boiled eggs. They are also available at the tea-stalls at most of the important railway stations. A few merchants from *Multan* (*Punjab*) send during the



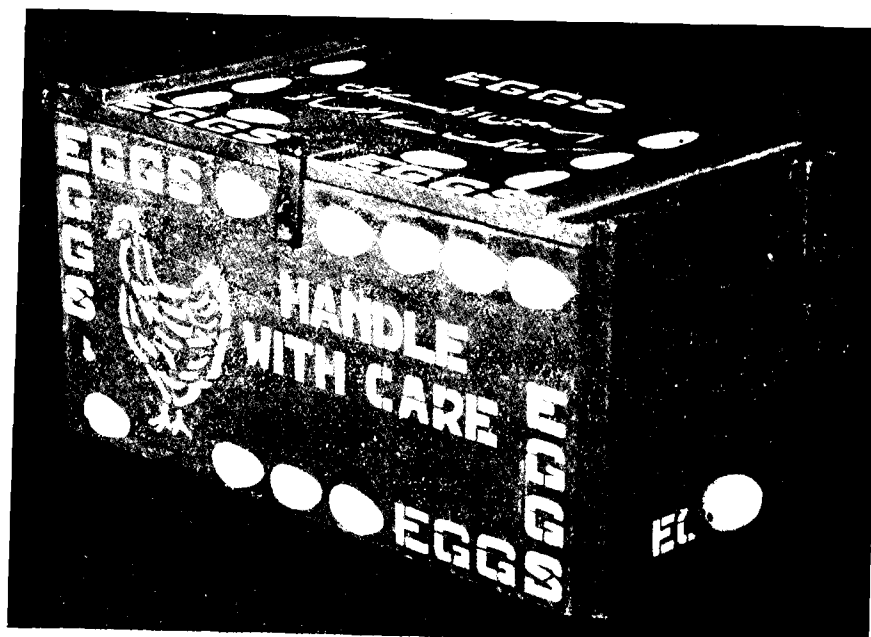
Eggs smeared with lime pickle, before export to Burma.



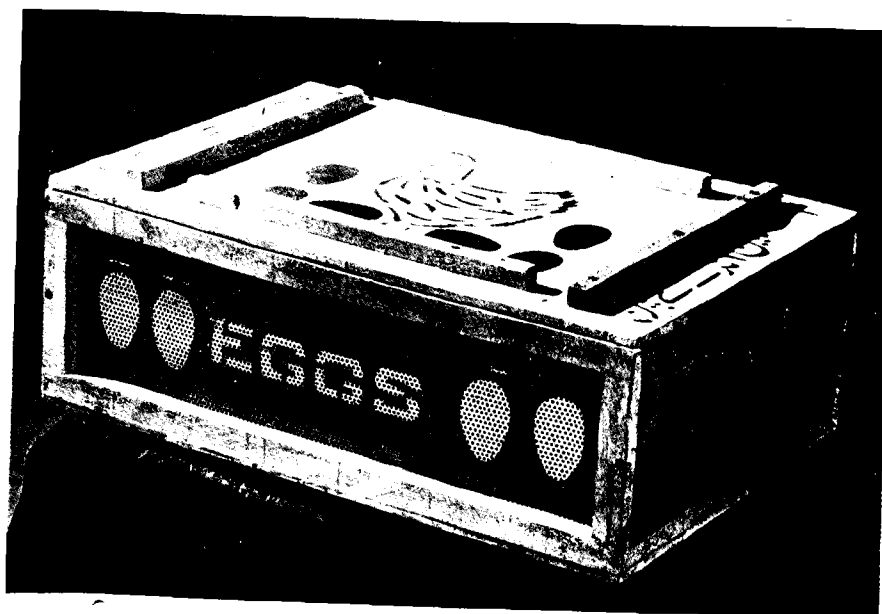
Lime being scraped off from pickled eggs.

[Note the cleaned eggs in the tray on the top.]

Facing page 115.]



An improved type of container.



A revised type of container.

summer months of May to August, baskets of boiled eggs to *Hyderabad (Sind)*. In boiling the eggs no special equipment is used but they are usually boiled in a pan of water for 2 to 3 minutes. Nor are eggs tested for quality before boiling, but it is said that the boiling prolongs the life of the eggs. The merchants do not charge anything extra for this processing.

At present, no doubt, there is not much trade in boiled eggs as such. But on page 44 it has already been pointed out that most of the eggs used for cooking and making of curries in Indian households, are first hard boiled. Boiling the eggs makes them considerably less fragile for packing and transport purposes, but, what is more, it eliminates spoilage in transit and prolongs their life to some extent.

In view of these propositions, investigations into the best process of boiling them to obtain maximum results, are not only of urgent importance but are likely to repay the trouble and indicate a useful line of development. Perhaps the addition of some preservative to the boiling water may help the problem of storage and preservation further. The water may also have to be slightly and suitably coloured, to stain the shell and indicate that the eggs are boiled and not raw.

H.—Improvement of containers.

Particulars regarding the breakages of eggs during transport are given in the chapter on Transportation (see page 151). From a study of 39 consignments it was observed that the extent of damage was over 16 per cent. Distances or time taken in the journey and the number of times the packages are handled *en route*, no doubt, have a certain effect on the extent of damage, but it is observed that the method of packing is more responsible for breakages rather than any occasional neglect on the part of the carrying agencies.

How defective the present methods of packing are in certain areas has already been described. It is also observed that when the eggs are properly packed, the breakages are reduced considerably. Therefore, for a fragile commodity like eggs, if adequate safety is to be ensured, it is evident that more attention must be paid to the selection of the container and to proper packing.

It has been pointed out on page 43 that about 9,035 lakhs eggs are consumed annually in the urban areas of India. At least two-thirds of this number (or about 6,023 lakhs eggs) are brought in from the rural districts and are given some kind of packing. It is shown on page 72 that the damaged eggs bring in at the most only about 33 to 50 per cent. of the price of whole eggs. In other words, a rupee's worth of whole eggs, when damaged, fetch only 5 to 8 annas. Therefore, the trade actually suffers a loss of 8 to 11 annas in every rupee's worth of whole eggs, if they are damaged

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in transit on account of defective packing, etc. It is estimated that about 722 lakhs eggs get damaged annually during transit and on this basis the annual loss to the trade by disposing of them at half the price ($2\frac{1}{2}$ annas per dozen instead of 5 annas) is therefore about Rs. 9.4 lakhs. The indirect loss caused to the other whole eggs, by reducing their keeping quality on account of washing, etc., and the labour involved in the operation, is, however, additional to the above direct loss in revenue. The total loss on account of bad packing must, therefore, be somewhere in the neighbourhood of 15 lakhs of rupees annually.

It does not need anything further to indicate how urgently necessary it is to carry out experiments in different areas and conditions, with a view to devising improved containers and methods of packing. The extension and introduction of the *Cochin* and *Travancore* type of basket and packing should receive serious consideration in the first instance.

A short trial already carried out with specially designed returnable box containers (see plates facing page 115) at the *North-West Frontier Province* grading station, has already yielded most encouraging results. There was no appreciable increase in the forward freight, and even taking the freight on the return of the empty boxes (at $\frac{1}{4}$ parcel rates) into account, the net gain was greater by about 5 per cent. through reduction in the breakages, as compared with the eggs sent in baskets.

The details of the experiment are given in Appendix XXVI.

I.—AGMARK eggs.

At present the preparation for market of AGMARK eggs in accordance with the rules made under the Agricultural Produce (Grading and Marking) Act, 1937, is done at the producing areas and also at consuming centres. Among the first are *Peshawar*, *Mardan* and *Havelian* in the *North-West Frontier Province*; *Etah* and *Rampur* in the *United Provinces*; *Chinnaganjam* in *Madras Presidency*; and *Quilon* in *Travancore State*. At the consuming centres, grading is done at *Delhi*, *Lucknow*, *Bareilly*, *Calcutta* and *Bombay*. The details of the actual methods of grading and packing are, however, given later in the chapter on Grading and Standardisation.

The AGMARK eggs are at present packed in baskets, which are also sealed with the AGMARK label. All that the merchants receiving the baskets at the consuming centres have, therefore, to do, is to open them and sell the eggs at one. No cleaning sorting or testing is necessary. For the guidance of the trade and the consumers, each egg bears on its shell its grade mark, e.g., SPECIAL A. B. or C. and the word AGMARK. If necessary, the purchaser may see the AGMARK label indicating the date and particulars of the package.

[Preparation for market.

INTER-CHAPTER FOUR.

Owing to the unsatisfactory nesting arrangements more than half the hen eggs put on the market are dirty and unclean looking. The condition of duck eggs is even worse. The presence of this dirt affects the quality and flavour of the egg even after washing, unless this is carefully done at a very early stage. Very little sorting of eggs is done by producers or village collectors apart from separating the duck from the hen eggs and removing a few of the more obviously damaged or stale ones. Some of the wholesale distributors on the other hand do a certain amount of grading and a few stamp the eggs with their own name and address. This latter measure is generally adopted as a safeguard only by those who are prepared to replace stale eggs purchased by the consumer. The proper grading and packing and the removal of stale eggs by means of candling is so far carried out only by a few merchants and at the AGMARK grading and packing stations which have been established under the Agricultural Produce (Grading and Marking) Act, 1937.

Packing is generally done in baskets which, as a rule are much too fragile for the contents. It is customary to put the eggs in the baskets without any packing material being used between the eggs. Great faith and confidence has, therefore, to be placed in the transport agency. The baskets are, however, so lacking in rigidity that it is almost impossible to pick them up without breaking some of the eggs. This particularly applies to the type of basket in common use in the north where under ordinary circumstances, the breakages range from 10 to 30 per cent. in the course of a journey.

The baskets used in the south are obtained mostly from *Salem*. They are more rigid and have bamboo lids.

The use of a small amount of dry paddy straw as packing is also a factor which keeps down the low rate of breakages found in the case of these baskets. Earthen pots and jars are frequently used particularly for the packing of pickled eggs for export to *Burma*. Only in a few places are boxes to be found in the trade.

At present the damage done owing to defective containers amounts to about Rs. 15 lakhs per annum. Much therefore needs to be done to bring about a more extended use of rigid containers—preferably boxes—and of packing material between the different layers of eggs. The small amount of experimental work which has been done indicates that by improving the container a net gain of 5 per cent. in price returns can be obtained through a reduction in breakages. This taken in conjunction with the 20 per cent. improvement obtained for graded, as compared with ungraded eggs, shows that the establishment of grading and packing centres would be a very paying proposition for producers.

CHAPTER V.—ASSEMBLING AND DISTRIBUTION.

A.—General.

In a sub-tropical country where the shade temperature is often above incubation point (103°F. to 105°F.), the speedy and efficient assembling and distribution of eggs from the nest to the kitchen of the consumer is most important. Consumers are in many cases unable to obtain eggs in a tolerably fresh state. This is mainly due to defective assembling and distribution.

Approximately 32,809 lakhs eggs are produced and collected annually in India and are disposed of roughly as under :—

	Eggs (in lakhs).	Percentage to total.
Retained for hatching	6,091	18.6
Retained by producers for eating	5,961	18.2
Marketed in rural area	11,440	34.8
Marketed in urban area	9,035	27.5
Exported	282	0.9
Total	32,809	(100)

For the first two items, i.e., eggs used for hatching and those used in the households of the producers, it is obvious that practically no assembling or distribution is needed. If sometimes, however, a person in rural or urban area needs any *desi* eggs for hatching, he usually gets in direct touch with a producer, and obtains them without any intervening agency.

Of the eggs that are actually marketed, it would be observed that the amount consumed in rural area is greater than that in the urban. In the former, however, the consumers are generally within easy reach of the producers and as such direct distribution by the latter takes place. No assembling either is necessary, but sometimes a producer may, besides selling his own produce, also collect eggs from his neighbours, and dispose them of either through a weekly market place such as a *hat* or a *shandi* or through hawking. In any case, on account of the fragmentary nature of the business there does not exist any clearly defined system of assembling or distribution in the rural areas. This would be more easily appreciated when it is read together with the fact that in the rural area, the per capita consumption of eggs amongst the egg eaters is just 20, whereas on the basis of the entire rural population it is only 6 eggs per annum (page 43).

It, therefore, follows that whatever assembling and distribution there does exist, it is only for meeting the urban demand of about

9,035 lakhs eggs or about 27.5 per cent. of the production, and a further 282 lakhs eggs (or about .9 per cent.) for the export trade. This demand is met mostly from the loadings made at assembling centres (inter or intra provincial), but a part of it may also be met from the supplies assembled by local (semi-urban) assemblers who are usually also the distributors.

The channels of assembling and distribution vary in different areas, but not rigidly. For instance, at the peak of production, the producers may bring eggs to a weekly or daily market where they are assembled, whereas under normal times they may be sold to the collectors who call round the villages. It is also observed that in some instances there is a greater number of agencies, and the diagram facing this page illustrates the most common channels of assembling and distribution of eggs for meeting the urban demand.

It would be noticed that there are the two most important assembling agencies, viz., (1) the village egg collectors, and (2) the assembling merchants. In between them there are the weekly and bi-weekly markets. There are also a few producers' co-operative societies that do the assembling of eggs, but the trade handled by them is insignificant. A few persons are also engaged in collecting the eggs from the producers and selling them directly to the consumers, generally through hawking. These agencies, as shown in the diagram, generally reside in the towns and meet the demand of eggs and poultry as well.

On the distribution side there is mainly one important agency, viz., the wholesale distributors who sometimes may also be retailers. Persons functioning purely as retailers are comparatively few.

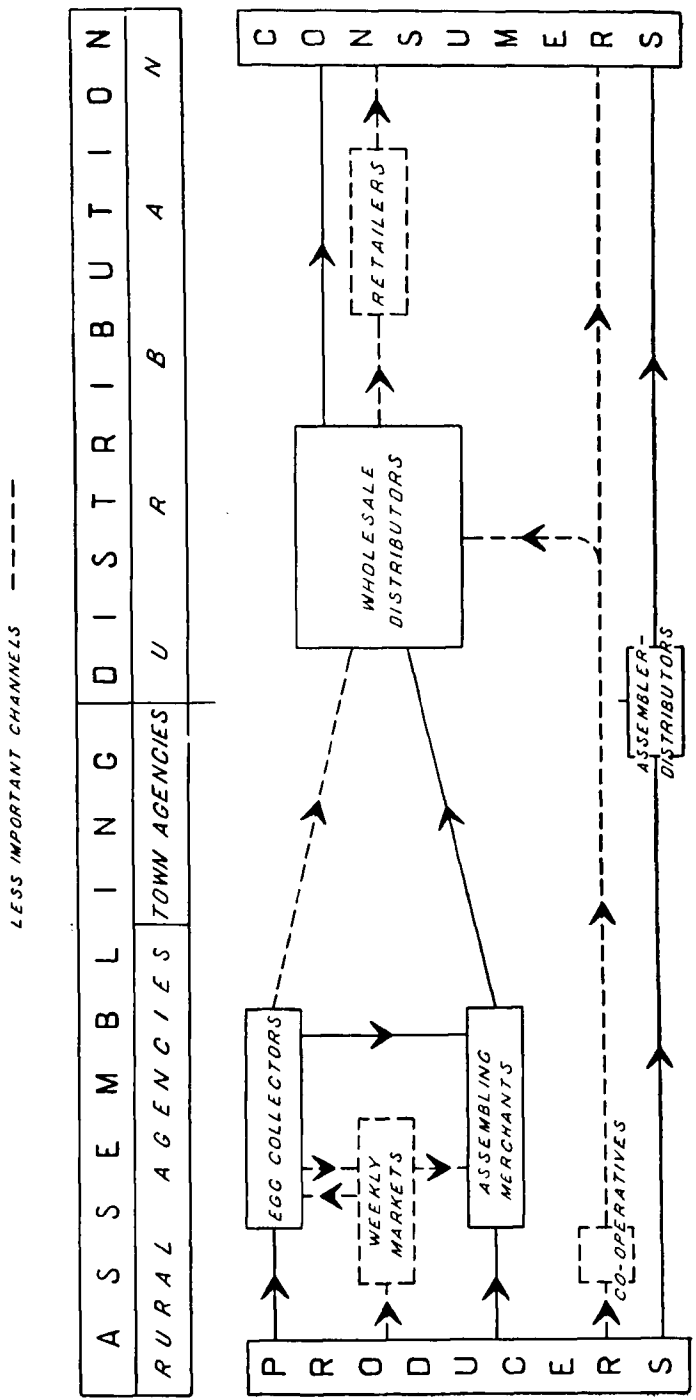
B.—Assembling centres and weekly markets.

The items connected with assembling of eggs are carried out at or near the assembling towns or weekly markets, where the assembling merchants usually operate.

(1) ASSEMBLING CENTRES.

There are many assembling centres that are of local or provincial importance only. In other words they do not despatch any eggs to inter-provincial or State consuming markets. In Appendix XXVII are given some of the more important ones that are of a commercial importance, and it would be seen that there are at least 147 centres where on an average approximately more than 3,000 eggs are assembled daily for the purpose of local consumption and despatches to other centres. Most of the consuming cities such as Lucknow, Lahore, Poona, etc., are also important assembling centres, but these have been left out of the Appendix, as the assembl-

COMMON CHANNELS OF ASSEMBLING & DISTRIBUTION OF EGGS
FOR MEETING THE URBAN DEMAND.





A scene at a weekly market.



A typical village collector of eggs and poultry.

[Note the fowls underneath one of the baskets.]

ing is only of local importance. The 147 centres may be grouped as under :—

Eggs per day.	No. of centres.
About 3,000 per day	18
3,000 to 5,000 per day	56
5,000 to 10,000 per day	33
10,000 to 25,000 per day	35
25,000 to 50,000 per day	4
Above 50,000 per day	1
Total	147

It would be observed that the number of centres assembling 3,000 to 5,000 eggs per day is the largest. It may, however, be mentioned that the location of an assembling centre is not a fixed one. For instance, the AGMARK grading station in the *North-West Frontier Province* was first started at *Pabbi*, some 14 miles from *Peshawar*, but after about a year's working it was decided to shift it to the district headquarters at *Peshawar*. This was carried out without the slightest inconvenience, and the assembling is being done at *Peshawar* just as well as it was done at *Pabbi*. The above state of affairs is true of most of the centres, unless there are some special features such as a ferry or a bridge across a river or an important weekly market place, where it may not be possible to change the location of assembling centre easily.

This would show that in selecting a place for establishing an egg freezing factory, etc., it may not be necessary to lay too great an importance on the present location of an assembling centre, and if some of the other important facilities (e.g., transport, electric power, etc.) are available, the egg centre could be conveniently shifted to any place within a reasonable distance, without much difficulty.

(2) WEEKLY OR BI-WEEKLY MARKETS.

A reference has already been made about the weekly or bi-weekly markets. These are the places where the village people assemble periodically, generally once or twice a week, to sell or purchase the necessities of life or other articles. The number of people that gather at such markets may range from 300 to 3,000, sometimes even more.

The weekly markets are called *hats*, *penths*, *shandies*, etc., in different areas. Sometimes they are known by the day of the week they are held on, e.g., *Itwari* (from *Itwar*—Sunday) or *Shukkerwari* (from *Shukkerwar*—Friday), etc. At these weekly markets, all sorts of commodities including eggs, poultry and game are brought for sale. In some areas these markets form important assembling centres

for eggs. Sometimes a producer may have to walk ten miles to sell only a dozen eggs. But such cases are rare, and usually he also brings other commodities, *e.g.*, parched rice, poultry, vegetables, goat and sheep, etc.

The *hat* is an important event in the countryside, particularly for the women-folk who make all their purchases there. For the men too, it provides a common meeting place. The bazaar meets early to enable visitors from long distances to return to their homes during light. It is also noticed that the prices usually drop after about 3 P.M., as the people are in a hurry to sell off what they brought.

It is, however, observed that the system of holding weekly or bi-weekly markets, and selling the produce through them, is generally more prevalent in the south and east than in the north and west. For instance, it is observed that in *Kashmir, North-West Frontier Province, Punjab, Patiala State, Sind and Rajputana*, there are very few weekly or bi-weekly markets, if any. On the other hand, the weekly markets are quite an important feature of marketing in the south and east, as would be seen from the figures that are available for a few areas.

No. of weekly or bi-weekly markets.

Bombay Presidency (excluding the Deccan States)	965
Madras	852
Travancore	600
Bihar and Orissa	2,900
Bengal	5,860

Besides these there are also 695 fairs* in *Bihar and Orissa*, 960 fairs in *Bengal*, 1,110 fairs in *Bombay Presidency* and 538 fairs in *Burma*.

At most of the weekly markets, besides other commodities, eggs are assembled regularly. At some only 200 may be assembled but at others as many as 10,000 to 20,000 may be brought for sale. For instance, there are about 600 weekly markets in *Travancore*. These form important centres for assembling the eggs and at some of the more important ones 20,000 to 50,000 eggs may be assembled, *e.g.*, at *Karuugal, Thoduvetty, Kaleekavilla, Aralmoodu, Sasthamakotta, Paracode, Mavelikara, Edathuva, Chengannur, Chenganacherry and Kottayyam*.

Ownership and charges at the weekly markets.—The weekly or bi-weekly assembling markets are generally open spaces with some kind of temporary arrangements for providing shade during summer and rains. They are situated generally near a main village road, tank or some place of religious sanctity, *e.g.*, temple or well, etc. Some of them may have raised mud platforms on which the pro-

*Fairs or *melas* as they are called, are usually religious in origin, but besides the particular sacred purpose for which the people congregate, they afford an excellent opportunity for people to buy and sell goods of all kinds, eggs included.

ducers squat with their produce. There may, or may not, be separate sections for different commodities and a man or woman may sell paddy, some vegetables, poultry and eggs, all from the same place (see plate facing page 121).

The market places usually belong to private persons, District Boards, village *panchayats** or the States. There are no fixed rules about the charges. Some of the markets do not charge any fees at all. Sometimes they charge 1 pice to 1 anna per head load of produce. They may or may not charge on eggs, as their number per seller is small. In *Bombay Presidency*, there is only one weekly market at *Rahuri* where a charge of 1 pice per dozen eggs is made. At *Cochin* there is no charge up to 4 annas worth of eggs (18—25) but above that number 4 to 6 pice per hundred eggs are charged. In *Travancore* the right of collecting the tolls at markets is sold by annual auction to a licensee, and his charges are prescribed in a schedule. In the case of eggs, a producer bringing 7 to 10 eggs pays about 1 pice, but when a larger number is brought the charges are proportionately less. In *Orissa* also, the charges vary from 1 pice to 1 anna per producer, according to the space he occupies. In *Assam*, if a person does not occupy any space in the market place but goes round selling the eggs, he does not pay any charge at all. In case he sits down and occupies a space, he may be charged 2 pice per day.

C.—Agencies operating at the assembling centres.

At the assembling centres two principal agencies generally operate, *viz.*, (1) the village egg collectors, and (2) the egg dealers or merchants. A third agency, consisting of a few co-operative organizations (seven in number), has also taken up the assembling of eggs.

(1) VILLAGE EGG COLLECTORS.

The term “village egg collectors” is plain enough to signify the type of service these persons render. The work is generally carried out by men but in some of the areas women have also been known to collect eggs. The egg collectors are the primary agency for collecting a few eggs from each household in the distant villages and for assembling them in large numbers at convenient centres. They may also collect poultry with eggs.

There are generally two types of egg collectors: (a) collectors working independently, and (b) collectors working for the merchants.

(a) *Collectors working independently.*—This is the more common of the two. They generally work on their own capital, make their own “rounds” of villages, and also make their own arrangements for disposal of the eggs. Unless there are strong reasons for dealing with more than one or with different dealers at a

*The word *panchayat* literally means a body of five (*panch*—five) but there are in some villages small local committees of 5 or 7 or 9 men who take charge of common funds of the village and look after local self-government on a small scale.

time, it is found that they dispose of the eggs collected by them through only one dealer.

(b) *Collectors working for the merchants.*—They are met with mainly in *Delhi Province, Baroda, Bombay Presidency, Travancore, Madras and Bengal*. They are fewer in number as compared with the other class. They work either on wages or on commission basis, and have more intimate financial relations with the merchants than the first class. Each one is generally bound (not in writing) to collect and supply eggs to only one merchant with whom he has a contract. The daily rates of purchase of eggs from the producers are indicated to the collectors by the merchant, but the rate of commission does not vary and is generally from 4 annas to 6 annas per 100 eggs. If a collector is given a monthly wage, it may be Rs. 7 to Rs. 10, with or without a small commission. In such a case he would have to collect daily an agreed number of eggs.

(2) ASSEMBLING MERCHANTS.

The assembling merchants are the second step in the assembling of eggs. It is seen that, on the whole, there is a large number of smaller assembling centres, where a merchant handles 1,000 to 3,000 eggs per day. Therefore at each centre of an average size there are three to six assembling merchants.

As described above, the merchants obtain the bulk of their supplies from the egg collectors. A merchant may have several egg collectors operating for him. It is also noticed that in certain instances, particularly in the case of duck eggs in the concentrated areas of production, the merchants may have direct connection with the larger producers. In such cases the merchants give direct cash advances to the producers.

(3) CO-OPERATIVE SOCIETIES.

These are of minor importance and their interest in eggs is of a comparatively recent origin. At present, so far as can be ascertained, there are only seven producers' co-operative societies in the *Bombay Presidency, Travancore, Cochin, the United Provinces and Burma*. In the other provinces, either a start has not yet been made or the enterprise was given up as unsuccessful.

The co-operative movement does not play any significant part at all in the assembling or distribution of eggs. In the seven producers' societies there are only 226 members (producers) and they handle daily about 320 improved eggs, 80 *desi* fowl eggs and less than 15 duck eggs, or in other words less than 2 eggs per member per day. They collect eggs from the members and arrange their disposal, but the working of these societies leaves much to be desired.

Since the starting of the AGMARK station at *Pabbi (North-West Frontier Province)* during December 1936, at the special request of the persons concerned, it has also been registered as a co-operative association, but it consists of village collectors and not of producers.

It must be pointed out that this co-operative association is the largest of its kind in the country, has been managed efficiently and has completed nearly two years' running on most successful and sound lines. The details, e.g., profit and loss account, etc., are, however, treated more fully in a subsequent chapter (see page 178).

As the establishment of a co-operative association of the kind mentioned above obviously leads to a more efficient system of distribution and enables the assembling merchants to pay better prices to producers, it is a question for consideration by Provincial Co-operative Departments whether this type of co-operative association (village collectors) should not be encouraged. Here at any rate one finds business acumen and commercial experience which is sadly lacking in the management of ordinary producers' co-operatives. They also have the enterprise to look further afield than supplying the demands of mere local markets. For example, the above collectors' co-operative association sent two of their members during the first year of their commencement, to *Bombay, Lahore, Delhi, Simla, Karachi*, etc., to study the requirements of the consuming markets and to establish direct contact with the distributors. The subject of organizing the marketing of eggs on co-operative lines successfully has, however, been treated in detail at page 206.

D.—Methods of assembling.

The methods of assembling as employed by (1) the village egg collectors, (2) assembling merchants, and (3) the co-operative societies, differ amongst themselves in minor details.

(1) BY VILLAGE COLLECTORS.

The village collectors generally go about on foot and carry with them some kind of receptacle or other for collecting the eggs. The most typical one is a *bahangi*—contrivance of two baskets suspended from a pole which is carried on the shoulders. One of the baskets may have poultry in it (see plate facing page 121). A few use a bicycle and the baskets are suspended on the handle bars. Occasionally a few use ponies, tongas, motor buses and boats.

The arrival of the egg collectors at the village is welcomed, for they usually purchase eggs for cash. They either go from house to house or the women and children of the producers may bring the eggs at a central spot in the village.

The table below summarises the different modes of travel adopted by the collectors, and types of containers they use in collecting the eggs in the different areas :—

Common mode of travel and types of containers.

Area.	Mode of travel.	Containers.
North-West Frontier Province.	On foot, tongas and cycles.	Baskets on slings and in hands.
Punjab	On foot	Baskets holding 12 to 15 dozen eggs.

Area.	Mode of travel.	Containers.
Delhi	.. On foot and cycles	Baskets.
Bombay Presidency	.. On foot and motor bus	Boxes and baskets.
Mysore	.. On foot and cycles	Baskets lined with cloth or straw for 100 to 150 eggs.
Travancore and Cochin	.. On foot or in boats	Palmyra baskets, holding 500 to 700 eggs. The boats hold 5,000 to 8,000 eggs.
Madras	.. On foot	Baskets carried on head.
Nizam's Dominion	.. On foot, cycle or bus	Baskets.
United Provinces	.. Head loads, horse back, carts and <i>ekkas</i> .*	Baskets and boxes.
Bihar and Orissa	.. On foot	Baskets holding 150 to 250 eggs.
Bengal	.. On foot and in boats	Baskets and boats.
Burma	.. Head loads and boats	Baskets and boxes.

It would be seen that going about on foot is common in all the areas and shows the desirability of improved methods of collection. Special difficulties arise during the monsoon when many of the village roads are impassable and certain areas remain flooded for days together.

This point leads to the important issue, *viz.*, the frequency of collection of eggs by the village collectors.

Frequency of collection.—It would be realised that when the producers are scattered and when each producer has but a few eggs to sell per day, the regular and timely collection of eggs from the villages must be the most important single item that affects the quality of eggs. It is noticed that once the eggs are assembled in large numbers at the assembling centres, on account of various reasons, *e.g.*, the locking up of the capital, risks of staleness and price fluctuations, etc., the eggs are moved quite speedily till they are all sold finally to consumers. But in the initial stages, *i.e.*, in the collection from the producers, there is unfortunately not the same degree of despatch. Several factors may be responsible for this. For example, there is no understanding between collectors or merchants, nor is there any control for assigning certain villages or areas to only a certain number of collectors. Nor is it so arranged that a collector must visit regularly certain villages on certain days. Fluctuations in supply, demand and prices, as well as the resources of the collectors also affect their visits. As a result of this state of affairs, there is a confusion and either certain areas are missed out or they are visited by several collectors in their daily rounds. The table below explains the general position with regard to the visits by the collectors to the villages. There is, however, no

*One horse trap.

hard and fast rule regarding the frequency of visits described below, but they may be taken as the averages in the different areas.

Frequency of the visits of egg collectors.

North-West Frontier Province	..	Daily to some of the villages. Every third or fourth day to others.
Punjab	..	Once a week.
Delhi	..	Twice a week.
Baroda State	..	Twice or thrice a week.
Bombay Presidency	..	Once a week.
Mysore	..	Once or twice a week.
Cochin	..	Twice or thrice a week.
Travancore	..	Daily.
Central Provinces	..	Thrice a week.
Nizam's Dominion	..	On alternate days.
United Provinces	..	Twice or thrice a week.
Bihar and Orissa	..	Twice or thrice a week.
Bengal	..	Once or twice a week.
Assam	..	Once a week.
Burma	..	Twice a week.

From the above it would be noticed that there is no regularity in the collection of eggs and that eggs are sometimes already a week old before they are collected. Nor is there any fixed rule about the number of villages visited per day. From the *North-West Frontier Province* it is mentioned that a collector may visit 5 to 8 villages daily. In the *Punjab* they cover 10 to 15 miles per day in going round 5 to 6 villages. In *Baroda State* they are said to visit on the average about 15 villages per week, and in *Bombay Presidency* not more than 10 to 12 villages per week. The producers have to cover long distances in *Bihar* also and it is estimated that a producer has often to travel 10 to 15 miles.

The number of eggs they collect daily or weekly is also a variable factor and depends mainly upon the productivity of the area, and the number of operators functioning in it. In the *North-West Frontier Province* it is estimated that a collector can collect 100 to 250 eggs during summer and 200 to 300 in the winter. In the *Central Provinces* each man collects 120 to 180 eggs per day. In *Bombay Presidency* they sometimes collect up to 350 eggs per day. In *Bihar* a collector may collect 50 to 250 eggs, whereas in *Travancore*, *Cochin* and *Bengal* he may collect even 500 to 800 eggs per day.

(2) BY ASSEMBLING MERCHANTS.

As stated already, these merchants handle eggs collected from the villages by the egg collectors. Sometimes the merchants may send their men to a nearby market place and purchase eggs assembled there. They usually have a room, a back yard or a

verandah for assembling, sorting and packing the eggs. Their premises are situated usually near the railway or the river service station. They keep sufficient stock of packing materials such as baskets, packing straw or earthen pots. They also keep a trained staff for sorting, counting, packing, etc.

Eggs are received from 10 A.M. to about 3 P.M. The settlement of account and payments, etc., to the collectors are also made simultaneously. The eggs are packed and sent to the railway station, usually not long before the train times, and there have been occasional complaints that this causes considerable rush of work to the railway staff.

The merchants do not have a scale for weighing the baskets sent for booking, but by sheer practice they generally know the approximate weight of each package that is packed by them.

(3) BY CO-OPERATIVE SOCIETIES.

The details of their constitution, working, etc., are described in full under chapter on Co-operative Marketing, but so far as their *modus operandi* is concerned, it is observed that the producers' co-operative societies differ only in minor matters as discussed below :—

Bombay.—There are two producers' co-operative societies, one at *Belgaum* and the other at *Ellur* in the *Satara* district. In the case of the first one, the eggs are sent by its 24 members to the society's shop at *Belgaum*. After testing and sorting them into four grades they are sold to local consumers. It handles about 4,620 improved eggs per annum. At *Ellur* the eggs are collected from about 21 members by two paid helpers and after testing them the manager of the society sends them to an egg commission agent and a club in *Bombay*. This society deals in *desi* eggs only and handles about 26,900 eggs per annum.

Travancore State.—There is only one co-operative society in the State and its office is situated at the Young Men's Christian Association, Rural Reconstruction Centre at *Martandam*. This is the largest producers' co-operative society, with 102 members out of a total of 226 members in India and *Burma*. It handles annually about 69,000 improved eggs of its producer members. The eggs are brought by the members to the society's office twice a week. After they are tested and sorted into two grades, they are packed in baskets and exported to consumers mostly in the different estates in *Nilgiris*, and also to a provision stores at *Madras*.

Cochin State.—The producers' co-operative society located at *Narakhal*, with 39 members, is the second largest in India and *Burma* so far as its membership is concerned. It handles about 2,500 *desi* fowl eggs, 540 improved eggs and is the only society that handles 5,000 duck eggs annually. The society employs a man on commission basis for collecting the eggs from the members. After being cleaned and tested they are sold direct to consumers.

United Provinces.—There are two societies functioning at present with headquarters at *Etah* and *Amroha*. In the case of the *Etah* Egg Sale Union, eggs are collected by a paid helper from the members residing in the villages. After they are brought to *Etah* on a bicycle, they are tested for freshness and after being sorted are despatched to customers at *Delhi* and *Calcutta*. It handles annually about 11,047 improved eggs only. The society at *Amroha* collects about 700 eggs from its 15 members through the help of a paid helper. After sorting them in two sizes, it sends them to *Calcutta* and *Mussoorie*.

Burma.—There are three producers' co-operative societies at *Shwemyo*, *Lewe*, and at *Kantha*. The last named has only 10 members and was started only last year. The first two have 11 and 14 members respectively. They deal only in improved eggs, each handling over 15,000 eggs annually. An egg collector goes round the houses of the producer members daily, and sends the eggs from each place to the *Pyinmana* Fresh Egg Association. The latter body disposes them of at *Rangoon*, *Chawk*, *Namtu*, *Maymyo*, etc., after grading them into two sizes.

The Frontier Co-operative Egg Grading and Sale Association, Ltd., *Peshawar* (*North-West Frontier Province*), as described before, is a co-operative association of village collectors and was established for the purpose of grading eggs. It has 13 active members, and it handled during the first year 27.3 lakhs *desi* fowl eggs. After being graded under the AGMARK Rules, the eggs were despatched to *Lahore*, *Delhi*, *Simla*, *Karachi*, *Bombay*, *Aligarh*, *Indore*, *Mhow*, etc.

E.—Suggested improvements for collection of eggs.

It has already been described that the present arrangements of collecting eggs need considerable improvement. It is, however, said that there is generally a keen competition (which may not always be fair) between collectors operating in a particular area. For instance, with a view to procuring all the eggs for supplying a rush in demand, a collector may occasionally purchase from a producer even defective eggs and offer also a higher price, but at other times he may refuse to purchase even all the sound or selected eggs. Again at certain times several collectors may visit a village during the course of the day and at other times no one may visit the village for days together. This may be due to different reasons. For instance, a collector cannot always know if some one else has visited a village or not and even if he enquires this of another collector, the chances are that he may not get a correct answer. It might also happen that a collector may suddenly switch on to collecting or selling some other commodity, such as fruits, vegetables or fish. From *Bihar* it is reported that he might alternately deal in sweetmeats, biscuits or *pan* (betel leaves).

It may be that, under the present conditions of marketing, some of these difficulties are unavoidable to a certain extent, but it is obvious that these abrupt practices and the unregulated conditions are the source of great hardship and loss to the producers who often

await anxiously for the collectors to come and take away the eggs.

In this connection a system in vogue at the *Bansda State (Gujrat, Bombay Presidency)* is of considerable importance and indicates suitable lines for development and control in other areas.

The main features of the scheme, however, are that the sole right of collecting the eggs for the purpose of exporting them is given to only one party for the whole State (about 215 square miles with an annual production of about 5 lakhs eggs). The amount to be paid to the State is settled at an annual auction, the highest bidder procuring the right of collection. A license is issued to him, *vide* Appendix XXVIII. The licensee has to purchase at a fixed price all the good eggs that the producers may have to sell. The price of purchase is also announced at the time of the auction. Since *Bansda* exports its eggs to the *Bombay* market, the rates prevailing there are obtained and considered at the time of auctioning. Of late years the licensee's purchase price for good eggs has been at 3 annas per dozen, and the amount realised by the State has varied from Rs. 600 to Rs. 1,000 per annum according to the trend of prices at *Bombay*.

The licensee is no doubt bound to purchase all the eggs brought by the producers, but there is no provision as regards stale eggs with the result that the sale of stale eggs is also carried on with the help or connivance of the licensee. With his permission the producers may export such eggs outside the State. The producers are free to sell eggs directly to a consumer, but for trade purposes they cannot sell to any one other than the licensee or his agent.

Since the producers have the right to complain to the revenue authorities any instance of irregular collection, and since they are assured of a fixed price for fair quality eggs, the system is said to be most popular amongst them. At the same time, the licensee is also sure of collecting an economic number of eggs every day or every week, and as such it is in his interest to collect them regularly. The State also gets a revenue of Rs. 600 to Rs. 1,000 every year for a small area of 215 square miles.

In connection with any organised scheme of this kind the following points appear to be important :—

- (1) With a view to improving the quality of eggs it is essential that the prices at which the license is to purchase the eggs from the producers, are fixed on quality basis, as set out in the Rules under the Agricultural Produce (Grading and Marking) Act, 1937.
- (2) It would be advisable to fix and notify the price of each grade every six months, instead of once a year. In certain areas it may be necessary to fix the prices quarterly.

- (3) The distribution of the area or the number of villages should be so selected that the paid collectors of the licensee should be able to collect at least 300 eggs per day per man, which is considered to be an economical unit to work upon.
- (4) There should be a system whereby any complaint regarding irregularity of collections or other matters are brought to the notice of the controlling authority, in time for necessary action to be taken during the quarter.
- (5) After allowing for supervision charges, a substantial part of the money collected as licence fees, should be devoted to the improvement of marketing facilities.

F.—Distributing agencies.

The consignments of eggs are booked by the rural assembling merchants to wholesale commission or retail merchants, at the consuming centres. In the distribution trade, however, it is difficult to draw a line between a wholesaler and a retailer. Generally speaking wholesalers combine the retail trade in their activities. In fact, two of the biggest wholesale merchants at *Bombay* and *Calcutta* handling 40 to 50 thousand eggs per day, do not mind selling even a single egg, if asked for it. Some of the wholesale distributors have arrangements for retail sales through restaurants, stores, etc. In such cases, after cleaning and sorting the eggs they are delivered to the shops. At the time of delivering, the deliveryman receives orders (in writing) for the next day. The retailer may, however, occasionally get eggs direct from the merchant in the assembling centres without going through the wholesale merchant at the consuming centre.

The wholesale distributor and the retailer may, therefore, be treated together. Both the parties have proper shops for their business, but it may be a part of their residence. Generally a separate room is provided for receiving the eggs and sorting them. They have trained men for the various jobs and also possess sometimes handcarts for distributing the eggs.

In large places like *Lahore, Karachi, Madras, Calcutta*, etc., the distribution actually commences at the railway platform, parcels office, or just outside the railway station building, and some of the eggs may not be taken to the distributor's shop at all. For instance, the wholesalers and retailers meet every morning at 6-30 A.M. at the *Bombay Central* and *Victoria Terminus* stations, *Bombay*, and after settling the prices take away the eggs direct from the platforms. Strictly speaking this is the wholesale market for eggs and poultry. Since the number of eggs in any basket or pot is fairly well standardised, such direct disposal is convenient. However, all the risks of shortages in count, breakages and staleness are borne by the person who purchases the packed basket. The merchants also watch the volume of supplies received by the different merchants for

that day. Although there is a certain amount of competition between them, it is not uncommon to let an opposite party have a few additional baskets, if his supplies have been short. Such arrangements are reciprocal. Sometimes large consumers, *e.g.*, hotels, clubs, etc., may also be supplied with their daily requirements direct from the railway stations, and the breakages, etc., may be made good afterwards.

The retail sales are made from the shops of the wholesale distributors or retailers. The latter may also deal in live poultry. Restaurants, groceries and sometimes vegetable shops (particularly in the *Punjab*), may also sell eggs in retail. These shops may be either in a street or within a municipal market, and are visited by the consumers direct (see plate facing page 103).

G.—Assembler—Distributor.

There are a few men in practically every town and city (but not in highly urbanised places like *Bombay* and *Calcutta*) who visit the surrounding villages two or three times a week, collect eggs and poultry (sometimes pigeons, etc., also) and sell them direct to the urban consumers. They actually combine in themselves all the functions of assembling and distribution (see diagram facing page 120). They have usually fixed villages, and producers, and also fixed consumers to deal with. They generally handle on an average a hundred eggs per day besides poultry.

H.—Distribution markets and market charges.

It has been said that the shops of the distributors may be situated in the streets or in municipal markets. Most of the wholesale merchants however do not operate within a municipal market, but prefer to rent out a private house or shop somewhere near it, or near the railway station. This is due to the fact that at a municipal market there are several restrictions regarding doing business on a large scale, such as the prohibition of stocking unsightly empty containers, bringing in of hand-carts, etc. The rents are also high for even small stalls.

Most of the municipalities have municipal markets where generally a separate section or a few stalls are set apart for eggs and poultry (see plate facing page 103). But it is surprising that some of the important ones do not possess any. For instance, *Delhi* Municipality has none, and the eggs and poultry shops are located in the streets. In the Appendix XXIX are given the names, ownership and market charges of some of the important markets.

With regard to the market charges, it would be observed that there are no direct market charges on eggs, except octroi charges at a few places only. At one or two places, there is also a licence fee. At *Secunderabad* (Deccan) Re. 1 is charged per year per

retailer of eggs. There is an annual license fee of 4 annas per stall holder at the eggs and poultry market, *Jubbulpore Cantonment*.

The rents of the stall vary according to the local schedule of rents, size of stall and the location of the stall in a market. The rents range from Rs. 3 per month to Rs. 20 per month, but a rent of Rs. 6 to Rs. 8 is more common. At some of the hill stations, a seasonal rent is charged, *vide* Appendix XXIX.

I.—Finance of assembling and distribution.

Three to four rupees worth of copper coins (pice and pies) is all that an average egg collector needs to carry on his daily business. Larger collectors need more and their working capital may exceed Rs. 15. The reason for requiring a small capital is that the collectors usually purchase the eggs on cash and dispose them of to the merchants also on cash on the next day, if not on the same day.

In the case of assembling merchants the problem of finance is, however, different. At times they are required to give small loans (Rs. 10 to Rs. 50) to the producers, through the egg collectors. No interest is usually charged and the amount is realised through the purchase of eggs. Money is, however, required daily for the purchase of eggs from the collectors, packing material and the payment of railway freight, as perishables including eggs are always booked "freight paid". The receiving merchant at the consuming centre may settle the account only once a month. As such, the assembling merchants generally have sufficient capital to allow for at least 30 days credit on the daily despatches. It is therefore observed that for every one thousand eggs that the merchants handle daily, they have generally an invested capital of about Rs. 600.

The wholesale or retail distributing merchants at the consuming markets are placed in a slightly better position, as they are able to realise some money every day through retail sales. They also have, however, large outstanding credit accounts against some of the consumers, particularly hotels, etc., who pay their bills only once a month. Sometimes they have to give cash security also, on which no interest may be allowed.

J.—Egg contracts, settlement of disputes, etc.

In the case of eggs there are no forward contracts. The most common form of contract is the usual agreement between an egg merchant and a hotel, club or another institution. The most popular term included in most of the contracts is about the free replacement of stale eggs. The period of contract is normally a year, but in the case of hill stations, it may be for the season, *viz.*, from middle of April to middle of October. A few of the consumers, particularly the better class of hotels, may classify the eggs into two classes "table" and "cooking". Both the freshness and size are taken into account and generally the contract rate of the former is about 25 per cent. above that of the latter. The minimum and maximum number required daily is also specified, though not in all cases.

At *Madras*, contracts for the supply of eggs are entered into by all the hospitals, and one of the hospitals had the following clauses in its contract :—

(i) The contractor should deposit 10 per cent. of the total annual value of eggs that are to be supplied, in Post Office Savings Bank Account and leave the Pass Book in the custody of the Hospital authorities.

(ii) Every egg should have a minimum weight of $1\frac{1}{4}$ oz.

(iii) All stale eggs should be replaced.

It was reported that since the contractor was not able to keep up the minimum weight he was supplying 6 to 8 extra eggs per every hundred to make up for the shortage in weight.

The eggs purchased by the *Army in India* are had from the approved contractors and they are governed by the following contract terms :—

1. The eggs shall be fresh, of good average size, and weigh not less than 12 to the pound. No egg weighing less than $1\frac{1}{4}$ oz. will be accepted. Country eggs are small and selection will be made from those that are roundest and of biggest girth compared to length, in preference to long narrow eggs.
2. Only fowls' or ducks' eggs are to be tendered.
3. The deliveries will be subject to the approval of the Supply Officer concerned.

The specifications for freshness are also prescribed, but these are dealt with in the chapter on Grading and Standardisation. (See page 172.)

Settlement of disputes.—In the absence of grades and standards, disputes are not uncommon but they are not of a serious nature. They are confined mostly to counts, prices, errors in accounting, breakages, staleness, etc., and are settled amicably between the parties. Here, also, therefore, the adoption of the Agricultural Produce (Grading and Marking) Act of 1937, should be of considerable help.

Questions of claims with respect to delays in transit, rough handling or unnecessary transshipments, breakages, pilferages, etc., are taken up by the merchants direct with the railways concerned. It is reported that although sympathetic consideration is given to the complaints, there is often considerable delay in obtaining relief.

K.—Assembling and distribution charges.

Except for only some of the items, the assembling and distribution charges are not well defined. This is due to the fact that often a helper may be employed on daily wages to do all types of work connected with assembling and distribution, such as collection, packing, unpacking, sorting, testing, cleaning, distributing and even

collecting the outstanding bills, etc. A few available examples are, however, reproduced below :—

EXAMPLE 1.

For assembling one basket of 400 eggs (20 seers in weight) by rail from Dasua to Jullundur (Punjab). Distance—30 miles.

				Rs.	A.	P.
Charges paid to collectors	..	..	..	0	12	0
Cooly charges up to station	..	..	..	0	1	0
Station charges at <i>Dasua</i>	..	..	..	0	1	3
Station charges at <i>Jullundur</i>	..	..	..	0	1	3
Octroi charges at <i>Jullundur</i>	..	..	..	0	1	0
				1	0	6

EXAMPLE 2.

Assembling charges from Panipat to Delhi on a basket of 400 eggs (58 miles).

				Rs.	A.	P.
<i>By road—</i>						
Terminal tax at <i>Panipat</i>	..	..	..	0	4	0
Cooly charges at the motor terminus	..	..	..	0	1	0
				0	5	0
<i>By rail—</i>						
Terminal tax at <i>Panipat</i>	..	..	..	0	4	0
Coolies and tips at <i>Panipat</i>	..	..	..	0	4	0
Coolies and tips at <i>Delhi</i>	..	..	..	0	2	6
				0	10	6

EXAMPLE 3.

For a basket of 400 eggs from Peshawar to Karachi.

				Rs.	A.	P.
Haulage at both the ends	..	..	..	0	4	0
Commission at <i>Karachi</i>	..	..	..	1	0	0
				1	4	0

EXAMPLE 4.

Assembling a basket of 500 eggs at Bhaluka Road (Bihar).

	Rs.	A.	P.
Paid to collectors	0	7	9
Station charges at <i>Bhaluka Road</i>	0	1	0
Cooly charges at <i>Digha Ghat</i>	0	0	6
Station charges at <i>Digha Ghat</i>	0	1	0
Money order, postage, etc.	0	0	3
	0	10	6

There appears in three of the four examples certain payments which are normally termed "station charge". It may be seen from Example 2 above, that when the merchant transported the eggs by road he saved at least 5 annas on account of such payments. The portorage paid to the coolies is another thing, and wherever it is not shown separately, it means that the merchants bring their own men to book or receive the eggs.

Except for the charge of monthly rent of the stall or shop, and the number of helpers a shop may have, there are no other distribution charges, as most of the eggs are sold from the shops of the merchants. The rents paid by the egg shops are also dealt with in Appendix XXIX. A merchant retailing, say, 3,000 eggs per day may have one helper (Rs. 8 to Rs. 15 per mensem) besides himself. For larger consumers the privilege of delivering the eggs to their residences is allowed, but without making any charge for this service.

[Assembling and Distribution.]

INTER-CHAPTER FIVE.

There are about 150 important assembling centres having more than three thousand eggs per day and at some of them as much as half a lakh are assembled every day for transport to the large consuming centres.

Many eggs are assembled at the ordinary weekly or bi-weekly markets particularly in the southern and eastern parts of India. It will be appreciated that if the system of assembling depended entirely on the weekly market, many of the eggs would be old before they started on their way to the consumer. There is much, therefore, to be said for the system whereby men go round the villages collecting eggs. The village egg collector occupies the key position at the producing end. These men can, however, only do 5 to 8 villages a day and their visits depend on the state of the roads. Collection is by no means systematic. The egg collector may go round one set of villages to-day and other villages to-morrow. The same village may be visited by a number of collectors in one day and then neglected for about a week. There is, therefore, much need for this business to be organised and controlled. In *Bansda State*, for example, the sole right of collecting and exporting eggs is allotted to one party who is responsible for seeing that eggs are regularly collected from producers throughout the State and paid for at a fixed price.

Producers' co-operative societies do not appear to have been very successful as an agency for collecting producers' eggs. Up till recently the seven producers' societies in existence had 226 members and the number of eggs handled represented an amount equivalent to

only two eggs per member per day. This might be compared with the Co-operative Association of egg collectors formed in the *North-West Frontier Province* to undertake the grading and marking of eggs under the Agricultural Produce (Grading and Marking) Act, 1937. This Society in the first year of its working showed a considerable profit. At the same time the price paid to producers in the neighbouring districts was raised by about 15 per cent.

As village egg collectors occupy the key position it would be advisable in the interest of improved marketing to concentrate on organising them in order to ensure the daily collection and despatch of all the locally produced eggs. So far as can be seen there is no justification at present for trying to establish daily markets for eggs in producing districts, as this would involve large numbers of producers walking considerable distances with a very small number of eggs, nor is the ordinary weekly market adequate.

There is a notable absence of wholesale egg markets in the large consuming centres. Generally the platform at the railway station is used by the wholesale distributing merchants. Here they meet the train on its arrival and sell the baskets of eggs and poultry in the condition in which they arrive direct to some buyers on the spot. Other baskets are despatched to large consumers such as hotels, and the remainder are taken by the wholesaler to his premises where eggs may perhaps be mixed, sorted or candled before being despatched to retail shops. These retail shops may merely sell the eggs on behalf of the wholesalers. Many wholesalers have retail shops of their own or are prepared to sell from their premises, in retail as well as wholesale.

A system of contracts is in vogue with larger buyers such as hospitals, hotels and other institutions and only

in a few cases is the quality of the eggs specified in the contract. As a result disputes are not infrequent and it would be desirable that buyers on contract should adopt the specifications prescribed for eggs under the Agricultural Produce (Grading and Marking) Act, 1937. It would be particularly helpful if institutions under the control of public bodies could be required to purchase eggs on the grade descriptions laid down by the Act.

Municipalities might also see that some provision is made in the retail markets for having stalls for the sale of eggs. The question of providing premises other than the railway platform for the conduct of wholesale business in eggs also requires consideration. Any wholesale market for eggs should, however, be closely associated with a cold store and it should not be too far from the station so as to avoid unnecessary transport. Whether such marketing facilities should be provided by the railway companies—as is done by some of the leading companies in the United Kingdom—or by municipalities is a question for consideration. It would assist in helping the authorities concerned to arrive at a decision if the local wholesale trade would form an association for controlling the market business and for ensuring that the full use could be made of the premises provided.

CHAPTER VI.—TRANSPORTATION.

A.—General.

Eggs are transported on almost all the main lines of the Indian railways. Except for the *Burma* railways and the Irrawaddy Flotilla Company, Ltd. (*Burma*), statistics of the quantity of eggs carried every year by the different railways and other agencies are not available, not even in respect of traffic between important stations. In the rail statistics eggs are included with other perishables, and if a separate account were to be prepared it would mean sorting out the particulars from the individual Way Bills or receipts, which would entail a great deal of time. The estimation of transport of eggs by road and water has been even more difficult, for in their case practically no records of any kind are available. An estimate of the total movement of eggs is therefore difficult.

Through the kindness of the railway station staff, however, fairly accurate information about the movement of eggs between important loading stations and inter-provincial consuming centres, was collected. The marketing staff obtained the actual maundage at the more important loading and receiving stations. Estimates were made in other cases and all the figures are summarised in Appendix XXX.

B.—Direction of movements.

The map on the opposite page indicates some of the important movements of eggs in India and between India and *Burma*. From this it would be seen that from the *North-West Frontier Province* and the *Punjab* the movement is towards *Sind*, *United Provinces* and *Bombay*. From the southern areas, the movement is northwards towards *Hyderabad* and *Bombay*. From *Bengal* the movement is towards the *United Provinces* and *Bombay*. There is also the south eastern movement for meeting the demand from *Burma*.

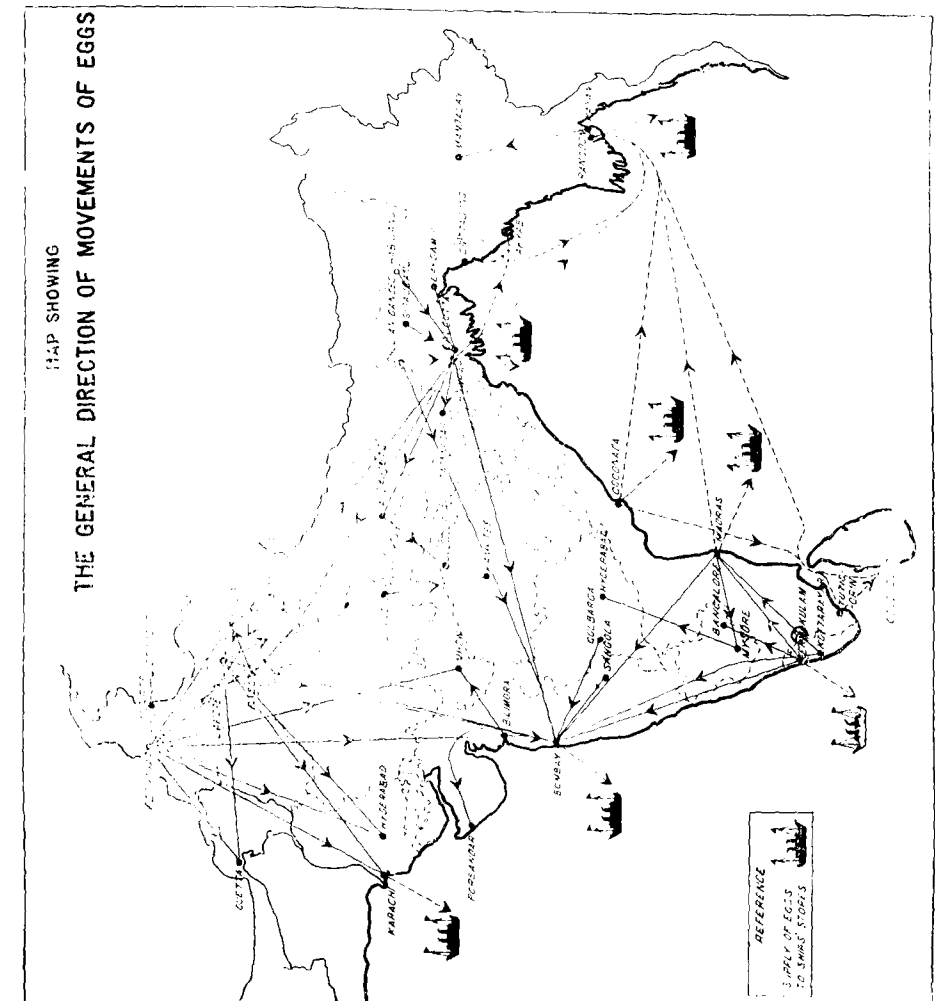
C.—Transport by rail.

(1) GENERAL.

Producing areas are so far from centres of consumption that transport over a distance of 900 to 1,200 miles is quite common. Therefore, except for a small traffic on the border lines in each province or State (which may be carried by other means of transport), it is observed that almost all the inter-provincial and inter-State traffic in eggs, is carried by the railways, which are the most reliable, quickest and safest means of long distance transport.

For the purpose of studying the inter-provincial or State movement of eggs, the whole country (including *Burma*) has been divided into 26 units. The figures of inward and outward movements of eggs (as transported by rail, road or water), in these units are treated as inter-provincial imports and exports, and are dealt with in detail in Appendix XXX. It may be added that on all the

[Facing page 140.]





Carrying baskets of eggs in a *bahangi*, to railway station.



A retailer of eggs on cycle.



Transport of eggs by bullock-cart.

railways, the amount of traffic in eggs is recorded in maunds and seers,* but in the Appendix the figures have been converted into the number of eggs. The annual inward and outward movements of eggs for each area are summarised below :—

Annual inter-provincial and inter-State movement of eggs.

(In lakhs.)

	Approximate number imported.	Approximate number exported.
1. Kashmir	Neg.	5
2. North-West Frontier Province	14	98
3. North-West Frontier Province Agency area ..	Neg.	14
4. Punjab	52	44
5. Patiala State	1	11
6. Punjab States	Neg.	2
7. Delhi Province	39	1
8. Rajputana	2	Neg.
9. Central India States	10	Neg.
10. Sind	52	2
11. Western India States	16	9
12. Baroda State	1	32
13. Bombay Presidency	146	25
14. Deccan States	Neg.	40
15. Mysore State	37	1
16. Coorg	2	Neg.
17. Cochin	18	77
18. Travancore	Neg.	144
19. Madras Presidency	166	75
20. Nizam's Dominions	5	2

*On the *Burma* railways the records are maintained in "viss", one "viss" being equal to 3.6 lb.

Annual inter-provincial and inter-State movement of eggs (contd.)
(In lakhs.)

	Approximate number imported.	Approximate number exported.
21. Central provinces	10	1
22. United Provinces	11	35
23. Bihar	23	2
24. Bengal	16	296
25. Assam	9	13
26. Burma	231	1

The above table shows that the most important exporting province is *Bengal* with an annual outward movement of about 296 lakhs eggs. It would be further seen that the area next to it in order of importance is *Travancore* with an export trade of 144 lakhs. No doubt the difference between the above two figures is considerable, but it must be realised that *Travancore* is only about a tenth in area of *Bengal* and as such, *Travancore* has relatively the heaviest export trade on the basis of area. *Cochin* also with an area of only 1,417 square miles sends out 76 lakhs eggs, against *Madras Presidency* with nearly a hundred times greater area exporting only 75 lakhs.

On the imports side, *Burma* no doubt tops the list with 231 lakhs eggs. But if a unit within India is considered, *Madras Presidency* imports most, viz., 166 lakhs, with *Bombay Presidency* running close to it with 146 lakhs.

From Appendix XXX it would be also observed that *Bombay Presidency* gets eggs from 12 areas in the following proportion :—

	Percentage of annual imports.
North-West Frontier Province	8.5
British Punjab	5.7
Patiala State	0.2
Western India States	6.1
Baroda State	19.8
Deccan States	27.4
Cochin State	8.2
Travancore State	1.9
Madras Presidency	7.6
Nizam's Dominions	1.2
United Provinces	2.0
Bengal	11.4

(100)

It would be noted that the most important sources of supplies are the *Deccan States*, which though considered a separate unit, are actually within the boundaries of the *Bombay Presidency*.

Duck eggs.—It is noticed that the range of transport for the duck eggs is generally within the province of production. For instance, the import of eggs into *Bombay* from distant areas of duck and hen egg production, viz., *Travancore*, *Cochin*, *Madras* or *Bengal*, is all of hen eggs, as *Bombay* has no market for duck eggs. Barring the States of *Travancore* and *Cochin* that send duck eggs to *Madras*, and *Bengal* that sends them to *Burma*, there is practically no inter-provincial movement of duck eggs as such, but a few duck eggs are being transported all over, mixed with the fowl eggs.

From Appendix XXX it would be further seen that about 932 lakh eggs (about 4,279 tons*) are transported annually from producing areas to inter-provincial markets, mostly by rail. It has, however, been estimated that the annual urban consumption of eggs is 9,035 lakhs eggs (see page 43). The remaining number represents those local eggs that are transported to the consuming centres within the province. A good part of this traffic also is carried by the railways, whereas some may be carried by motor-buses, on foot, cycles or boats, etc. It may be indicated that it has not been possible to hazard precisely any estimate of this traffic carried by different agencies, but even here (although the distances may be shorter) the railways are the more important carriers. The total annual volume of traffic in eggs should therefore be about 10,000 lakhs eggs (or about 45,914 tons), and enquiries indicate that over a half of this traffic is carried by the railways.

Since the principal loading stations are known, it has been possible in most instances to estimate the distances travelled by consignments of eggs, in reaching the inter-provincial centres of consumption. By taking into account the distances of rail journeys travelled by different consignments (932 lakhs eggs) for reaching the inter-provincial centres of consumption, it is observed that the average distance covered by them is about 425 miles.

Eggs are transported by passenger, express or mail trains, so that the speed of travel (including halts, etc.) is about 25 to 30 miles per hour. They take about 16 to 18 hours to cover the average distance of 425 miles. The longest journey between *Peshawar* and *Bombay* takes a little less than 48 hours. When the trains leave early in the morning or reach the destination late in the evening, the eggs are to be booked either on the previous evening or taken delivery of on the next morning. Thus 12 more hours are to be added to the time taken in actual travel.

(2) BOOKING.

Consignments of eggs are brought on headloads, *bahangis*, and in carts to the railway stations by merchants' coolies (see top plate facing

*800 hen eggs (gross including packing) equal to one maund or 21,780 hen eggs equal to one ton.

page 141). Booking and delivery of perishables (eggs included) can be done on all the days of the week from 7 A.M. to 5 P.M.

Addressing of parcels.—According to rules parcels have to be fully and clearly marked and addressed in English showing the name of the consignee, his full address, destination and the railway. In actual practice the rules are seldom observed or enforced. The merchants usually mark the parcel (on the muslin cover or the bamboo basket) in vernacular and it is noticed that since baskets are returnable, in certain cases, they have on them more than one address. Much confusion, however, does not seem to result because except at a few places like *Bombay, Calcutta, Madras*, etc., the traffic in eggs is not great and with least marking on the parcel its identification is quickly established. At the time of giving the delivery, the consignments are checked up with the railway receipts and the railway Way-Bill ticket or label on the parcel. For despatch to bigger stations, e.g., *Bombay*, etc., some of the merchants do use proper labels or the basket itself may be marked adequately.

(3) FREIGHT.

There is a general tariff of rates, for carrying luggage and parcels by passenger or mail trains, and it is based upon distance and weights. These rates are fixed by the Indian Railway Conference Association and are generally applicable to all the railways in India. These are published in Coaching Tariff No. 11, which deals with rules and rates for carrying luggage, parcels, animals, etc. Eggs and some other commodities are charged at half parcel rates, when booked at owner's risk. The freight is payable in advance.

On the basis of the rates in vogue, and on the basis that eggs (for inter-provincial traffic only) are transported on the average over a distance of about 425 miles, the freight (at half parcel rate) per maund of eggs amounts to Rs. 2-2-0. Considering that a maund is equal to 800 eggs, the amount of freight that is paid in transporting, say 100 eggs is Re. 0-4-3, or for a dozen eggs is about 6 pies.

Accordingly, the railways are estimated to earn annually about 2.5 lakhs rupees in freight on the inter-provincial traffic alone. The above traffic (in quantity) is, however, only about a tenth of the urban consumption, but information regarding the mode of traffic for the latter is not available. Since this traffic moves within a province or State, the distance travelled is comparatively less. It would therefore be observed that the amount of freight on the majority of eggs consumed in the urban area is much less than 6 pies per dozen, and is likely to be near 3 pies.

A few examples of transport charges between some of the important centres are given below. It may, however, be mentioned that the under-mentioned charges are worked out on the basis of fowl eggs (800 eggs being equal to one maund), but since the duck eggs

are heavier and weigh only about 550 eggs to a maund, the transport charges per dozen on the duck eggs would be proportionately higher.

Amount of freight payable on eggs.

			Approximate mileage for charge.	Railway freight.	
				On 100 eggs.	Per dozen eggs (approximate).
				As. P.	As. P.
Peshawar	to	Lahore ..	288	3 2	0 5
"	"	Delhi ..	585	5 8	0 11
"	"	Karachi ..	930	8 3	1 4
"	"	Bombay ..	1,361	11 6	1 5
"	"	Mhow ..	1,129	9 7	1 2
Jullundur	"	Delhi ..	266	2 10	0 4
"	"	Simla ..	420	4 2	0 6
Baroda	"	Bombay ..	244	2 10	0 4
Billimora	"	Mhow ..	360	3 9	0 5
Quilon	"	Bombay ..	1,227	10 6	1 3
"	"	Madras ..	471	4 4	0 6
Madras	"	Bombay ..	794	7 6	0 11
"	"	Mysore ..	308	3 4	0 5
Gajraula	"	Bombay ..	919	8 1	1 0
Sajnipura	"	" ..	1,297	10 10	1 4
Howrah	"	" ..	1,284	10 10	1 3
"	"	Delhi ..	902	8 1	1 0
Daulatganj	"	Rangoon*	800	6 7	0 9

*The eggs travel up to *Chittagong* in train and then onwards by steamer to *Rangoon*.
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From the above figures of inter-provincial transport charges of eggs it would be seen that the fair average freight per dozen eggs is about 6 pies. Reckoning the price of a dozen eggs to be 6 annas in retail, the freight (at 6 pies per dozen) would thus comprise about 8 per cent. of the retail price of eggs.

(4) REQUIREMENTS OF RAILWAYS REGARDING CONTAINERS.

The question of breakages of eggs while in transit has already been dealt with in the chapter on Preparation for Market. It has been said that occasionally there may be other causes, but a comparison of the different types of packages shows that the containers and the method of packing are more responsible for breakages in transit, than the neglect on the part of the carrying agencies (see page 105). The railways require that parcels should be securely packed in stout baskets, etc., but if a consignor executes an Owner's Risk Note, he thereby absolves the railway administration from all responsibility for loss or damage to the contents, and thus parcels that are packed in a defective manner are also accepted for booking. The result is that the consignors are never made to feel that the packing is defective or unsafe.

(5) HANDLING CHARGES.

The handling of consignments of eggs between the parcels office and the trains, both at despatching and receiving stations, is part of the service performed by the railways. Merchants, however, it is alleged, often incur special handling charges which amount to 1 anna per 100 eggs, on the average.

It has been shown on page 144 that the average freight between distant markets amounts to annas 4 pies 3 per 100 eggs, so that the special handling charges may average 23 per cent. of the freight.

(6) TRANSIT.

During transit the consignments are placed in the brakevans of the passenger or mail trains which have a few shelves provided in them. These shelves are about 2 feet deep and the distance between the two shelves is also about 2 feet. Except in *Southern India* where the baskets are strong enough to be piled up, in other areas no other parcels could be put over the egg baskets. Thus considerable useful storage space is lost, and it would appear that if proper type of containers were used it would greatly facilitate handling and storage not only during transit, but at the destinations also if ever an attempt was made to put the eggs in cold-stores.

Transshipments.—During transshipments from metre to broad gauge or at junctions on the same gauge, the packages are either

carried as headloads or are carried on the hand trollies. Here also it is observed that due to defective packing there are considerable breakages in transshipment.

(7) DELIVERY OF THE CONSIGNMENTS.

When the consignments are received at a station the railways are not required to give any intimation of its arrival, as is the case with post parcels. The consignments of eggs and other perishables are to be removed within 24 hours, or even earlier if they are likely to become offensive. If they remain unclaimed beyond the above period, the station masters are empowered to auction them at the owner's risk and expense. The egg merchants therefore make it a point to call at the parcels office at appropriate time every day to clear away the consignments they expect to have arrived. The parcel staff often arrange to send the consignments to the merchants' premises, if they have failed to turn up. This arrangement is, however, strictly private and forms really a part of the unofficial service the staff renders to the merchants.

Street delivery of parcels.—At some of the important stations the system of street delivery of parcels is in vogue, but generally parcels of eggs are not included for street delivery. It is understood that the exception shown to the egg parcels, is mainly on account of their present unsafe and defective packing. This is another instance where improved containers should facilitate matters for the merchants.

(8) RETURN OF EMPTY CONTAINERS.

Returned empties are carried at quarter parcel rates, *i.e.*, half of the rates at which the consignments of eggs are charged. Three conditions must be satisfied for transport of empties : (i) that the empties are returned within seven days of their receipt at destination, (ii) that particulars of the original booking are quoted on the forwarding note, and (iii) that the consignee and consignor are the same as in the original consignment.

Egg baskets and boxes are, however, only occasionally returned. Most of the baskets being conical in shape, fit in one another and are tied up together.

(9) TRANSPORT BY GOODS TRAINS.

Because of the perishable nature of the commodity and the slow speed and irregular hours at which goods trains generally run, eggs are usually not transported by goods trains.

The general rules regarding the acceptance and carrying of articles by goods trains are given in the Goods Tariff No. 21 issued by the Indian Railway Conference Association. The general conditions of transport are that the freight has to be prepaid and the goods are at owner's risk, eggs are charged in class 4 rate or at 62 pie per maund per mile. The usual Risk Notes in the case of parcels also apply in the case of consignments of eggs by goods train.

At the above schedule of rates the freight on transporting 100 eggs, say between *Peshawar* and *Bombay* (1,361 miles) would be about 8 annas against 11 annas 6 pies by passenger or mail trains, but the time taken in the journey would be about 10 to 12 days against about 48 hours by the latter service.

Three instances have, however, come to notice wherein eggs are booked over short distances by goods trains in *Madras Presidency*, *Eastern Bengal* and *Burma*.

(a) *In Madras Presidency*.—During winter occasionally small consignments of duck eggs are booked between *Tuticorin*, *Rajapalayam* and *Madras*, but their number is indeed small.

(b) *In Eastern Bengal*.—On the Assam-Bengal Railway eggs are sometimes carried by goods trains, but particularly between *Daulatganj* and *Chittagong port* (about 80 miles) earthen jars of preserved eggs for export to *Burma* are frequently so transported. When booked in wagon loads for this traffic, the Assam-Bengal Railway has also given special rates. A goods wagon (four wheeler) can accommodate twenty-five jars* of eggs, weighing roughly 125 maunds, but a charge of only hundred maunds per wagon is made. When the jars are booked in smaller numbers, a charge of 5 maunds per jar is made. Approximately about 9,500 jars are transported annually between the above two stations, mostly in wagon loads.

(c) *In Burma*.—Between *Pegu* and *Mandalay* boxes of eggs are carried by fast goods trains. Actually the eggs are loaded from *Kayan*, an important assembling centre, but between *Kayan* and *Pegu* (38 miles) they are carried by passenger trains. At *Pegu* they are transhipped into fast goods wagons, and the distance of 339 miles between *Pegu* and *Mandalay* is covered in 2 and sometimes 3 days, against only 12 hours by fast trains.

D.—Transport by agencies other than the railways.

Railways are not found everywhere and in the interior cycles, bullock-carts, motor buses and boats are used for short distance transport.

(1) CYCLES.

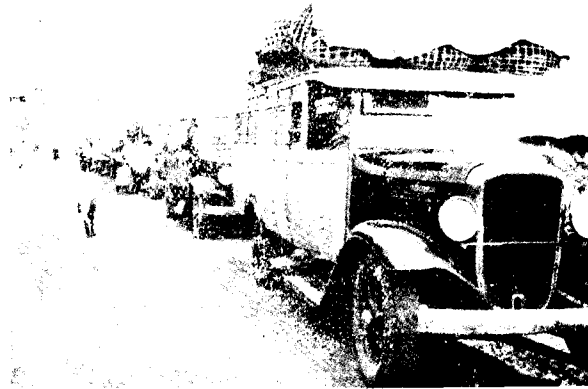
These are rather common means of transport but are mainly employed in urban and semi-urban areas for collection or distribution of eggs (see centre plate facing page 141). The cycles usually belonging to the distributors are of the conventional type without any special attachments, nor are they used exclusively for the distribution or transport of eggs. The cost of a good second-hand cycle is Rs. 20 to Rs. 25 and its maintenance may cost less than Re. 1 per month. A man usually delivers in retail 3 to 5 dozen eggs per hour, according to the distance to be covered.

*A jar contains roughly 2,500 eggs, or the wagon 62,000 eggs.

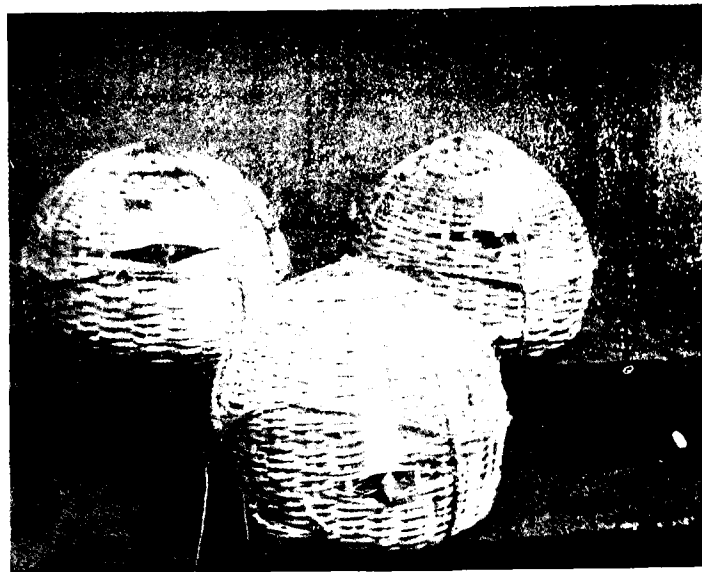
[Facing page 148.



Transport and assembling of lacse eggs by boats, in Travancore State.



Transport of eggs and poultry by motor-buses.



Baskets cut open and some eggs removed during transit.

(2) BULLOCK-CARTS.

Bullock-carts, with their slow speed and jerks, are used only rarely for the transport of eggs. Their use is confined mainly to carrying packed baskets or boxes of eggs from the premises of the merchants to the railway stations or *vice versa* (see bottom plate facing page 141). The charges may be 1 to 2 annas per basket or box for a distance of a couple of miles. The loading or unloading of the packages is usually done by the cartman.

(3) MOTOR-BUSES.

Baskets of eggs and poultry are often transported by motor-buses over short distances, and sometimes even for long distances. For instance, since there are no railway connections, eggs and poultry are regularly carried by bus between *Rawalpindi* and *Srinagar*, a distance of about 200 miles and between *Sylhet* and *Shillong*, 86 miles (see top plate facing this page). The bus charges are about half of what railways would charge for a journey of the same distance on the plains. Lately the motor-buses have penetrated even on the *kachcha* village roads.

(4) BOATS AND RIVER-STEAMERS.

The available information indicates that boats and river-steamers are employed in the transport of eggs only in *Travancore*, *Cochin*, *Bengal* and *Burma*. Occasionally in *Bombay Presidency* also country boats are used for coastal transport of eggs.

(a) *Travancore and Cochin*.—In both these States, large stretches of back-waters, creeks and waterways are generally inter-connected by boat traffic. Since the railways here extend only for a short distance at one end, the assembling of eggs from the interior is done by boats (see plate facing page 148). The transport charges are not fixed and vary from boat to boat. It is, however, observed that between *Chenganacherry* and *Ernakulam*, for a distance of 50 to 60 miles, the charge is 3 annas per basket of 500 eggs (about 25 seers). The corresponding railway freight (the above places are, however, not connected by rail) would be about 8 annas. The above charge of 3 annas per basket is for small lots, but if a full boat is engaged, which might carry 40,000 to 50,000 unpacked eggs or about 80 to 100 baskets, the charge is only Rs. 7 to Rs. 8 for the trip or about anna 1 pies 4 per basket.

(b) *Bengal*.—Here also there are many waterways, and several villages are connected by boat traffic. During monsoon a good part of the country gets flooded and boats have to be towed through paddy and jute fields. Eggs are therefore commonly assembled at several places by boats. At *Gouripur* (District *Tippera*) the assembling merchants or collectors generally possess their own country boats, in which 7,000 to 10,000 eggs are collected from the surrounding villages within 10 to 15 miles. Two or three men are employed per boat and are paid Rs. 10 to Rs. 15 each per month.

(c) *Burma*.—In its well-developed waterways a boat may carry about 5,000 eggs in 10 boxes, the charge for a short distance up to about one mile being eight annas per trip. Loading and unloading of the packages are mostly done by the boatmen themselves. The jars of preserved eggs (imported) being too heavy, are carried by coolies. About four men are required to carry a jar (approximately 5 maunds in weight), and each man is paid about six annas for a distance of one mile.

For longer journeys, river-steamers are usually used, in which case the risk of breakage is reduced to a minimum. However, as a steamer does not cover much distance in a day, it is generally not used for transporting fresh eggs to distant places. Even in the case of pickled eggs it is observed that the steamer transport is suitable only for ordinary shipments, but not for consignments intended to meet emergency orders. It is, nevertheless, the only means of transport from the producing areas to the consuming centre in *Rangoon*. For instance all the eggs from *Pyapon* and *Kyaiklat* have to be sent by steamer. The daily consignments from these places are about 20 to 30 cases of 500 duck eggs each. The river journey takes about 10 hours or so. It may be interesting to note that though *Pyapon* is farther away from *Rangoon* than *Kyaiklat*, the freight from *Pyapon* is only 3 annas per hundred *viss* whereas that from *Kyaiklat*, is double that amount. This is due to the fact that *Kyaiklat* has no private launches to compete with the regular steamer service of the Irrawaddy Flotilla Company, Ltd., as in the case of *Pyapon*.

Practically all the duck eggs from *Kayan* are also sent by steamers to *Rangoon*, though the two places are connected by rail as well. The time taken by the two services is about the same, although the distance by rail is roughly double that of the waterway. The main reason for using the waterway is that it costs only one anna for a box of 500 eggs, compared to about fourteen annas charged by the railways.

Steamers are used for the conveyance of pickled eggs to up-country markets. Here also the question of freight is important. For instance, between *Rangoon* and *Prome* steamer charges are only Rs. 2-2-0 per hundred *viss* compared to the railway freight of Rs. 2-5-6.

E.—Extent of damage during transit.

It has been estimated that the value of direct and indirect loss caused to the trade during transportation is in the neighbourhood of Rs. 15 lakhs (see page 116). To a very large extent this loss is attributed to the defective methods of packing generally employed at present.

(1) BY RAIL.

(a) *Due to handling, etc.*—Thirty-nine consignments of eggs, which were transported by rail over an average distance of 470 miles were examined, and it was observed that about 11 per cent. of the eggs were cracked and over 5 per cent. were found to be badly damaged and were leaking, or a total of over 16 per cent. The

details of the distances travelled, etc., are dealt with in table below :—

Distances travelled by eggs by rail and extent of breakages in transit.

No. of consignments examined.	Name of place where examined.	Name of place from where the eggs came.	Approximate distance travelled (miles).	Percentage of breakages to the total eggs.		
				Cracked.	Leaking.	Total.
1	Lahore ..	Mardan ..	270	16	4	20
1	Lahore ..	Lawrencepore ..	221	14	6	20
1	Delhi ..	Bulandshahr ..	70	35	10	45
3	Karachi ..	Peshawar ..	1,041	12	10	22
2	Hyderabad (Sind) ..	Peshawar ..	750	10	10	20
4	Baroda ..	Bilimora ..	110	5	3	8
4	Bombay ..	Peshawar ..	1,446	10	5	15
3	Madras ..	Kottarakara ..	475	3	3	6
3	Madras ..	Minnel ..	50	2	1	3
2	Madras ..	Quilon ..	417	4	2	6
1	Hyderabad ..	Kohir (Nizam's Domini- nions) ..	75	10	5	15
3	Dinapore ..	Birbhum ..	400	12	4	16
3	Patna ..	Sagnipara ..	400	14	9	23
2	Sabzibagh (Patna) ..	Maida ..	287	15	3	18
3	Calcutta ..	Seraiganj ..	194	8	3	11
3	Calcutta ..	Chandpur ..	300	6	6	12
39	Average ..		470	11	5.3	16.3

The figures show that the extent of damage has hardly much to do with the distance covered. For instance, an average of four consignments from *Peshawar* to *Bombay* (1,446 miles) showed a damage to the extent of about 15 per cent. whereas another consignment from *Mardan* to *Lahore* (270 miles only) was damaged to the extent of 20 per cent. In a consignment from *Bulandshahr* to *Delhi*, a distance of 70 miles, the damage was as high as 45 per cent. In all the above areas very unsecure type of baskets are used. In the south where the packing is better, the average damage in five consignments from *Madras* to *Kottarakara* and *Quilon* was only 6 per cent.

The above facts when read with the description of the types of containers in use and methods adopted for packing (see page 110), confirm the argument that the weaker the packing, the greater are the chances of damage, irrespective of the distance travelled.

(b) *Due to pilferage*.—Occasionally there is pilferage during transit. This is generally done by cutting open the sides of the baskets or the lid with a knife and removing some eggs. This happens mostly at night and at junction stations, where the consignments may have to wait for a few hours for a connecting train. Defective packing more than anything else is responsible for this. Some of the baskets are so flimsy and opportunities for pilferage made so tempting that with the least effort a few eggs can be removed from the lid or through the bamboo splits. The plate facing page 149

shows three baskets from *Tirur* (South Indian Railway), which were cut open on their way to *Bombay* and 2 to 3 dozen eggs were removed from each. But the evil is reported to be going down.

(2) BY OTHER METHODS OF TRANSPORT.

In other methods of transport are included headloads, cycles, tonga, motor-buses, boats, etc. The table below deals with transport of eggs by such methods and the extent of damage.

Transport of eggs by methods other than rail and extent of damages.

No. of consignments examined.	Name of place where examined.	Name of place from where the eggs came.	Approximate distance travelled in miles.	Mode of transport.	Percentage of breakages to the total eggs.		
					Cracked.	Leaking.	Total.
3	Srinagar ..	Ganderbal ..	12	Tonga ..	8	2	10
2	Bassi Pathanan ..	Sirhind (Patiala) ..	6	Headloads ..	2	Nil	2
6	Karachi ..	Surrounding vil- lages.	5	Cycle ..	2	"	2
5	Surat ..	Do. ..	4	Headloads ..	4	"	4
4	Bijapur ..	Konnur Tal ..	15	Do. ..	4	"	4
8	Belgaum ..	Agisge ..	12	Do. ..	2	"	2
2	Bangalore ..	Kola ..	40	Motor bus ..	8	2	10
2	Ernakulam ..	Narrakal ..	9	Motor boats ..	2	Nil	2
3	Do. ..	Pulinkuman ..	50	Do. ..	2	2	4
2	Kottarakara ..	Surrounding vil- lages.	10	Headloads ..	2	1	3
3	Hyderabad ..	Do. ..	20	Cycle ..	4	1	5
3	Serunderabad ..	Yenjal ..	12	Headloads ..	2	Nil	2
2	Nagpur ..	Chindwara ..	80	Motor bus ..	6	2	8
1	Kamptee ..	Surrounding vil- lages.	10	Headloads ..	3	1	4
3	Agra ..	Do. ..	35	Motor bus ..	5	3	8
2	Do. ..	Do. ..	8	Headloads ..	9	5	14
1	Lucknow ..	Do. ..	2	Do. ..	2	1	4
2	Do. ..	Malihabad ..	20	Do. ..	6	3	9
3	Jhansi ..	Surrounding vil- lages.	3	Do. ..	5	2	7
1	Tundla ..	Do. ..	9	Do. ..	3	2	5
4	Firozabad ..	Do. ..	5	Do. ..	5	4	9
4	Bareilly ..	Do. ..	3	Do. ..	3	2	5
3	Patna City ..	Do. ..	11	Do. ..	6	3	9
50			15		4.2	1.5	5.7

It would be seen that there can hardly be any comparison between the long distance transport by rail with an average range of 470 miles, and the short distance transport with an average range of under 20 miles. Again out of 69 consignments that were examined as many as 45 consignments were carried on "headloads", over an average distance of less than 9 miles. When eggs are transported on headloads, the carrier himself is able to give all the attention they need, yet to a certain extent damage is unavoidable. The damage, however, is confined to the cracking of the eggs, and to the leaking of a few. Only one instance of transport by *tonga* (horse-trap) could be studied in *Kashmir* and, in a distance of twelve miles, 10 per cent. of the eggs were damaged, but most of these received only cracks. Transport by motor-buses damaged about 8 to 10 per cent. of the eggs but here also the injury was mostly cracking. Two instances of motor-boats were also studied and the damage was found to be about 3 per cent. of the eggs carried. Nine lots of eggs carried on cycles were examined and the damage was found to be less than 4 per cent.

F.—Possibilities of improvement in transport facilities.

There seem to be four cardinal points on which must be based the planning of any scheme for the improvement of transport facilities for eggs. These are (i) reduction in freight, (ii) minimizing the damage during transport, (iii) acceleration in the speed of transport, and (iv) provision of refrigeration facilities.

(1) REDUCTION IN FREIGHT.

It has been pointed out that the freight charges paid at present on the transport of eggs to inter-provincial or State markets, amount to about 6 pies per dozen for the average distance of about 425 miles. The table below shows the calculated freight charges for certain other distances :—

Freight on eggs.

Exceeding (miles).	But not exceeding (miles).	Per hundred eggs.	Per dozen eggs (approximately).
		As. P.	As. P.
..	25	0 4½	0 ½
50	75	1 1½	0 1½
100	125	1 10½	0 2½
225	250	2 10½	0 4
475	500	4 10½	0 7
975	1,000	8 7½	1 ½
1,225	1,250	10 8	1 3
1,450	1,500	12 0	1 5

It would be observed that when the eggs are transported to distances of 1,000 miles and above, the freight goes beyond 1 anna per dozen. On the other hand for transportation within the province or State or say even up to a distance of 250 miles, the freight is 4 pies per dozen or only about 5½ per cent. of the retail price of eggs at

say, 6 annas per dozen. For shorter distances the freight is still lower.

For longer distances (over 1,000 miles) the freight no doubt amounts to about 20 per cent. of the retail price of eggs and this might be considered rather high, but the number of eggs transported annually over such distances is only about 40 lakhs eggs or about 5,000 maunds. It would also be seen that the rates are based on the sliding scale, and that the freight for, say, 1,500 miles, is less than three times that of 500 miles. Further, apart from certain special cases, it is doubtful whether in a tropical country there is any advantage in encouraging long distance transport of eggs by a general reduction in freight.

On the other hand, a glance at the production maps facing pages 10 and 11 would show that there is uneven production in practically every province or major State. As such it would appear that efforts should be made to facilitate the transport of eggs over shorter distances within the province itself. For instance, it is already noticed that at certain times of the year eggs from *Bengal* are sent to *Delhi* (902 miles) and are sold there at prices at which eggs from even nearer districts of the *Punjab* and *United Provinces* could not compete with them. This has a definite tendency of keeping down the prices in the latter areas.

It should, however, be pointed out that as possibilities for developing an export trade in eggs or egg products appear to be already in sight, the railways should consider the matter of allowing special reduced rates of freight between certain assembling centres and the ports, for those eggs only that are meant for export, either in shell or as products. This would open up new outlets of business for the railways. It would also help the factories or packing stations to draw supplies from producing centres and would tend to stabilise abnormal fluctuations in the price of local eggs.

(2) MINIMISING DAMAGE DURING TRANSPORT.

It may be necessary at certain places to issue fresh warnings to the railway staff to be more careful in handling egg consignments. The fact, however, must be admitted that the basic cause of the breakages in eggs is the use of defective containers and inefficient methods of packing. Wherever better type of containers have been used, the breakages are known to be reduced considerably. Therefore, if the breakages are to be eliminated and the annual loss of about rupees 15 lakhs is to be prevented, attention should first be given to the improvement of containers. In any country where the trade in eggs is developed to any extent, it is unthinkable to merely place the eggs in a rickety basket and cover them up with a piece of cloth for transport to distances up to 1,500 miles. Indeed it is a matter of surprise that more eggs do not get damaged in transit, under the present conditions.

(3) ACCELERATION IN THE SPEED OF TRANSPORT.

As described before, eggs are generally transported by fast passenger and mail trains. The average amount of time taken in reaching the inter-provincial markets, is only from 16 to 18 hours (see

page 143), i.e., the eggs reach the destinations the next day. For shorter transport within the province, it may be a case of travel over night. For long distance travel, they are despatched by the fastest mail trains. There is thus no further scope for reducing the time, nor is it likely to help the cause of transport in any way.

There may, however, be instances where an undue delay at a junction station may be avoided, or a particular fast train may be stopped at a wayside station to pick up loads of eggs, but such cases when brought to the notice of the railways generally receive attention. For instance, at the request of the merchants, the *Bombay Express* leaving *Peshawar* at 6-15 every evening is stopped specially for a few minutes at the wayside stations of *Taru Jabba* and *Pabbi* to pick up consignments of eggs and fruits only, so that they may reach *Lahore* early next morning. If this were not done the eggs would not reach *Lahore* till 3 P.M. next day by the subsequent passenger train leaving *Peshawar* at 10 P.M.

(4) PROVISION OF REFRIGERATION FACILITIES.

Although egg merchants have often mentioned that the railways might do something in the way of refrigerated transport, the problem does not seem to have been tackled in a commercial manner. The railways in the past have no doubt made attempts to introduce "cold transport" facilities, but except for the transport of fruits in insulated vans on certain lines that has taken place, they have not been able to impress upon the trade in general, the benefits arising from such transport.

In long distance transport, eggs remain in transit from 36 to 48 hours, and particularly in summer when carriages get heated up, the necessity for transport under cold conditions is strongly felt. For instance, in the table below are reproduced few of the estimates of the proportion of stale eggs, as found in the markets during the different seasons :-

Proportion of stale eggs in the market eggs at different seasons.

	Summer and monsoon. (March—October).	Winter. (November— February).
	Per cent.	Per cent.
North-West Frontier Province ..	15	5
Punjab	30	5
Delhi Province	25	3
Baroda State	12	3
Travancore State	10	2
Bihar and Orissa	25	5
Bengal	20	5
Assam	12	5
Burma	5	1
Average ..	17	4

It would be seen that during the summer and monsoon months, the average proportion of stale eggs is about four times that during the cooler months. The extent to which the transport agencies are responsible for this is, however, not known as irregular collection of eggs from the villages also has a bearing on this point.

Long distance traffic on any line is, however, not great at present. For instance, between *North-West Frontier Province* and the *Punjab* on the one end and *Bombay* on the other, about 20 lakhs eggs are transported annually, most of which are transported by the *Bombay Baroda and Central India Railway*. The above number represents less than 14 baskets of 400 eggs each or about 7 maunds per day, and by itself hardly justifies provision of cold transport facilities. It must, however, be indicated that if such transport were available, and if it was supplemented with proper service, there might be other commodities also, which could be transported along with eggs, practically at the same temperatures, i.e., between 45° and 50° F. The question is a general one for all perishable products and is to be considered in respect of not only eggs, but also other dairy and vegetable produce.

In this connection it might be mentioned that during the summer months—April to August—facilities have been provided in late years by the *East Indian Railway* for refrigerated transport of perishable parcels between *Howrah* and *Delhi*. A portion of one of the parcel vans is insulated and the inside is cooled with blocks of ice. The temperature is about 40°–50° F., and its capacity is about 100 maunds. The van is attached every Tuesday and Friday from *Howrah*, on the up Parcel Express and reaches *Delhi* at about 10 A.M. on the following Thursday and Sunday. Traffic to and from the intermediate stations is also booked for the above service. The freight is 25 per cent. over and above the usual freight, i.e., instead of the usual freight of 1 anna per dozen eggs between *Howrah* and *Delhi*, the freight under cold storage would be 1 anna 3 pies per dozen.

It is, however, noticed that while the other wagons may be fully loaded the special van seldom leaves *Howrah* with its full load, and whatever little space is used, it is occupied by one or two English provision stores at *Delhi* and *Cawnpore*. Most of the parcels are, however, booked for *Cawnpore*, but the egg merchants are not known to make use of the above service at all. It is said that the increased charge of 1 pice per dozen eggs in freight is considered too heavy by them. They do not consider that, if the transport at ordinary temperatures helps to render, say, one more stale egg per two dozen eggs, the loss to them would be greater than paying one extra pice per dozen eggs.

[Transportation.]

INTER-CHAPTER SIX.

Apart from the movement of eggs from rural areas to the nearest local urban centre, there are three main long distance movements. From the *North-West Frontier Province* and the *Punjab* there is a general move towards *Sind*, *United Provinces* and *Bombay*. From the southern areas, *Cochin* | *Travancore* and parts of *Madras Presidency* the movement is northwards towards *Hyderabad* and *Bombay*. From *Bengal* there is a regular export trade to *Burma* and the balance moves towards the *United Provinces*, *Delhi* and to south-west towards *Bombay*.

Motor transport and cycles and horse-drawn vehicles may be used for short distances. The same applies normally to boat traffic, e.g., in *Bengal*, *Travancore* and *Burma*, although this may on occasion compete with long distance transport by rail particularly in the case of pickled eggs where water transport is very much cheaper and time is not important.

Long distance transport is done entirely by the railways and generally by passenger, express or mail trains. Goods trains are seldom used as the time taken is much too long. Taking into consideration the distance between the respective producing and inter-provincial consuming centres and the quantities loaded, the average distance covered may be taken as about 425 miles and the time about 15 or 16 hours. The cost works out at about 6 pies per dozen eggs, which represents roughly about 8 per cent. of the retail price or 15 to 17 per cent. of the producers' price. The intra-provincial movement is, however, much shorter and the cost on freight is proportionately less.

It has been estimated that the amount of damage due to breakages caused in the course of transportation is in the neighbourhood of Rs. 15 lakhs. To a very large extent this loss may be attributed to defective methods of packing generally employed at present. On an average of a series of consignments examined, 16 per cent. were found on arrival at the destination to be cracked, leaking or broken. There appears, however, to be no relation between the distance travelled and the amount of damage. The weaker the packing the greater the chances of damage irrespective of distance. Apart from this, owing to the flimsy character of the containers there is apparently some pilfering also.

So far as can be seen there is no need for a general reduction of freight on eggs. With a view to encouraging long distance transport from certain points in the three or four main producing areas, something has already been done towards establishing special rates to the leading consuming centres and there is perhaps scope for including smaller consuming centres in such concessions and also the ports in the case of eggs intended for export.

About 30 per cent. of the eggs reaching the consumer are by no means fresh and can only be sold at the price of "cooking" eggs. Another 10 or 12 per cent. are positively stale. The total loss due to lower prices on account of staling is estimated at Rs. 25 lakhs every year. Much of this occurs in the course of transport. The provision of insulated or refrigerated facilities on rail needs looking into. In view of the very high rate of loss in the hot weather, something more might perhaps be done by the railways in providing specially built-in lockers in goods vans on their express trains, and in educating dealers to make use of such facilities.

A study of the transport question, however, reveals that a good deal more needs to be done to improve the

present form of containers and method of packing eggs. This might also involve some modification of the present terms regarding the return of empties by rail. So far the railways do not appear to have developed to any appreciable extent a system for collection and delivery of eggs. This seems to call for further consideration and in contemplating any modification, account would have to be taken of the fact that the railway platform at the receiving end is frequently used as a wholesale market. If the railway companies are unable to provide cold storage facilities at such rail heads it would be desirable that their freights should be inclusive of delivery to the nearest cold store.

CHAPTER VII.—GRADING AND STANDARDISATION.

A.—General.

No two eggs are alike and the most important process in the successful marketing of eggs is their efficient "grading". In a country like India, where the temperature in shade is well above the incubation temperature and in view of the fact that collection is far from regular, and also on account of the long distances over which eggs have to be transported to the consuming centres, the process of "grading" is of the greatest importance. Grading is sorting of produce according to certain predetermined standards of quality. In the words of Linlithgow Committee*—

"Standardization is the first principle of modern commerce. It enables goods to be bought and sold on the faith of their description; it renders valid a comparison between lot and lot and between market and market; it is the essential foundation of advertisement."

In India, until the recent passing of the Agricultural Produce (Grading and Marking) Act, 1937, the quality standards for eggs were generally unknown to the trade. In the past sporadic attempts were no doubt made to grade and also to mark a few eggs (mostly of the improved birds), but these grades were generally unspecified, much less statutory, and their day to day application depended entirely upon the judgment or the will of the operator. As indicated on page 104 in the retail trade also the merchants generally sort the eggs into large, small and damaged, i.e., broken, chipped, stale; etc. This process, however, is also equally arbitrary and the eggs are rarely marked to indicate what they are. In *Bombay* some of the merchants have slightly better defined grades for interior quality as described later.

Municipal regulations regarding sale of defective eggs.—For the prevention of adulteration of foods and drinks, most of the provinces have the Pure Food Laws in force. There are, however, no specific regulations regarding the quality of eggs. Under the above Act, the Public Health Inspectors are empowered to seize and destroy any article of food, the consumption of which in their opinion may be injurious to human health. The Superintendents of the municipal markets are also sometimes delegated these powers. It is reported that occasionally a few bad eggs are seized and destroyed, e.g., during 1936 the Public Health Authorities destroyed about 385 eggs from a few shops at the Gol Market, *New Delhi*.

B.—General position with regard to grading in other countries.†

In most of the countries there exist grades of eggs, but these are generally observed more strictly in the case of eggs that are meant for export.

The grading is generally performed by exporters, producers' co-operative societies or merchants in business. *Danish* eggs stand out prominently as examples of good grading. Although the export

*Final Report (abstracted from Report on Egg Marketing in England and Wales).

†Abstract from Report on Egg Marketing in England and Wales.

control legislation does not prescribe weight grades, but merely requires that the grade weight as declared on each package shall be duly attained, as many as six weight grades are offered by the *Danes*, the eggs being graded uniformly in grades ranging from 13 to 18 lb. per 120 eggs, with occasionally larger samples. *Dutch* eggs are fairly uniform in the grading, the weight grades being from 15 to 18 lb. per 120. Their size and grading are largely known by the districts from which the eggs come. *Belgian* eggs are graded with less variety, 16 lb. being the usual standard. *French* eggs, when available, range from 13 to 18 lb. per 120, with special consignments weighing 20 lb. per 120. Some *French* packers grade closely to size; others grade less closely and in order to attain the putative average, eggs differing in weight by as much as $\frac{1}{4}$ oz. are even packed. The eggs vary, also according to the districts where they are produced. *Normandy* eggs, for example, are packed in weight-grades ranging from 15 to 18 lb. per 120, as against 13½ to 16 lb. per 120 for *Brittany* eggs. Many of the *Northern Irish* eggs, although supplied to a statutory guaranteed weight, are not closely graded, and eggs of the 14 and 17 lb. standard being included in making up a weight of, say, 15½ lb. (normally 16 lb.) per 120 eggs. Some of the *Italian* eggs are also not well graded. Eggs from *Russia*, *Sweden*, *Norway*, the *Baltic States*, *Yugoslavia* and the *Balkans* are generally fairly uniform in size, those from *Norway* are sorted for export into seven statutory weight grades ranging from 12 to 18 lb. per 120. Sorting into intermediate $\frac{1}{2}$ lb. grades is also permissible. Eggs from *Estonia* are classified for export into three statutory weight grades of 13 to 14, 14 to 16, and over 16 lb. per 120. The grading to size of supplies from *Canada*, *South Africa*, *Australia*, and *New Zealand* is well carried out, the weights ranging from 14 to 16 lb. per 120 with occasionally heavier samples. Eggs from *Argentina* average 14½ to 15 lb. but are not closely graded. Eggs from *Egypt* are not sold on a weight basis, but the district of origin is usually declared and this is a sufficient guide for the trade. *Chinese* eggs are graded for size, colour and quality; but are not sold to a declared weight; the grades are known in the trade as "greens", "violets" and "blacks", representing approximately 14½, 14, and 13½ to 12 lb. per 120, respectively.

In the other *European* countries, eggs are sometimes graded to size by weighing each egg individually. In one instance, in *France*, the eggs were weighed into three grades, 20,000 eggs a day being said to be graded by one person in this way. More usually, grading is carried out by hand and eye, scales being resorted to only for verifying the weight of doubtful eggs. This seems to be the general practice in *France*. In *Holland*, where grading by hand and eye is also usual, some exporters make a practice of weighing every 100 hand-graded eggs before packing; others rely on weighing the cases before despatch. The proportion of cases weighed depends on the skill and experience of the graders. One large *Dutch* exporter weighs no more than one case in 100, but so skilful is the grading that he definitely guarantees each consignment as being of the weight-grade named in the consignment note. *Danish* eggs now arriving on the *English* markets are also guaranteed as to weight.

Most of the graded eggs imported into *United Kingdom* are, however, sold on a trade margin of $\frac{1}{4}$ lb. per 120 eggs, which is said to be the allowance for shrinkage. Eggs from *Northern Ireland* carry a statutory allowance of $\frac{1}{2}$ lb. For instance, the 16 lb. pack, must weigh not less than $15\frac{1}{2}$ lb. per 120 eggs.

In *England and Wales*, under the "National Mark" scheme, fresh (unpreserved) hen eggs are graded into three grades. The statutory grade designations and definition of quality are as under.

Eggs produced in England and Wales : Statutory grade designations and definitions of quality.

Grade designations.	Definition of quality.	
	Minimum weight.	State or condition.
<i>Hen eggs—</i>		
NEW LAID SPECIAL Weight or NEW LAID SPECIAL or SPECIAL Weight or SPECIAL	$2\frac{1}{8}$ oz.	First quality i.e. the egg must not have been preserved by any process and must be free from taint; the shell must be clean, sound, of good texture and shape. The contents must be free from blemish, the yolk central and translucent or faintly but not clearly outlined, the white must be translucent and the air-space must not exceed $\frac{1}{4}$ " in depth.
NEW LAID STANDARD Weight or NEW LAID STANDARD or STANDARD Weight or STANDARD ..	$1\frac{1}{2}$ oz.	
NEW LAID MEDIUM Weight or NEW LAID MEDIUM or MEDIUM Weight or MEDIUM ..	$1\frac{1}{4}$ oz.	
NEW LAID PULLET Weight or NEW LAID PULLET or PULLET Weight or PULLET	None	
<i>Duck Eggs—</i>		
NEW LAID SPECIAL Duck..	$2\frac{1}{4}$ oz.	First quality, i.e., the egg must not have been prepared by any process, the shell must be clean and sound, the yolk central, visible but not dense, and moving freely. The white must be translucent and firm.
NEW LAID STANDARD Duck	2 oz.	
NEW LAID SMALL Duck ..	None	

Under the Agricultural Produce (Grading and Marking) Act, 1928, (England and Wales), all eggs which have been preserved by processes such as lime-water, water-glass or oil must be marked distinctly and legibly on the shell with the word "PRESERVED". Further all British eggs which have been kept in cold storage or chemical storage must be marked on the shell with the words "CHILLED" or "COLD STORED", in the former case, and in

the latter case with the word "STERILISED", before they leave the storage premises.

In the *United States of America* standards are provided for eggs with clean sound shell, for eggs with dirty but sound shell and for eggs with cracked shell as well. The grade designations under each type are as under* :—

(a) *Eggs with clean sound shell—*

(i) U. S. Special, (ii) U. S. Extra, (iii) U. S. Standard and (iv) U. S. Trade.

(b) *Eggs with dirty sound shell—*

(i) U. S. Extra Dirty, (ii) U. S. Standard Dirty and (iii) U. S. Trade Dirty.

(c) *Eggs with cracked or checked shell—*

(i) U. S. Check.

C.—Quality of market eggs.

It is already indicated that the trade in India does not practise grading or marking of eggs, and as such, there was no data available for drafting the necessary statutory grades for the market eggs. Grade specifications of the western countries are also equally unsuitable as the Indian eggs are much smaller, the average weight per 100 fowl eggs being about 9 lb. against 15 to 18 lb. of the Continental or British eggs. The Indian duck eggs weigh about 14 lb. per 100. With a view to drafting the specifications for the Egg Rules under the Agricultural Produce (Grading and Marking) Act, 1937, several market samples of fowl and duck eggs were examined in different parts of the country and the variations studied.

(1) *Desi FOWL EGGS.*

Consignments of eggs were analysed for weight, appearance, interior quality, etc., at each of the 28 places where the study was made. The results of these analyses are summarised in Appendix XXXI.

(a) *Age of market eggs.*—By this is meant the period that elapses between the laying of the egg and the time when it reaches the consumers. It is clear that in the trade of unpreserved eggs this factor is rather important, particularly in the absence of cold-storage facilities. The results of enquiries are summarised in column 2, of the above Appendix. It would be seen that the average age of the market eggs is reported to be 7 days, i.e., the eggs were a week old when they were examined at the consuming markets. The period ranged from 3 days to 12 days. It must, however, be mentioned that much reliance should not be placed on these figures, as the information is based entirely on what the sellers disclosed and it is highly probable that they themselves did not know exactly when the eggs were actually laid by the birds. For instance, a basket of eggs at a consuming market may be made up of eggs from different collectors, different villages and different households. As such the age of each egg may vary and it would be generally difficult to say with accuracy how old they were.

*Handbook of official United States Standard for individual eggs.

It may not be out of place to mention here that attempts have been made by some of the poultry farms to stamp on each egg the date when it was laid, but since all of them may not at times be sold within a day or two, it was observed that, an unstamped old egg was preferred to an egg which bore a date one or two days old, because the former was passed as fresh. During the early experimental period, when the grades and the method of marketing were being tried, graded eggs were individually marked with their grade designations, e.g., A, B, C, etc., and also with the name of the packing station or area, e.g., *Pabbi* or *Travancore*. It was soon discovered that the purchasers at the distant consuming centres (*Bombay*, *Delhi*, etc.), suspected the quality of these eggs, simply because they came from such distances. The same eggs when delivered without the name of the packing station or place of production, were accepted without any hesitation.

Practically no work has been done in a scientific manner to study the useful life of an egg under different conditions in India. As such it is difficult to say for how long an egg will remain good, say, for table purposes, for cooking and for confectionery, at different times of the year. A short and somewhat crude trial, however, showed that even with about 10 days of storage at ordinary temperatures during winter, the eggs showed no appreciable deterioration in quality and at least 90 per cent. of the eggs were still fresh (see page 183).

(b) *Weight groups of eggs.*—Prior to examining the eggs and laying down a standard for the minimum weight of the different groups, large, small, etc., the eggs were classed according to sizes (dimensions), so that the eggs of the different proposed grades might show marked difference in their looks.

It was observed that when the minimum weight groups were of $1\frac{1}{2}$ oz., $1\frac{1}{4}$ oz., and $1\frac{1}{2}$ oz., the classification was most satisfactory and a group of eggs could not be mistaken for a higher or lower weight or size group (see lower plate facing page 172). In most of the lots examined it was further observed that a few eggs were below $1\frac{1}{4}$ oz. also and these were grouped as such. Accordingly the minimum weight standards adopted in examining eggs at different centres were $1\frac{1}{2}$ oz., $1\frac{1}{4}$ oz., $1\frac{1}{2}$ oz., and also less than $1\frac{1}{4}$ oz. The results of the analysis thus obtained in different areas, are given in Appendix XXXI. The averages for India and *Burma* are as under :—

Proportion of different weights in desi fowl eggs.

	Minimum weight.			Below $1\frac{1}{4}$ oz.
	$1\frac{1}{2}$ oz.	$1\frac{1}{4}$ oz.	$1\frac{1}{2}$ oz.	
	Per cent.	Per cent.	Per cent.	Per cent.
India	8	33	41	18
Burma	23	52	15	10

(c) *Weight per hundred eggs.*—The calculated weight of the consignments examined in different areas are also given in Appendix XXXI. Since the calculated weight is based on the minimum weight of eggs in each group, the net weight would be slightly greater than the calculated weight. Accordingly, the average weight of *desi* fowl eggs is 8 lb. 5 oz. whereas the actual weight is found to be in the neighbourhood of 8 lb. 8 oz.

From the figures given in the above Appendix it would appear that the heaviest eggs (9 lb. 7 oz. per 100) are found in the north, particularly in the *North-West Frontier Province*. In these areas the fowls are usually larger than in other areas and the producers also hand feed them occasionally. The climatic conditions are also more favourable with long periods of cooler weather and less rainfall. Similarly, eggs in *Bihar* and *Bengal* are smallest and weigh only 7 lb. 9 oz. and 7 lb. 15 oz., respectively, per 100. This is said to be due to the wet conditions in some parts of these areas.

(d) *Seasonal variation in the weight of eggs.*—From the results obtained at the AGMARK grading stations (described later) during the different months, it is observed that there is only a slight natural variation in the weight of eggs. The table below deals with the position.

Seasonal variation in weight of eggs.

	Peshawar Station.		Travancore Station.	
	Weight per hundred eggs.	Percentage of deviation from annual average.	Weight per hundred eggs.	Percentage of deviation from annual average.
1937.	lb. oz.		lb. oz.	
January	9 8	+1.3	9 1	+2.8
February	9 5	—0.7	8 15	+1.4
March	9 7	+0.7	8 12	—0.7
April	9 5	—0.7	8 13	Nil.
May	9 4	—1.3	8 15	+1.4
June	9 5	—0.7	8 13	Nil.
July	9 8	+1.3	8 14	+0.7
August	9 7	+0.7	8 15	+1.4
September	9 6	Nil.	8 12	—0.7
October	9 6	Nil.	8 13	Nil.
November	9 4	—1.3	8 11	—1.4
December	9 3	—2.0	8 13	Nil.
Average	9 6	..	8 13	..

The above figures represent the results of grading of over 43 lakhs eggs during the course of a year, at the above two places. It would be noticed that there is only a slight variation in the monthly weights of eggs. In the case of *Travancore* the range of variation is about 4 per cent., but in the case of *Peshawar* it is only 3.3 per cent. It is particularly noticed in the *Peshawar* area that during the months of April, May, and June when the production of eggs is greater (see page 19), the weight of the eggs decreases. Similarly with low production in July and August, the weight of eggs increases. At any rate the present information shows that buyers need not entertain any doubts regarding the abnormal seasonal decrease or increase in the weight of the Indian eggs.

(e) *Appearance*.—Reference has already been made that nearly half of the market eggs are found dirty and that the shells are covered with mud and ashes, or have the shells and egg matter of the broken eggs sticking on them. Columns 8 and 9 of Appendix XXXI deal with the readings as obtained in the various consignments examined. It is noticed that the degree of extraneous dirt on the shells varies with each consignment. The average of the 28 places, viz., 56 per cent. clean and 44 per cent. dirty eggs might, however, be considered as representative of most of the consignments and areas.

(f) *Natural colour of the shell*.—The natural colour of the shell is mainly due to influence of breed characteristics. Amongst the indigenous breeds, the *Asil* or the "Indian Fighting Game" lays a brown coloured egg, whereas the "Indian Jungle fowl" lays generally a white coloured egg. In the building up of any breed, the extent of the blood of the above fowls would therefore influence the colour of the eggs in that breed. It may be further noted that although a hen lays eggs of approximately the same shade, the degree of pigmentation may vary according to the stage of production. According to Benjamin* there is a tendency for the eggs produced gradually to become whiter during the first five or six months of production, and then to become more tinted again towards the end of the production season.

In the marketing of *desi* eggs, however, hardly any attention is paid by the trade to the colour of the shell. In certain instances the dirt on the shell covers it so completely that its colour is neither visible nor has any importance. It would, however, be noticed from Columns 10 and 11 of the Appendix XXXI that on the average a little less than half (47 per cent.) of the eggs have white coloured shells, and the remaining eggs have tinted shells in which light brown colours predominate.

In *North-West Frontier Province, Punjab, Patiala State, Sind, Bombay Presidency, Travancore, Cochin, Madras Presidency, Central Provinces, Bihar, Bengal and Assam*, the brown tinge usually predominates, whereas in the other areas either there is an equal

* "Poultry Breeding" by Jull.

distribution of white and brown or the white coloured shells predominate. In *Burma*, also nearly three-fourths of the fowl eggs are found to have white coloured shells.

(g) *Interior quality*.—At the time of examination (by candling) for the interior quality, three standards were specified as follows: (a) Eggs in which the yolk was well centred and dimly visible with the white translucent and firm, (b) Eggs in which the yolk was plainly visible and mobile, but not dark or discoloured, thin white being permissible, and (c) Eggs that were definitely bad and had ceased to be edible. The above three types were roughly called as "fresh", "cooking" and "stale", and the results of the analysis obtained are given in Columns 12 to 14 of Appendix XXXI. Several eggs were also opened up in each case to confirm the candling tests.

The examination showed that only about two-thirds (65 per cent.) of the market eggs could be classed as "fresh". The fresh eggs with the yolk generally free from blemishes, and the white firm, clear and not spreading out upon breaking are considered fit for table use. In the consignments examined in *Burma* also, nearly the same proportion (64 per cent.) of fresh eggs was obtained.

About 30 per cent. of the eggs were classed as "cooking eggs". In these, the yolk generally lies flat upon breaking the egg and the white is also thin. Some of the yolks may even break upon opening, and they are not considered suitable for table purposes, but may pass off for cooking, confectionery, etc.

The third classification was of eggs that were definitely "stale" and unfit for consumption. Some of them were even found to be offensive upon breaking. The proportion of stale eggs was found to be about 5 per cent. in India and only 2 per cent. in *Burma*.

(2) "IMPROVED" EGGS.

These are larger eggs from imported birds of improved strains and breeds, or from improved birds bred and acclimatized in India. As explained before, the production of these eggs is small. The village produced improved eggs generally get mixed up with the *desi* fowl eggs and are marketed with them. In such instances, their age, appearance and interior quality may be the same as those of the *desi* eggs, as discussed above. The size of the eggs diminishes with improper breeding, feeding, etc., and it is noticed that the eggs of improved birds kept in the villages for some years are only about 1 lb. 8 oz. heavier per 100 than the eggs of *desi* fowls, but the farm produced improved eggs are decidedly larger and superior in quality.

All the farm produced improved eggs may be classed as "fresh" for table purposes, since they are marketed within a day or two of their production and are clean.

Although on most of the farms the *White Leghorn* breed predominates, small numbers of other breeds, such as, *Black Minorca, Rhode Island Red, Light Sussex, Australorp*, etc., are also found.

The above figures represent the results of grading of over 43 lakhs eggs during the course of a year, at the above two places. It would be noticed that there is only a slight variation in the monthly weights of eggs. In the case of *Travancore* the range of variation is about 4 per cent., but in the case of *Peshawar* it is only 3.3 per cent. It is particularly noticed in the *Peshawar* area that during the months of April, May, and June when the production of eggs is greater (see page 19), the weight of the eggs decreases. Similarly with low production in July and August, the weight of eggs increases. At any rate the present information shows that buyers need not entertain any doubts regarding the abnormal seasonal decrease or increase in the weight of the Indian eggs.

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*"Poultry Breeding" by Jull.

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The third classification was of eggs that were definitely "stale" and unfit for consumption. Some of them were even found to be offensive upon breaking. The proportion of stale eggs was found to be about 5 per cent. in India and only 2 per cent. in *Burma*.

(2) "IMPROVED" EGGS.

These are larger eggs from imported birds of improved strains and breeds, or from improved birds bred and acclimatized in India. As explained before, the production of these eggs is small. The village produced improved eggs generally get mixed up with the *desi* fowl eggs and are marketed with them. In such instances, their age, appearance and interior quality may be the same as those of the *desi* eggs, as discussed above. The size of the eggs diminishes with improper breeding, feeding, etc., and it is noticed that the eggs of improved birds kept in the villages for some years are only about 1 lb. 8 oz. heavier per 100 than the eggs of *desi* fowls, but the farm produced improved eggs are decidedly larger and superior in quality.

All the farm produced improved eggs may be classed as "fresh" for table purposes, since they are marketed within a day or two of their production and are clean.

Although on most of the farms the *White Leghorn* breed predominates, small numbers of other breeds, such as, *Black Minorca, Rhode Island Red, Light Sussex, Australorp*, etc., are also found.

The size of the eggs not only differs in each of these breeds, but also within a breed. For example, the "exhibition" strains of birds lay smaller eggs than the "utility" strains, which lay larger eggs. The table below illustrates the position with respect to some of the breeds found on two farms in *Madras Presidency* and the *United Provinces*.

Grades and weights of improved eggs.

Breed.	Type.	Minimum weight.			Below 1½ oz.	Approximate weight per hundred eggs.
		2 oz.	1-7/8 oz.	1½ oz.		
		Per cent.	Per cent.	Per cent.	Per cent.	lb. oz.
<i>White Leghorn</i>	(a) Utility ..	67	33	..	..	12 4
	(b) Exhibition	7	81	11	1	11 7
<i>Black Minorca</i>	(a) Utility ..	81	19	..	..	12 6
	(b) Exhibition	7	82	10	1	11 9
<i>Rhode Island Red</i>	(a) Utility ..	58	42	..	..	12 3
	(b) Exhibition	5	74	17	4	11 3
<i>Australorp</i> ..	..	63	37	..	..	12 0
<i>Light Sussex</i> ..	..	30	62	7	1	11 12
					Average	11 13

It would be seen that the weight of eggs of improved birds, kept on the farms, is about 3 lb. 8 oz. per 100 eggs more, than the average weight of 100 *desi* fowl eggs.

The natural colour of the shell depends upon the breed, which is as under :—

Colour of the shell.

<i>White Leghorn</i>	..	..	..	White, without any traces of brown tinting.
<i>Black Minorca</i>	..	..	..	Same as above.
<i>Rhode Island Red</i>	..	..	..	Brown.
<i>Australorp</i>	..	..	..	Same as above.
<i>Light Sussex</i>	..	..	..	Tinted, but not as brown as that of the <i>Rhode Island Red</i> .

(3) DUCK EGGS.

Prior to the recent examination of duck eggs, in all the important areas of production in India and *Burma*, little was known about their quality. These eggs were examined simultaneously with those of hen eggs and the results of analysis are summarised in Appendix XXXII.

(a) *Age of market eggs.*—The average age of the consignments of the fowl eggs that were examined was reported to be about 7 days, whereas from the appendix it would be observed that the age of the market duck eggs is a day less, viz., 6 days. This small difference between the two types is due to the fact that duck eggs are not transported to distant markets as is done with hen eggs.

(b) *Weight groups of eggs.*—The duck eggs being larger than the hen eggs, at the time of analysis, the weight group for these eggs had to be different. It was noticed that the minimum weights of 2½ oz., 2¼ oz., 2 oz. and 1½ oz. were best suited for the purpose and between these the difference in appearance was quite perceptible.

It would also be noticed from the above Appendix that the average eggs could be graded as under :—

Proportion of different weights in duck eggs.

	Minimum weight.				Calculated weight per hundred eggs.
	2½ oz.	2¼ oz.	2 oz.	1½ oz.	
	Per cent.	Per cent.	Per cent.	Per cent.	lb. oz.
<i>India</i>	30	29	27	14	13 11
<i>Burma</i>	19	64	12	5	14 0

(c) *Weight per hundred eggs.*—From the above Appendix it would be seen that the calculated average weight per hundred eggs (on the basis of minimum weights) amounts to 13 lb. 11 oz. The actual weight is, however, nearly 14 lb. per hundred duck eggs. It would also be clear that the smallest eggs are found at *Calcutta*, being only 11 lb. 15 oz. per hundred, whereas the heaviest eggs are reported from *Cochin* where the recorded weight is 15 lb. 3 oz. per hundred. Some of the consignments have weighed as much as 17 lb. per hundred eggs.

In *Burma* the calculated weight is 14 lb. per hundred duck eggs.

(d) *Appearance.*—It has been pointed out that duck eggs are generally dirtier than fowl eggs. This is due to wet conditions

under which the ducks are kept. From the appendix under discussion it would be seen that less than 30 per cent. of the duck eggs are clean, the rest being dirty. In a consignment examined at *Trivandrum* only 2 per cent. eggs could be called clean.

In *Burma* the position is better, only about a third of the eggs examined being found dirty.

(e) *Natural colour of the shell.*—Nearly all the duck eggs are white, with a slight shade of blue. For this reason a separate reference has not been made in the Appendix about this factor. Certain shells are, however, noticed to have slight shades of peacock blue colour and this is reported to be due to the eggs being laid in water on the banks of tanks or creeks. The immersion of a new laid warm egg in cold water, is said to change the colour of the shell.

(f) *Interior quality.*—The technical difference between the fresh, cooking and stale qualities described on page 167, for the hen eggs, is generally applicable to the duck eggs also. There is, however, a slight difference in the market quality between the two types of eggs, and it would be seen from the Appendix under reference, that compared with the hen eggs, the duck eggs generally reach the markets in a fresher state.

(4) COMPARATIVE QUALITIES OF MARKET EGGS.

The discussion in the foregoing pages is summarised in the table below, for the eggs of fowls (*desi* and improved) and ducks.

*Comparative qualities of market eggs.**

	Average age when sold (days).	Approximate weight per hundred eggs.		Appearance.		Interior quality.		
		lb.	oz.	Dirty (per cent.).	Clean (per cent.).	Fresh (per cent.).	Cooking (per cent.).	Stale (per cent.).
<i>Desi</i> fowl (India) ..	7	8	5	56	44	65	30	5
<i>Desi</i> fowl (Burma) ..	5	9	3	92	8	64	34	2
Improved (village) ..	7	9	13	56	44	65	30	5
Improved (farm) ..	1	11	13	Neg.	Mostly	Mostly	Neg.	..
Duck (India) ..	6	13	11	29	71	71	25	4
Duck (Burma) ..	6	14	0	64	36	67	30	3

It would be seen that the duck eggs are the heaviest of the lot, even heavier than the improved (farm) fowl eggs.

*Based upon examination made during winter months.

(5) VALUE OF ANNUAL LOSS TO THE TRADE ON ACCOUNT OF DEFECTIVE QUALITY OF MARKET EGGS.

From the foregoing table, illustrating the comparative qualities of market eggs, it would be noticed that the proportion of stale (inedible) eggs is found to be 5 per cent. and that of the "cooking" eggs about 30 per cent. The remaining eggs or about 65 per cent. only could be sold as fresh.

A reference has already been made on page 155 that the percentage of stale eggs in winter months is only about a quarter, of that found in the other months. Since the examination under discussion, (on which the foregoing table is based), was made during winter, an allowance for the other months has to be made, and it is estimated that on an annual basis, the proportion of the three types would be somewhat as follows :—

Interior quality of market eggs on annual basis.

	Percentage to the total.					
Fresh ..	..	..	..	..	..	60
Cooking ..	..	..	..	..	..	28
Stale ..	..	..	..	..	..	12
						(100)

From the above figures it would be seen that the present state of marketing of eggs is far from satisfactory. Nearly 40 per cent. of the eggs do not reach the consumers in a "fresh" state, of which more than 10 per cent. are positively stale and inedible when marketed. It not only illustrates the fact that for making an improvement in the quality of the market eggs, more than a third of the supply is to be tackled, but the annual loss to the trade due to this must also be considerable.

For instance, it is stated at page 43 that about 9,035 lakhs eggs are marketed and consumed annually in urban areas of India. If the retail price of fresh eggs is, say, 6 annas per dozen, the price of "cooking" eggs would be about 4 annas 6 pies and that of definitely stale eggs would be about 1 anna per dozen. Most of the stale eggs are to be thrown away or exchanged for good ones, but in large cities (as would be seen later) there may be a demand for these eggs at 4 to 6 annas per hundred. Some of these eggs may also sometimes be passed off with the cooking eggs. Even if it is reckoned, that 40 per cent. of the market eggs are sold as cooking eggs at 4 annas 6 pies per dozen, instead of 6 annas per dozen as fresh eggs, the annual loss to the trade on the sale of 3,614 lakhs eggs amounts to a sum of Rs. 28 lakhs, which could be prevented if the quality was improved.

(6) QUALITIES OF OTHER EGGS.

A few eggs of guinea-fowls, geese and turkeys were also examined but, as their production is insignificant, it has been difficult to obtain representative samples of these eggs from all the areas.

The guinea-fowl eggs are slightly smaller (the average size ranges between 1 oz. and 1½ oz.) than the *desi* fowl eggs, are roundish in shape and are speckled brown on the shell. The goose eggs are the largest in the above group, and weigh about 4 to 5 oz. each. The natural colour of the shell is white. Turkey eggs are smaller than the goose eggs and weigh about 2½ to 3 oz. Their white shell has brown specks on it.

(7) QUALITY REQUIREMENTS FOR SUPPLY OF EGGS TO THE ARMY IN INDIA.

Reference has already been made at page 134 to the weight specifications of eggs required by the *Army in India*. The following specifications are prescribed for "freshness" of the eggs.

The freshness or otherwise of eggs may be ascertained as follows :—

Place the egg in front of an opening in a screen between a bright light and the eye. If the egg is fresh, it will show an uniform rose-coloured tint, without dark spots, the air chamber being small and occupying about one-twentieth the capacity of the egg. The air chamber is always at the larger end of the egg. On candling, the air chamber will be found to be slightly less translucent than the rest of the egg and shows up relatively darker. It is not opaque and is bounded by a well defined line of demarcation.

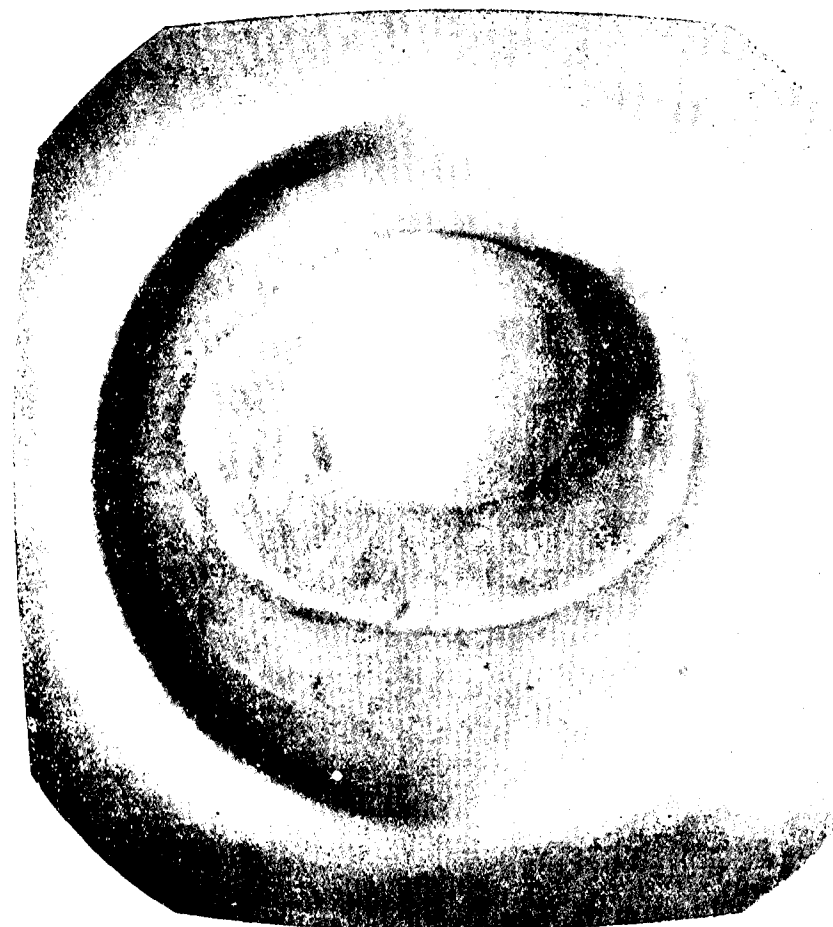
If the egg is not fresh, it will appear more or less cloudy, being darker as the egg grows older, becoming in extreme cases opaque. At the same time the air chamber grows larger as the age increases.

D.—Quality standards in vogue at Bombay.

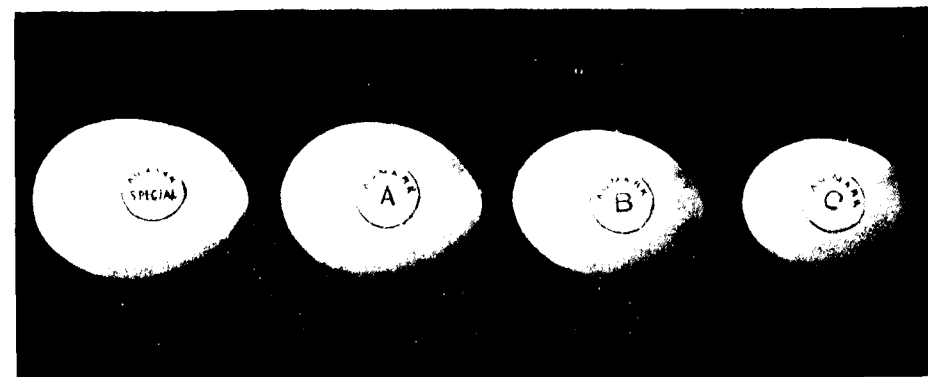
Except in *Bombay city*, where some of the merchants have three or four standards of interior quality of eggs, there is no information available to show that in other places in India or *Burma* the trade observes standards on similar basis. The *Bombay* standards are no doubt unspecified, nor are the eggs marked as such, but owing to long practice they have attained a fair amount of uniformity.

After receipt of the eggs from various sources and before distributing them to the retailers or consumers, they are sorted by candling into three grades, with the following local vernacular names :—

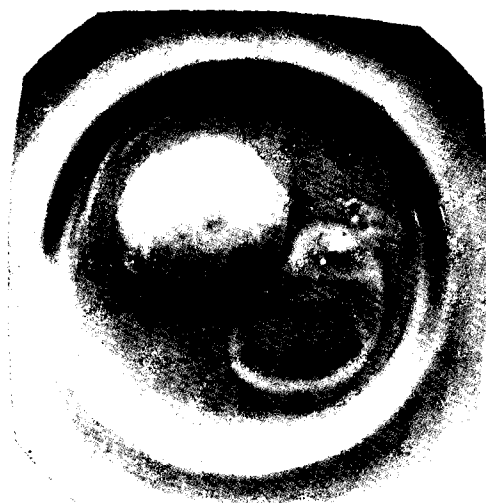
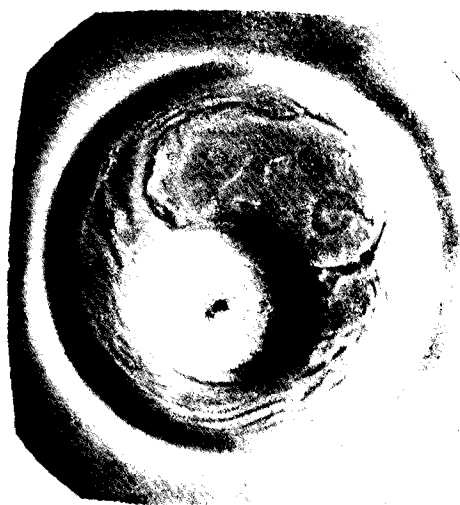
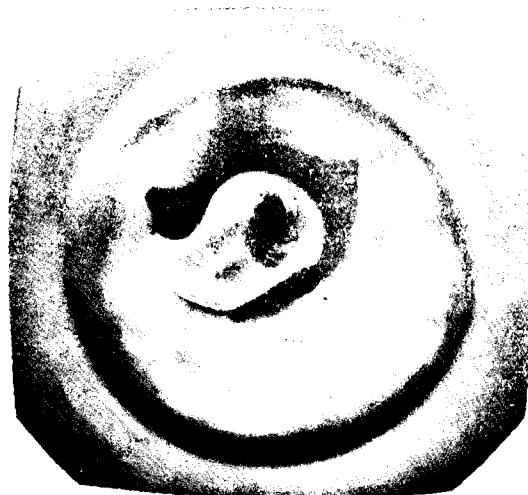
- (1) *Taza* or fresh.—This quality is supposed to fulfil the requirements of "table" and "cooking" eggs. It would be seen later that as many as 85 per cent. of the eggs are graded as "fresh" during winter season.
- (2) *Jaliwala* or those eggs that have on the yolk blood rings or meat spots, (*jali* meaning a network of rings). They are used mainly for cooking, at cheaper types of hotels and confectioneries. It is observed that when the size of the blood ring is small [not larger than a *moon*]



The interior quality of AGMARK eggs.



The external appearance of AGMARK eggs of the four grades.

(i) *Taza* quality (Bombay).(ii) *Jaliwala* quality (Bombay).(iii) *Naram* or *ganda* quality (Bombay).

pulse—(*Phaseolus radiatus*)] the eggs of *jaliwala* quality may even be included into the *taza* quality. If the ring or the blood spot is, however, larger than the size of a pea (*Bisum sativum*) the eggs may be classed in the third class below.

- 3) *Naram* or weak, and *Ganda* or rotten quality.—There may be a variety of factors on account of which these eggs may have ceased to be edible. For example, the germ development may have commenced, the white and yolk may have become putrid or watery, or dark coloured areas, black rot, or other defects in the yolks may have developed. On breaking, these eggs give offensive smell.

See plates facing this page for illustrations of the three qualities.

(1) PROPORTIONS OF THE DIFFERENT GRADES.

These depend upon the age of the eggs coming from different areas and vary from day to day. Produced below are the results of grading examination as obtained by a merchant at *Bombay*.

Local grading of eggs at Bombay.

		<i>Taza.</i>	<i>Jaliwala.</i>	<i>Naram</i> <i>and ganda.</i>	
Winter season	.. ..	85	10	5	(100)
Summer season	.. ..	60	25	15	(100)

(2) PRICES AND UTILIZATION.

The *taza* or fresh eggs are sold at popular market prices, after further sorting them for size, as already described in the Chapter on Prices. They are used for table or cooking purposes. *Jaliwala* quality eggs are generally used for confectionery and sell at about 10 to 15 per cent. below the price of *taza* eggs. The *naram* eggs are used exclusively by the cheaper type of confectioneries at Re. 1 to Rs. 1-4-0 per hundred, or about a third of the price of the *taza* eggs. It is surprising that even the *ganda* eggs have a market and are sold at 4 annas to 6 annas per 100. It is difficult to understand how these eggs could be used at all, as their inclusion in any type of cooking or confectionery must prove ruinous to its flavour and wholesomeness. Sometimes no doubt these eggs are thrown away when they become offensive. In rare instances, due to a bacterial infection and heat, they even burst open and make the surroundings most unpleasant.

E.—The AGMARK eggs.

(1) THE AGRICULTURAL PRODUCE (GRADING AND MARKING) ACT, 1937.

The preliminary marketing surveys of some of the agricultural commodities showed that the practice of selling produce of doubtful quality mixed with clean and good produce, was fairly common throughout the country. Such a practice involved unnecessary

expense in packing, transport and handling. In the case of a perishable commodity like eggs, the practice led to a further deterioration of their quality and ultimately greater loss to the trade. Grading and marking of the produce was therefore considered to be one of the methods whereby, not only could waste be minimised and even eliminated but better prices could be obtained for the graded produce. It also encouraged the marketing of good produce of uniform quality under a definite grade.

Accordingly the Agricultural Produce (Grading and Marking) Act, 1937, was passed from 1st April 1937. Under the Act apart from grades of other commodities, statutory grades of fresh and unpreserved fowl and duck eggs are also prescribed. The scheme in general is known as the AGMARK scheme, based upon the abbreviations of the words "Agricultural Marketing". The graded produce is termed as AGMARK produce, e.g., AGMARK eggs, AGMARK ghee, etc. (See Appendix XXXIII.)

(2) QUALITY OF THE EGMARK EGGS.

For the sake of convenience the AGMARK specifications are reproduced below. The illustration of the interior quality of an AGMARK egg is given in the top plate facing page 172, while the external appearance is shown in the lower plate.

Grade designation and definition of quality of EGGS (hen and duck) produced in India.

Grade designations.	Definition of quality.			
	Hen eggs.		Duck eggs.	
	Minimum weight.*	State or condition.	Minimum weight.*	State or condition.
1	2	3	4	5
	oz.			
Special	1½	The eggs must not have been preserved by any process and must be free from taint; the shell must be clean free from stain, sound, of normal texture and shape. The contents must be free from blemish, the yolk central and translucent or faintly but not clearly outlined and freely mobile; the white must be translucent and clear and the air space must not exceed three-eighths of an inch in depth.	2½	The eggs must not have been preserved by any process, the shell must be clean, free from stain and sound, the yolk central, visible but not dense, and freely mobile. The white must be translucent, firm and not watery.
A	1½		2½	
B	1½		2	
C	1½		1½	
†				

*To allow for accidental errors in grading a tolerance of 1 drachm in the weight of any egg may be permitted.

†A fourth grade 'D' for small eggs below 1½ oz. is under consideration.

(a) *Explanation of quality**.—In column 3 above are given the specifications for interior quality of the AGMARK eggs. It would be noticed that they are identical for large or small eggs, but are slightly different for hen and duck eggs.

(i) *The shell—Clean*.—A clean shell is one which is free from any extraneous matter, stains or discoloration. *Sound*.—A sound shell is one that is free from visible or blind cracks. *Normal texture and shape*.—A normal shell is one which approximates the usual shape and which is of good, even texture.

(ii) *The yolk—Central*.—A yolk that occupies the centre of the egg without much movement from that position when the egg is twirled. *Not clearly outlined*.—A yolk, the outline of which is not clearly discernible when viewed before the candle. *Freely mobile*.—A freely mobile yolk is one which shows a wide movement, or swing away from the centre of the egg, when it is twirled before the candle, and comes sufficiently close to the shell to cast a decidedly dark shadow.

(iii) *The white—Translucent and clear*.—A white which is free from discolorations which before the candle appear as dark bodies.

(iv) *The air-space—Not more than three-eighths of an inch in depth*.—When in its natural position the depth of the air cell is the distance from the broad end of the egg to the lower edge of the air-cell, where it touches the shell, which must not exceed three-eighths of an inch.

(b) *Explanation of the quality of AGMARK duck eggs*.—

(i) *The yolk—Visible but not dense*.—When a freely mobile yolk closely approaches the shell, when twirled before the candle, it should not appear as a dense or dark shadow.

(ii) *The white—Firm*.—A firm white is one which is sufficiently thick or viscous to permit but little movement of the yolk from the centre of the egg. *Not watery*.—The white which is not thin, or lacks viscosity and shows a dark shadow of the yolk, as the egg is twirled before the candle.

F.—General method of grading the AGMARK eggs.

It is of utmost importance to see that no time is wasted during grading. It has been noticed that the work at a grading station can be divided into six convenient stages as follows :—

First stage—sorting of cracked eggs and cleaning of other eggs.—Since village eggs include dirty and damaged ones which cannot be graded they are sorted out at the very start (see plates facing page 176). This is done by hand and takes but a few minutes. The Rules under the Act require that the egg-shell must be "clean, free from stain, sound, and of normal texture and shape". The cleaning may

*Some of the terms used in here, are borrowed from the Handbook of Official United States Standards for individual eggs.

be done with a damp piece of felt, but care must be taken to avoid the use of excessive water. It is observed that with a little practice a helper can generally clean about 700 to 1,000 eggs per hour.

The use of egg cleaning machines may also be tried out and an efficient machine operated by hand costing about Rs. 140 is observed to clean and dry about 1,500 eggs per hour. The machine cleaning is, however, recommended for merchants handling over 5,000 eggs per day.

Second stage—candling.—Candling is done with the help of a strong light. Since electricity is still not available at most of the places, an ordinary Petromax lamp covered with a metal hood, as per bottom plate facing this page, is used for candling. The lamp is placed in the corner of the room, which is darkened with a black curtain. The egg is held with the large end upward, between the thumb and the first two fingers, at a distance of about a foot from the eye, and as near as possible to the aperture of the lamp. It is given a quick twirl so that the contents may rotate. A reverse twirl may also be given. According to the Rules under the Act, "the contents of the egg must be free from blemish, the yolk central, and freely mobile; the white must be translucent and clear and the air-space* must not exceed three-eighths of an inch in depth". When a normal fresh* egg is candled the entire contents appear pinkish yellow, but by looking closely the air-space at the larger end and the diffused shadow of the yolk near the centre are seen.

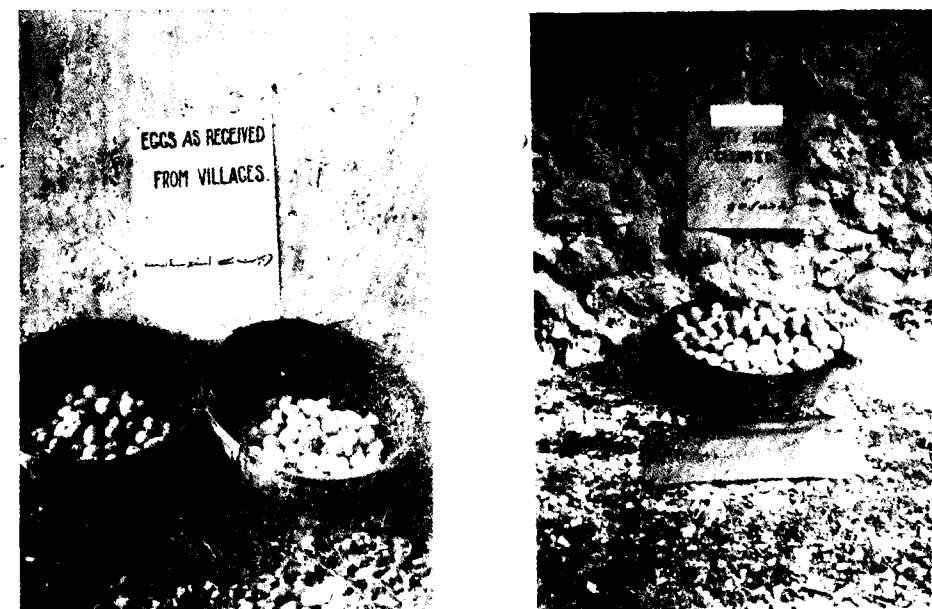
It has been found that when the grade specifications are clearly understood, a helper can candle 600 to 900 eggs per hour, if not more.

Third stage—grading.—After the sound uncracked eggs are cleaned and examined for their freshness, they are sorted into different grades according to the Rules (see top plate facing page 177). Grading is done with the help of machines† of various sizes. For grading 2,000 to 3,000 eggs per hour the cost is Rs. 400 to Rs. 1,000. These machines are generally suitable for merchants handling over 10,000 eggs per day. For those handling up to 3,000 eggs per day, a small and simple machine is designed locally and is available for less than Rs. 20.

Fourth stage—marking or stamping the graded eggs.—The rules require that "the mark on each egg shall consist of the word "AGMARK" together with the grade designations (Special, A, B, and C) placed centrally in a circle of not less than $\frac{1}{4}$ inch diameter and further, "the grade designation mark shall be marked legibly

**Signs of a bad egg.*—If the yolk moves quickly and shows blood, meat or black spots, or is discoloured, patchy or sticking to the sides, and if the white is indistinct, discoloured or cloudy, or there is a large air-space the egg is considered as stale.

†Machine grading is done on the basis of weight as indicated in the Rules, but since weight and size are fairly closely related, it is possible to grade eggs by hand (without any mechanical help) on the basis of size, as determined by individual judgment. In such cases, the weight should be checked occasionally by a small egg weighing scale (cost about Rs. 3).



First Stage. The plate on the left shows dirty, cracked and stale eggs as received from villages. The other on the right shows these eggs after sorting and cleaning.



Second Stage. After cleaning, the eggs are candled.

Facing page 177.]

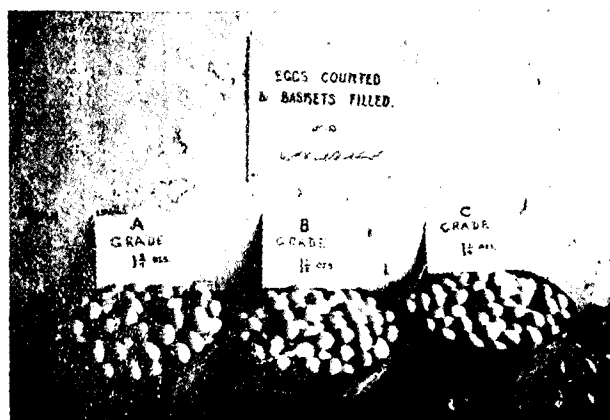


Third Stage. After candling, the eggs are graded.



Fourth Stage. After grading the eggs are stamped with AGMARK.

[Note the grading machine on the left.]



Fifth Stage. After stamping the eggs are packed according to the grades.

on each egg in indelible ink on the shell by means of a rubber stamp". The eggs are laid flat on a padded tray and marked gently with the stamp (see centre plate facing this page).

Fifth and Sixth stages—packing and affixing the AGMARK labels.—The Rules regarding packing are "The contents shall be clean and suitable for the purpose. Packing material if used shall be clean, dry and sweet, free from any taint liable to impart an objectionable odour to the eggs. Hen and duck eggs shall be packed separately. Eggs of different grades shall also be packed separately as far as possible. If more than one grade are packed in one container, a layer of clean paper or clean straw shall be placed between the different grades" (see bottom plate facing this page).

After the above has been complied with, the grade designation label bearing the "AGMARK" is attached by means of a lead seal to each package of eggs (see plates facing page 178). The labels have different colours for different grades (see Appendix XXXIII). They have written on them (1) grade designation (Special, A, B and C), (2) number of eggs, (3) their weight, (4) the name of the packing station, and (5) the date of despatch (see bottom plate facing page 178).

G.—Cost of grading.

From the methods adopted for grading AGMARK eggs as described above, it would appear that there is nothing extraordinary in the process for which the trade have to incur much expenditure, either in the initial stages or in the day to day grading of eggs. At present, usually a merchant handling, say, 5,000 eggs per day, would have a helper besides himself. If in any rare case the merchant himself does not lend his hand, he may keep two helpers, each on Rs. 10 to Rs. 15 per mensem, to attend to all the operations required at present.

When such a merchant takes up to AGMARK grading, the extra processes are : (a) candling, (b) putting the eggs over a grading machine, and (c) stamping them with the grade mark. For these extra processes it is observed that, under normal commercial conditions, one extra man is needed to help the other two, in grading daily about 5,000 eggs. Even if this man is paid Rs. 30 per month (or if two men are employed on Rs. 15 per month each) the extra cost on grading (over the present method of handling ungraded eggs) is therefore less than 4 pies per hundred eggs. Against this insignificant extra expenditure, the merchant by adopting standard methods of grading can obtain better prices to the extent of 8 to 20 per cent. or about 2½ to 6 annas per hundred eggs. (See page 90.)

H.—The application of the Act.

Although the Act came into force from 1st April, 1937, the experimental grading of the eggs, on the lines as later prescribed in the Act, had been commenced from November 1936. The first experimental grading and packing station commenced working on 27th

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November, 1936, at *Pabbi* (*North-West Frontier Province*) and on that day despatched the first consignment of 3,723 AGMARK eggs. The second experimental station started grading eggs at *Kottarakara* (*Travancore State*) from 21st January, 1937, and despatched its first consignment of 4,500 AGMARK eggs (see plates facing page 179).

The number of eggs brought at these stations (*Peshawar* and *Kottarakara*) and the proportion of the different grades obtained therefrom together with the numbers found cracked and stale, during the first 12 months of the running, are given in Appendices XXXIV and XXXV, respectively.

(1) THE GRADING STATION IN *North-West Frontier Province*.

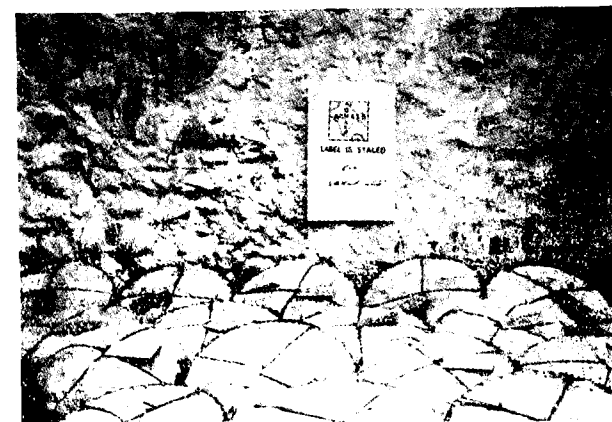
The station was first situated at a small village of *Pabbi*, 14 miles from *Peshawar*, but later on it was transferred to *Peshawar* itself. During the first twelve months of its running 27,36,015 eggs were brought to the station for grading. The annual figures are summarised on the next page.

It would be seen that nearly half the eggs are of B. grade, i.e., having a minimum weight of $1\frac{1}{2}$ oz. The proportion of stale eggs on the annual basis is low, being only 1.7 per cent. of the total eggs brought for grading. From Appendix XXXIV it would be observed that the proportion of the stale eggs varied from .2 per cent. in February, to 3 per cent. in May, mainly due to the severity of cold and hot weathers respectively. It would be further observed that although the annual average of cracked eggs is .6 per cent. of the eggs brought for grading, during the first month of starting the station it was 1.8 per cent., but it improved steadily and during the last two months (November and December) it was reduced to .1 per cent. or one-eighteenth of what it was a year ago. This was due to giving special instructions, both to the producers and collectors, to be careful with the handling of the eggs.

A part of the first year's expenses at the above experimental station was met by the Central Government, but at the termination of the experimental period, the merchants completely took over the charge of the station and are now working under the Certificate of Authorization issued under the Act. The Association of the village merchants (which is organized on a co-operative basis) during the short period of its working of $8\frac{1}{2}$ months ending 31st July, 1937, made a net profit of Rs. 4,000 on a paid up capital of Rs. 2,500 only. The Association also agreed to purchase all the grading equipment (costing about Rs. 800) and to run the station as a business concern without any financial assistance from the Government.

(2) THE GRADING STATION IN *Travancore State*.

The progress of this station during the first 12 months is given in Appendix XXXV. This station was first started at *Kottarakara* and was later transferred to *Chengannur*, a few miles further for the sake of better facilities for assembling. The comparative annual



Sixth Stage. After packing the baskets, the AGMARK label is sealed on them.

Serial No. _____

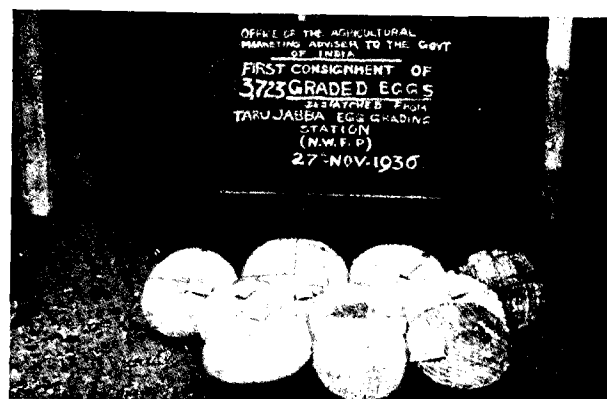


EGGS—TESTED AND GRADED—EGGS

Grade _____
 Number of eggs _____
 Nett weight _____
 Name of _____
 packing station _____
 Date of despatch _____

This label is the property of the Agricultural Marketing Adviser to the Government of India.

AGMARK label for egg containers.



The first consignment of AGMARK eggs from North West Frontier Province.



The first consignment of AGMARK eggs from Travancore State.

figures of this station in the extreme south and the *Peshawar* station in the extreme north are given below :—

Comparative grading results in the North and South.

	Eggs brought to grading station.	Cracked.	Stale.	Agmark A.	Agmark B.	Agmark C.	Small*.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Peshawar ..	27,36,015	0.6	1.7	25.6	49.5	21.5	1.1
Travancore ..	15,75,308	1.7	3.1	14.8	40.0	33.6	6.8

The difference in the outturns of each grade is due to the fact that the weight of the eggs received at *Peshawar* was 9 lb. 6 oz. whereas those received at *Chenganoor* was 8 lb. 13 oz. per hundred. This is due to the regional variations which are bound to exist, as the two stations are about 1,800 miles away from one another, as the crow flies. It would also be noticed that the proportion of cracked eggs in the south is about three times as great as in the north. The figures in Appendix XXXV show that, although there has been a slight decrease in their numbers in the south also, the progress there has not been anywhere near that of the *Peshawar* station. The proportion of stale eggs is also about double of that obtained in the north. The figures in the Appendix XXXV further show that so far as the supply of eggs to this station is concerned, the season did not have any effect on the proportion of stale eggs received with them. Actually more stale eggs were found during the cooler months, whereas during the rainy months of June to August, the quality was better.

(3) OTHER STATIONS.

Although the scheme is less than two years old, several merchants have taken to grading of eggs, some without any assistance from Government at all. They are all operating under the Certificate of Authorization issued by the Agricultural Marketing Adviser to the Government of India. The conditions that are attached to the issue of the Certificate of Authorization, are given in Appendix XXXVI.

Eleven stations are functioning at present, viz., *Peshawar*, *Mardan*, *Havelian*, *Delhi*, (two merchants have taken to grading), *Bareilly*, *Bombay*, (three merchants have taken to grading), *Lucknow*, *Etah*, *Rampur*, *Chinna*, *Ganjam* and *Quilon* (shifted from *Chengannur*). At these stations approximately 15,000 eggs are being graded daily. A merchant at *Calcutta* also started grading but after grading over 3 lakhs of eggs in less than 3 months, he has closed

*The marking of small eggs is not included in the Egg Rules under the Act, but they are being marked experimentally.
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down the station temporarily, with a view to starting more stations in the producing areas of *Bengal*. The grading results obtained at *Calcutta* are as under :—

Experimental Egg Grading Station, Calcutta.

	Total eggs brought to the grading station.	Cracked.	Stale.	Agmark A.	Agmark B.	Agmark C.	Under 1½ oz.
1937.							
December ..	71,440	2,359	1,484	2,588	22,406	28,093	13,910
1938.							
January ..	1,05,230	2,362	2,596	3,945	36,314	41,240	18,773
February ..	1,23,382	3,830	2,658	3,862	30,545	56,728	25,750
Total ..	3,00,052	8,551	6,738	10,395	89,265	1,26,661	58,442
Percentage to the total.	(100)	2.8	2.2	3.5	29.8	42.2	19.5

It would be seen that the proportion of "A" eggs (3.5) is very small, compared with those obtained at *Peshawar* (25.6) or even at *Travancore* (14.8). This is due to the lighter weight of the *Bengal* eggs, it being only 8 lb. 2 oz. per hundred against 8 lb. 13 oz. in *Travancore* and 9 lb. 6 oz. at *Peshawar*. Nearly half of the eggs are of "C" grade, i.e., having a minimum weight of 1½ oz.

In spite of the very low proportion of "A" grade eggs, the price difference between the AGMARK graded eggs and the ungraded eggs, works out at Re. 0-2-10 per hundred eggs, or an increase of 8.3 per cent. over the price realised for ungraded eggs. For details see Appendix XXXVII.

(4) PROGRESS OF THE AGMARK EGG GRADING SCHEME.

In the table below are reproduced the monthly and progressive totals of the eggs graded during each month from the commencement of the scheme in November 1936. The figures are self-explanatory, and do not need further explanation :—

Progress of the "AGMARK" egg scheme.

	Number of parties authorised to grade.	Number of eggs graded during the month.	Progressive total.
November 1936 ..	1	15,649	15,649
December ..	1	89,562	1,05,211
January 1937 ..	2	2,75,756	3,80,967

	Number of parties grading eggs.	Number of eggs graded during the month.	Progressive total.
February 1937 ..	2	2,99,604	6,80,571
March ..	2	2,44,211	9,24,782
April ..	2	4,37,652	13,62,434
May ..	2	5,84,162	19,46,596
June ..	3	4,69,991	24,16,587
July ..	3	2,78,770	26,95,357
August ..	3	2,27,851	29,23,208
September ..	3	3,54,898	32,78,106
October ..	3	2,99,188	35,77,294
November ..	3	3,73,521	39,50,815
December ..	4	6,41,875	45,92,690
January 1938 ..	4	3,25,583	49,18,273
February ..	4	3,48,107	52,67,380
March ..	8	2,93,129	55,60,509
April ..	11	7,43,758	63,04,267
May ..	11	8,16,743	71,21,010
June ..	12	4,45,607	75,66,617
July ..	12	5,70,107	81,36,724
August ..	15	4,84,396	86,21,120

I.—Where should grading be done ?

The question has often arisen as to where the grading of eggs should be done, in the areas of production or at the consuming centres ? At the present moment both the practices are in vogue with an equal amount of success. In some instances it is feared that if the grading is done in producing areas, which are typically rural and have no local market, there may not be a market for "ungraded" eggs, (stale, etc.), but if it is done at the consuming centres, such eggs may also be disposed of. On the other hand, if these eggs could be disposed of locally even at a nominal price, the unnecessary freight, packing and handling charges for exporting these eggs would be saved. Again, if the eggs are graded in the producing area and then sold on the basis of grades, the producers stand to gain more than with the other method of selling them ungraded and then grading them at the consuming centres.

The main point, however, is that when the AGMARK is put on an egg, an assurance of its quality (weight and freshness) is given. Although the AGMARK is put on the day of testing it, the assurance is supposed to hold good so long as it is on the egg. The date of grading is, however, not marked on each egg, but appears only on the label attached to the container. As such, an egg may have the AGMARK on it, but because of the fact that it has to reach distant consuming markets, or it may remain unsold for a few days, or due to improper storage, its quality may be anything but satisfactory. Due to shrinkage, its weight may also be reduced and the egg might cease to belong to the grade, the designation of which it bears on the shell. These are the apparent disadvantages of grading in the districts.

An experiment carried out recently to study this aspect of the problem is of interest. A consignment of 196 eggs was observed for the purpose, after being graded at *Peshawar* on 22nd January, 1938. On their arrival at *Delhi* (on the 25th January) they were weighed and candled individually. Thereafter, they were weighed on the 1st February and again on the 12th February, i.e., 10 and 21 days after the date of grading at *Peshawar*. Assuming that the eggs were about 5 days old when they left the grading station, the examination was made first at the grading station on the 5th day, then at *Delhi* (on arrival) on the 8th day, then on the 15th day and again on the 26th day. During the experiment the eggs were kept all along in open baskets, in a well ventilated office room. The weather was dry and the temperature at *Delhi* during the above dates ranged between 44° and 70°F. In the above trial an examination for the shrinkage as well as the deterioration in the interior quality was made.

(1) SHRINKAGE IN WEIGHT.

This was studied by carefully weighing each egg in a sensitive balance, and the results obtained were as under :—

Shrinkage in AGMARK eggs.

Grade.	Number of eggs examined.	Average weight of individual egg.			
		On 22-1-38 (the day of grading at <i>Peshawar</i>).	On 25-1-38 (after 3 days at <i>Delhi</i>).	On 1-2-38 (after 10 days).	On 12-2-38 (after 21 days).
		oz.	oz.	oz.	oz.
A	99	1.8	1.8	1.78	1.70
B	49	1.6	1.6	1.5	1.4
C	48	1.3	1.3	1.28	1.26

It would be seen from the figures that up to 10 days, after grading, all the eggs were still within their minimum weight groups*. As

*The minimum weight for "A" is 1½ oz., for "B" 1¼ oz. and "C" 1½ oz.

such, the grade designation mark, so far as the weight was concerned, was not violated on account of storage. Even on the second weighing after 21 days of grading date, the "A" and "C" grade eggs were still above the minimum weight prescribed, but the "B" grade was less by a small fraction.

(2) DÉTERIORATION IN THE INTERIOR QUALITY.

The candling test disclosed the following results :—

Percentage of eggs that passed the specifications of AGMARK quality.

On 25-1-38 (after 3 days of grading).	On 1-2-38 (after 10 days).	On 12-2-38 (after 21 days).
100	90	66

It would be seen that after reaching the consuming centre and up to 10 days of storage, the quality stood up fairly well and approximately 90 per cent. of the eggs were of the AGMARK specifications. Thereafter there was a rapid deterioration, and on the 21st day, only about two-thirds of the eggs were good. As indicated above, these results were obtained with storage during winter when the temperature was between 44° and 70°F. Had it been summer, when the temperatures range between 70° and 110°F, the results would no doubt have been much worse.

In this connection Sharp and Powell* found that fertile new-laid eggs deteriorate to the quality of the "U. S. Standard"† at the temperatures and in the length of time as indicated below :—

Effect of temperatures on the quality of eggs.

Temperature.	Days necessary for new laid eggs to deteriorate to the quality of "U. S. Standard".
98.6°F.	3
77.0°F.	8
60.8°F.	23
44.6°F.	65
37.6°F.	100

From the specifications at the footnote it would be observed that the "U. S. Standard" quality has a lower standard for freshness than that prescribed for AGMARK eggs (see page 174). For instance, not even the slightest visibility of germ development is

*Marketing of Poultry Products by Benjamin and Pierce.

†The specifications for "U. S. Standard" quality are : The air-cell must not exceed three-eighths inch in depth and may show movement not in excess of one-half inch. The yolk outline may be well defined. The yolk may be mobile and may show slightly visible germ development and other definite, but not serious defects.

permitted in the AGMARK eggs, but in the "U. S. Standard" quality this is permissible.

From the foregoing discussion it would appear that, if the AGMARK grading is properly practised (and this is the most important aspect of the whole question) under normal circumstances no harm to the interior quality or to the weight of AGMARK eggs should result, for the first week or so after grading.

Under practical conditions, most of the eggs reach the consuming markets within 3 days, and are sold out within a day or two thereafter. As such, the trade can be sure of the quality of the AGMARK eggs for a week or so after grading. Under the circumstances, the grading of eggs at the producing areas and their quotation and sales on the basis of the grades, appears to be feasible.

This should, however, not minimize the importance of grading at the consuming centres. There is no reason why even a retail merchant handling, say, 500 eggs per day, should not adopt the AGMARK grading before selling the eggs at a consuming centre. Also, as long as there is no refrigerated transport during summer, the grading at the consuming centres may even be necessary, or perhaps a re-candling of the graded eggs from the distant producing areas may be necessary to cull out any defective eggs.

J.—Need for putting more AGMARK eggs in the markets.

Proposals are regularly received for starting new grading stations. For instance, the *Peshawar* merchants have completed plans for starting two more large stations at *Havelian* and *Mardan*, as branches under the main station at *Peshawar*. In the early stages of any new scheme, however, one common difficulty has to be encountered, *viz.*, that sufficient interest is lacking in the consuming markets regarding the superior quality of the produce concerned. Hitherto there were no standards for the trade to follow. If there are not many AGMARK eggs yet on the market it is not altogether a question of obstinate disinclination on the part of the trade to move forward with the times. There has been no doubt opposition to the extension of AGMARK eggs from certain interested parties, but these must and are giving place to confidence in the scheme and a demand is being definitely created for the AGMARK eggs. Consumers are asking for AGMARK eggs, although the need for paying a slightly higher price for the larger eggs is not yet fully appreciated. In some instances, therefore, the A, B and C AGMARK eggs are mixed and sold at a flat price at the consuming centres. But even here there is a change for the better.

Unless therefore, an increasing number of AGMARK eggs are put on the markets, the progress of their popularity would be retarded. That grading is paying has already been shown (see page 178) and in some cases the increase in price has been about 20 per cent. over that of ungraded eggs. Even in a short period of three months, a merchant at *Calcutta* increased his price returns by over 8 per cent. by grading eggs, (see Appendix XXXVII). The extra expense is insignificant compared with its advantages.

It is therefore a matter for the consideration of the Provincial and State Governments to extend the egg grading scheme so that the eggs produced in their areas, either for internal consumption or for export, are graded before they are sold. This also appears to be the quickest way of raising the producers' price. For instance, at *Peshawar*, before the merchants took to grading, they were purchasing 63 eggs per rupee from the producers, but a few months later they could pay a rupee for 54 eggs only. But what was more, the producers demanded a little higher price for the larger eggs, and the much desired method of purchase and sales on the basis of quality, even in village produce seems to have been established.

Money spent on the poultry industry annually.—It cannot be said that at present no money is being spent on the poultry industry. The table below illustrates the expenditure, incurred annually in some provinces and States.

Annual expenditure on Departmental Poultry Farms.

	Number of poultry farms.	Approximate amount spent.	Approximate number of adult birds.		
			Improved	Desi.	Ducks.
		Rs.			
Kashmir State ..	1	1,140	153	81	15
North-West Frontier Province ..	2	840	18	62	224
Punjab	4	15,300*	539	593	Nil
Sind	1	610	117	3	Nil
Baroda State ..	3	6,000	300	Nil	Nil
Bombay Presidency ..	1	7,460*	448	11	47
Mysore State ..	3	2,000	225	2	Nil
Travancore State ..	1	900	33	Nil	Nil
Pudukottai State ..	4	630	110	Nil	Nil
Madras Presidency ..	4†	2,440	176	37	Nil
Nizam's Dominions ..	3	4,780	174	27	9
Central Provinces ..	2	7,040	442	8	Nil
United Provinces‡ ..	2	16,360	3,100	Nil	Nil
Bihar	2	2,000	400	Nil	Nil
Bengal	1	3,350	333	5	Nil
Assam	2	2,900	161	46	46
Total	36	73,750	6,729	875	341
Burma	2	400	120	17	Nil

* Including the grant from the Imperial Council of Agricultural Research for certain experiments.

† Although there are 4 farms, the figures relate to only the *Hosur* farm.

‡ The figures are the averages for 6 financial years from 1931-37 and include a grant of Rs. 2,660 to the Mission Farm at *Etah*.

A study of the figures in the preceding table, in the light of the total fowl and duck egg production in the country, would be found of interest. Whereas the *desi* fowl is the main source of supply of about 81 per cent. of the eggs produced in India and the duck of about 15 per cent., the improved bird provides less than 2.5 per cent. (see page 15). On the other hand, the respective strength of these birds on Departmental poultry farms—improved birds 85 per cent., *desi* birds 11 per cent. and ducks 4 per cent.—and the huge sum of about Rs. 74,000 which is being spent on rearing them, would seem to indicate that it is the improved bird which is of greatest importance to the country. It is not so and obviously the village producer with his limited resources is not likely to get much benefit from rearing this improved but on the whole, less remunerative type of poultry. For instance, in *Bombay Presidency* although Rs. 7,460 are spent annually over a Government farm, and its village extension scheme, for rearing only 450 improved birds, 11 *desi* birds and 47 ducks, the total number of improved poultry at present does not exceed 5,000 laying birds. In other words, even now one cannot get, say, even 500 improved eggs per day at any one place in the Presidency, whereas eggs of the *desi* birds are available daily by thousands, at several places, and do actually find an extensive market, both within and outside the Presidency.

Therefore, the question of the improved marketing of millions of village produced *desi* eggs, with a view to obtaining better quality and better prices for the producer, is of far greater importance than that of breeding a few improved birds, which under ideal conditions may lay more and larger eggs. It seems plain that more attention should be given to developing the duck and *desi* fowls and the egg trade by (a) experiments on the improvement of egg containers, (b) investigations regarding cold-storage and transport, (c) development of the market news service, (d) advertisement and propaganda for the increased consumption of eggs, (e) helping the producers and merchants in opening more AGMARK grading stations, etc. The last named help might take the form of providing them with grading equipment, and a little extra labour in the initial stages of the experiment.

[Grading and Standardisation.

INTER-CHAPTER SEVEN.

Large eggs should be capable of commanding higher prices than small eggs but apart from size, the value of an egg depends on its exterior and interior qualities. The external appearance of the shell must be clean and free from stains and the eggs should have the normal shape and texture. The interior quality which can only be satisfactorily judged by "candling" in front of a bright light should show the contents to be free from blemish such as blood spots or rings. The yolk should be central, translucent, faintly outlined and capable of moving not very freely about the axis. The air space at the broad end gets larger as the egg gets older, so that in the case of fresh eggs it should be small.

An examination of a large number of eggs on the wholesale market showed that about two-thirds may be classed as fresh but 30 per cent. as "cooking" quality, and 5 or 6 per cent. as definitely stale. In the summer, however, the number of stale eggs is more than doubled.

In the course of this survey it was observed that a flat rate price is normally paid to producers and dealers for all eggs large and small, but that in some of the larger towns wholesale distributors occasionally sorted out the eggs according to size and sold the large eggs at a price higher than the small. Further, in the case of *Bombay*, wholesalers have a system of grading the eggs according to the interior quality into three groups, viz., *taza* (fresh), *jaliwala* (with blood rings or spots) and *naram* or *ganda* (weak, watery, addled or rotten).

Steps were therefore taken to prescribe AGMARK grade designations and definitions of quality for hen and duck eggs produced in India, and to carry out experimental grading and marking on the basis of those regulations.

CHAPTER VIII.—STORAGE AND PRESERVATION.

A.—General.

It would appear from the experiments so far conducted that sorting and grading by distributors at the consuming end has actually shown increased price returns of over 8 per cent. There is no reason why the profit on grading and sorting should not go to the producers rather than the distributors and experimental work at the producing ends shows that by grading and packing the eggs before despatch to the consuming centres, increased price returns of 15 to 20 per cent. can be obtained. This is due to the fact that eggs which might deteriorate badly if put on rail can be sold locally as "fresh" and similarly that cracked and slightly stale eggs can be sold at a reasonable price whereas they would be entirely unfit for sale if sent to distant markets. Apart from the enhanced price obtained for the graded eggs there is a saving in freight by retaining those eggs in the producing area, which are damaged and not fresh. Altogether therefore the grading and marking of eggs at the producing end has proved itself a profitable proposition and every effort should be made to extend the system.

Systematic grading must, however, be done on the basis of Standard grades. In the absence of recognised uniform grades and descriptions, consumers and the trade become confused, no comparison of prices is possible and the mixing and "doctoring" of grades leads to unfair competition among the merchants and to disappointment for the buyers. First quality eggs should be known everywhere by the same name. Similarly second and third qualities should have distinctive descriptions known and used by all. It is for that reason that the Government of India made rules under the Agricultural Produce (Grading and Marking) Act, 1937, prescribing the names Special, Grade A, Grade B and Grade C for "AGMARK" eggs. The use of these grades is at present voluntary but it is hoped that the good sense of buyers and sellers will bring about their extensive use throughout the country in the near future.

In countries abroad where the trade in eggs is highly commercialized, in order to balance the fluctuations in production and demand, cold storage of eggs is important. For instance, in the *United States of America* about 15 per cent. of the eggs marketed are usually removed from the markets during the spring period of surplus production and stored in modern refrigerator warehouses for later consumption*. Five to seven months of storage is not considered too long a period.

If the use of cold storage in economic marketing of eggs has become popular in cold countries abroad, one would imagine that its usage in a country like India should be even more welcome. This is, however, not so. Not only with eggs but in general also the use of cold stored goods is not very popular. Dietetic habits of the people are no doubt responsible for this, to a great extent. For instance, in western countries the use of chilled meat, poultry, milk, etc., is common and sometimes even preferred to fresh articles, but in India the contrary is the case. In countries abroad the preparation of food and drinks is also industrialized and large recipes, e.g., of cakes are made up daily for which large quantities of perishable raw products are required. For this reason the employment of artificial cold in the preservation, storage and transport over long distances is unavoidable. In India, however, there is no industrialized production of food stuffs, and most people prefer to cook their meals in their own kitchens. Religious scruples also prevent many people from eating food cooked or prepared by others. Hence the storage of eggs is not yet developed in this country either in a preserved form or under artificial cold conditions.

B.—Present methods.

(1) TEMPORARY STORAGE.

Unsold baskets of eggs may be stored for some days at only a few consuming markets where cold stores are available. Otherwise the most that is done at present is just to "hold" the eggs for a short period of a week or ten days. This is done mainly to meet any sudden rise in the demand and price of eggs due to festivals like *Id* or X'mas, etc. On such occasions the merchants at the assembling centres begin to restrict the despatches to the consuming markets, with a view to hold a reserve of eggs to be released a day or two ahead of the festival. This tends to push the prices up temporarily.

(a) *Methods adopted and materials used.*—Generally no special methods are practised for this temporary holding of eggs, but the eggs are put singly in baskets and left in a cooler part of the house. A dark room is preferred.

Occasionally specific indigenous materials as green neem (*Melia Azadirachta*) leaves, sand, etc., are used in the storage of eggs, but

*Marketing Poultry Products, by Benjamin and Pierce.

their comparative efficiency and improvements are still matters for study. Information regarding the materials that are occasionally employed, for holding the eggs temporarily, in some of the areas is summarised below :

Materials used for holding the eggs.

	Material used.
North-West Frontier Province ..	Green <i>shisham</i> (<i>Dalbergia sissoo</i>) leaves.
Punjab	Green <i>shisham</i> (<i>Dalbergia sissoo</i>) and mulberry leaves. Wet sand.
Travancore and Cochin ..	Rice husk or bran.
Madras Presidency	Dry salt.
Nizam's Dominions	Green <i>neem</i> (<i>Melia azadirachta</i>) leaves.
Central Provinces	Dry charcoal powder or slaked lime.
United Provinces	Green <i>shisham</i> (<i>Dalbergia sissoo</i>) and mulberry leaves.
Bihar and Orissa	Moist sand.

(b) *Cost and efficiency.*—The above materials are placed with the eggs which may be in baskets, boxes or heaped on the floor in a corner of a room. Most of the above are available free of cost in the villages, but, as stated above, little is known about their comparative efficiency as mediums for holding the eggs. For instance, green *neem* (*Melia Azadirachta*) leaves are said to have a cooling effect on the eggs, but they are also said to impart a bitter odour. Rice husk is said to be useful, but if it is even slightly moist, it also imparts a peculiar odour to the eggs. It may also leave impressions on the shell.

(2) USE OF COLD STORES.

There are a few commercial cold stores where, besides other commodities, small consignments of eggs may also be occasionally stored for a few days. Such facilities are available at least at *Karachi, Bombay, Madras, Hyderabad (Nizam's Dominions) and Calcutta.*

It must be understood that at the above cold stores eggs are not stored for long periods in the sense in which they are stored in other countries. In most of the cases only the unsold consignments of eggs in summer season are "placed" in the cold store for a day or two to prevent spoilage. Accordingly, the charges are also generally on a daily basis per basket.

(a) *At Karachi.*—There is a commercial cold store where eggs are usually kept for a short period. The charges are 12 annas per

basket of 400 eggs per month or about 4 pies per dozen eggs per month.

(b) *At Bombay.*—During the summer of 1936, the packages were held at the cold stores attached to the Crawford Market, *Bombay*, as follows :—

Cold storage of eggs at Bombay.

Months.	Number of packages stored during the months.	Average number per day.
March	1,677	54
April	3,417	114
May	1,567	51
June	521	17

Baskets are accepted with reluctance for storage as they occupy space without enabling other packages being placed on them. The storage charges are 1 anna per package (100 lb.) for 24 hours or part thereof, or about 1 pie for about 67 eggs.

It was stated (see page 17) that approximately 51,597 maunds (gross) of eggs were received at *Bombay* during 1935. This amounts to an average of about 1,13,000 eggs per day. During the four summer months under discussion, it would be seen that on an average 59 packages or about 47,200 eggs were placed daily in the cold stores. Thus about 39 per cent. of the daily arrivals were cold stored at *Bombay* during summer, for a day or two. The merchants take delivery of the stored consignments early in the morning and sell them first.

(c) *At Madras.*—In *Madras* also there is a commercial cold store which is attached to an ice factory. The charges are 1 anna 3 pies per basket of 500 eggs for 24 hours or part thereof, but the egg merchants do not make much use of the facility.

(d) *At Hyderabad (Deccan).*—Here also a few fruit merchants have jointly built a small cold store for their own use. They charge Rs. 9-6-0 per month per ton of storage, based on the monthly charge of Re. 0-5-6 per maund. From the merchants outside their group,

they charge the above rates per week instead of per month or Rs. 37-8-0 per ton per month.

(e) *At Calcutta.*—There is a large commercial cold store at Calcutta with a capacity of about 8 lakhs cubic feet. The local egg merchants, however, do not make any use of this space. The cold store is situated in Kidderpur area (near the docks) and is about 4 to 5 miles away from the place where the egg business is carried on. Occasionally, however, eggs belonging to ships' stores are stored there temporarily. The cases contain five layers each of six dozen or 360 eggs, approximately of 2½ oz. each, and are packed in what is known as "Hold Tite Safety Cushion Cupped Seats."

Small lots of eggs may also be stored at some of the provision stores, hotels, etc., before retail sales or use. This is done with the help of domestic refrigerators or small cold stores meant exclusively for their own use.

C.—Possibilities of developing the use of cold stores.

It has already been indicated at several places in the report that the use of cold storage is long overdue in the egg trade and is likely to be helpful if not in any other respect, at least in stabilizing the prices (see page 87). It is, however, considered that soon after grading, the eggs should be transported to the consuming centres and stored there for the necessary period. They could be put in at the peak of the production (early summer) for issue during the winter. From diagram facing page 78 showing the monthly index of prices, it would appear that there is a fair margin of difference between the two prices. It would further be seen that between the summer prices in the important producing areas and the prices during winter at the consuming centres, there is indeed a wide margin of difference. In some instances the difference is even more than the initial price of eggs in the producing areas.

The length of the period between the low and high prices, however, ranges between 5 to 9 months, and if storage is contemplated, it would have to be over this period to obtain full benefit.

Indeed little information is available about the cost of storage of eggs (per month) over long periods or the manner of their behaviour during storage. This is because there are very few cold stores in the country, and as said before, eggs do not form an important commodity for storage.

The available information for storage per ton of other commodities like fruits, etc., at the three commercial cold stores is given below. The range of temperature for fruits is between 40—45°F., which is also suitable for eggs. The small cold store at *Hyderabad (Deccan)*, which is owned by a few merchants and its charges, which are the lowest available, are also included in the table. The charges at *Bombay* represent those charged by the Crawford Market cold store, and are based on retail charges on daily basis.

Cost of cold storage per month.

				Per ton.	Per thousand eggs.
				Rs. A. P.	Rs. A. P.
Bombay	..	..	..	42 0 0	1 14 10
Calcutta	..	..	..	20 0 0	0 14 8
Hyderabad (Deccan)	..	..	..	9 6 0	0 6 11
Karachi	..	..	..	14 0 0	0 10 4
Average				21 5 6	0 15 8

It would be observed that the cost of storage per thousand eggs amounts to about Re. 0-15-8 or, say, Re. 1 per month. It is likely that it could be reduced if the stores were assured of regular custom. But even at this cost, there is a fair margin of profit, as would be seen from some of the instances given in the table below. Cases of variations in the other areas may be further seen from Appendix XXI.

Suggested plan for cold storage of eggs.

Producing areas.			Consuming centres.					Difference (Approximate profit per thousand eggs.)
	Best months of storage.	Price per thousand eggs.	Centre of storage.	Up to (months.)	Period of storage (months).	Prevailing price per thousand eggs.	Cost of storage.	
		Rs. A.				Rs. A.	Rs. A.	Rs. A.
North-West Frontier Province.	March-April.	15 9	(i) Punjab markets.	November-December.	8	26 6	8 0	2 13
			(ii) Delhi	December-January.	9	29 12	9 0	
Bengal ..	April	12 9	Bombay ..	August and November.	4-8	28 4	6 0	9 11

The above figures are no doubt approximate and some allowance should also be made for spoilage, interest, etc. It might also

happen that a large demand for storage of eggs may affect the level of prices to a certain extent. Nevertheless the figures indicate that the problem deserves a further study, either by the trade itself or by the various cold storage concerns.

The question of storage, however, gives rise to the problem of containers, and the use of a proper box-type container is necessary in the case of cold storage in small lots and its early adoption by the trade is indicated.

Proper grading and examination of the interior quality of eggs before putting them into storage, is of utmost importance. Even in the countries where storage of eggs is practised extensively, it is observed that there is always the risk that eggs may deteriorate during storage. Eggs graded as "storage packed firsts" when placed in the warehouses are expected to be withdrawn as "refrigerator firsts", but they may come out as "refrigerator seconds", or even a poorer quality.*

Ventilation, temperature and humidity are the other factors that need technical control during storage of eggs. No work in this direction has been done in this country and the practices observed in other countries would need to be tried out before they could be recommended.

D.—Preservation of eggs.

Except for quantities exported to *Burma*, particulars of which have already been dealt with at page 114, no preservation of eggs is done in India. Egg preservatives from abroad are to be found in India, but these have practically no sale. A small experiment carried out at the Government Farm, *Tarnab, North-West Frontier Province* for preserving eggs with a chemical preservative is of interest.

Between 20th July and 21st September 1936, eggs were preserved as under :—

Number preserved.	Number of days after laying.
170	On the day of laying.
214	After 1 day.
59	After 2 days.
53	After 3 days.
33	After 4 days.
14	After 5 days.
8	After 6 days.
7	After 7 days.

The preserved eggs were held at temperatures ranging from 76° to 81°F. in a cellar during months of July, August and September 1936. During October and November the temperature of the cellar was 56°F. to 70°F.

*Marketing Poultry Products. by Benjamin and Pierce.

Forty-seven preserved eggs were taken out and tested in February 1937. Out of these, 15 were hard boiled and 34 were examined in a raw condition. From the boiled eggs 20 per cent. were in perfect condition, 26 per cent. in a fairly fresh condition, whereas more than half were definitely stale. Out of the 34 raw eggs examined, only 9 per cent. could be classed as table quality. A further 9 per cent. were classed as fresh, whereas 82 per cent. were considered stale. It was further noticed that fresh eggs were found only in the lot which was preserved in August and September on the day they were laid. There is therefore a need for more work in this direction to be done under local conditions and with indigenous materials, before any opinion could be hazarded as to the efficiency of chemical preservatives.

Mention has also been made at page 114 about the "boiled" eggs. This seems a useful form of preservation for adoption in this country. In most Indian households a common practice is to hard boil the eggs and re-cook them in the form of curries, etc. It is therefore a matter for consideration whether the trade would not be well advised to adopt this method of preservation by heat instead of cold. There is already a trade in the hawking of hard boiled eggs to travellers at railway stations which might form the basis of a trial on commercial lines.

INTER-CHAPTER EIGHT.

Eggs cannot be held in good condition for any length of time at normal temperatures, much less at the temperatures prevailing in this country during the hot weather. If they are to be kept in good condition they should be stored under controlled conditions of humidity and at temperatures between 35°F. and 45°F.

In other countries where the trade in eggs is highly commercialised, cold storage over a prolonged period is commonly practised. For example in the United States of America about 15 per cent. of the eggs marketed are put in cold store during the spring period of high supplies and held for sale from 5 to 7 months later.

Long period storage is not practised in India. Un-sold baskets of eggs may be temporarily stored for a few days in cold stores where they are available at large consuming centres. At *Bombay*, for example, about half a lakh of eggs are dealt with in this way and in April the number of packages may be as high as 3,500. Altogether about 30 or 40 per cent. of the supplies during the hot weather are temporarily placed in cold store from day to day.

It may be observed that when making use of these cold stores, baskets cannot be piled on top of one another and a lot of useful space is lost. It is therefore a matter for consideration whether the trade should not make more effort to bring boxes into general use.

Temporary storage by various indigenous methods is also practised by producers. The general practice is to pack the eggs in fresh leaves, moist sand or rice husk and place them in a dark room. Very little is known

about the efficiency of these methods of storage but it would appear that certain leaves and rice husk, especially when moist, are liable to impart objectionable odours to the egg and in some cases to leave marks on the shell.

From a study of the seasonal fluctuation in prices and a comparison with the costs of storage it would appear that as between the early summer months, March|April and the cold weather months from August onwards, the normal rise in price more than covers the cost of storage even at what appears to be the relatively high rates at present prevailing. There seems, therefore, scope for the development of long period storage of eggs in this country and the matter is one which requires the attention not only of the egg trade but of the various cold storage concerns also.

The preservation of eggs is commonly practised in the case of those exported to *Burma* which are pickled in lime, or with salt mixed with clay and packed in earthen-ware jars. The use of chemical preservatives in India has not so far been practised to any appreciable extent and such trials as have come to light are not promising.

The possibility of preserving eggs by boiling seems worthy of serious consideration particularly as most Indian households commonly hard-boil the eggs before re-cooking them in the form of curries, etc. Further, hawkers at railway stations in the North seem to do quite a good business in retailing hard-boiled eggs to travellers. An experimental trial on commercial lines of this method of preservation seems clearly indicated.

CHAPTER IX.—CO-OPERATIVE MARKETING.

A.—General.

The All-India Co-operative Societies Act was passed in the year 1904. Since then there has been a steady progress in the movement and the number of societies has increased almost every year. Co-operative societies and banks now exist in all the provinces (including the minor administrations) and also in the Indian States of *Baroda, Bhopal, Cochin, Gwalior, Hyderabad, Indore, Kashmir, Mysore* and *Travancore*. They exist in some of the other States also, but the number is small. In the year 1935-36 there were in *India* 1,05,807 and in *Burma* 2,150 or a total of 1,07,957 co-operative bodies grouped as under. Their annual working capital was over 100 crores of rupees*.

Co-operative bodies in 1935-36.

Types.	No.
1. Central (including provincial and central banks and banking unions)	626
2. Supervising and guaranteeing unions (including insurance societies)	731
3. Agricultural credit and non-credit (including cattle-insurance societies)	94,433
4. Non-agricultural (including other insurance societies)	12,167
Total	1,07,957

The number of members was reported to be 45,08,729 or 13.9 members per 1,000 inhabitants in *India* and *Burma*. The above four groups function as follows :—

The Central group represents co-operative banks and banking unions. Supervising unions generally manage the affairs of about 20 to 40 societies, but the number per union varies in the different areas. The third group is agricultural, and it would be observed that it has the largest number of societies in it. It is further subdivided into two classes, viz., (a) credit, and (b) non-credit societies. The credit societies are purely for the purposes of giving loans, etc. The non-credit class includes societies, functioning for the purchase and sale of agricultural produce (including eggs), implements, seeds, manure and cattle, and for the improvement of poultry-breeding, cattle-insurance, etc. The fourth group is that of non-agricultural and represents generally the societies having artisans as their members, e.g., weavers, carpenters, boot-makers, etc. Fishermen are also included under this class.

*Statistical statements relating to co-operative movement in *India*.

Although information is not available as to which was the first co-operative egg society to be registered in *India*, the oldest records relate to a society established near *Gurdaspur* in the *Punjab* in the year 1919. It might be said that on the whole the movement has not made much headway in the field of egg marketing. The available information indicates that, during recent years, only about 12 co-operative societies and one sale union have existed in *India*. It is, however, reported that last year only 5 Producers' Co-operative Societies were functioning in *India* with one union having two societies as its members, or 7 societies in all. In addition to the above, three other societies are also reported to exist in *Burma*, out of which one has not started work.

B.—Producers' societies in *India*.

In the light of the above figures, it is indeed embarrassing to realise that out of 1,05,807 co-operative societies in *India*, there should be about 7 societies only dealing in eggs. They are all producers' co-operative societies. None of them are, however, reported to handle live poultry, because of greater risks involved in its handling as compared with eggs, and of the larger capital required. Besides the above 7 societies, information is, however, available for 5 other societies also, which have either ceased to function recently or are about to make a start. The table below deals with their general particulars.

Lately (March 1938) a co-operative egg marketing society has been registered at *Chinnaganjam* in *Guntur District* (*Madras Presidency*). It has 76 members consisting of individuals and societies. The members have adopted the AGMARK grades and are operating under a Certificate of Authorization granted under the Agricultural Produce (Grading and Marking) Act, 1937. The supervision is done by an Inspector of the Depressed Classes Societies, *Ongole*, and the eggs are sent to *Madras* for being marketed through the Provincial Marketing Society. The society at present handles only about 300 eggs per day.

Producers' societies.

Registered name of the body.	Date of registration.	No. of members.	Capital.		Average No. of eggs handled daily (1935-36).
			Paid up share.	Working capital.	
<i>Bombay.</i>			Rs.	Rs.	
(1) The Belgaum District Co-operative Breeding and Egg Sale Society, Ltd., <i>Belgaum</i> .*	13-8-35	24	104	..	12
(2) Ellur Co-operative Egg Sale Society Ltd., <i>Ellur</i> (District <i>Satara</i>).*	24-10-35	21	102	124	70

*Societies functioning at present.

Producers' societies—contd.

Registered name of the body.	Date of registration.	No. of members.	Capital.		Average No. of eggs handled daily (1935-36).
			Paid up share.	Working capital.	
Cochin.					
(3) The Kollinor Poultry and Egg Marketing Society Ltd., Narakkal*.	2-1-37	39	Rs. 85	Rs. 95	23
(4) The Vypeen Inter-school Co-operative Poultry Club, Ltd., (a)	3-12-36	..	..	88	..
(5) The Cochin Central Co-operative Poultry Association, Ltd. Crangamore. (b)	..	45	265	..	..
Travancore.					
(6) The Martandam Poultry Farming Co-operative Society, Ltd., Martandam.*	March 1928	102	479	1,363	188
United Provinces.					
(7 & 8) The Egg Sale Union Etah*. [Comprising the (i) Etah Rural and (ii) Etah Urban societies].	21-1-31	46	8	120	33
(9) Poultry Co-operative Society, Amroha*.	18-11-32	15	..	114	1.8
(10) The Agra Poultry Co-operative Society, Ltd., Agra. (c)	28-8-29	24	..	5	..
(11) The Co-operative Egg Sale Society, Ltd., Bhagaon. (d).	27-1-32	14	4	4	..
Madras.					
(12) The Tanjore Co-operative Poultry Farming and Egg Production and Sale Society, Ltd., Tanjore. (e)	17-6-36	41	..	47	..
Total*	..	247*	778*	1,822*	326

* Societies functioning at the end of 1935.

*Societies functioning at present.

(a) Handles only eggs for hatching.

(b) In the process of formation.

(c) Ceased functioning.

(d) Was closed down on 21st November, 1932.

(e) Has not yet commenced working.

(1) NUMBER OF EGGS HANDLED.

It would be seen that the number of eggs handled in these societies is very small. This has very depressing effects in many directions. For instance, the Society at *Amroha* has 15 members and between them it handled annually only 677 eggs or less than 2 eggs per day, between all the members. Even from the total of all the societies it would be seen that between 247 members the 7 societies handled only 326 eggs per day, a little over one egg per member per day. Whether this small number represents the total production of the members, or they also deal with other collectors or merchants (and give to the society only a part of the production) is, however, not known. In any case the paid up share money of each member amounts to only Rs. 3-2-0, whereas the working capital per member is only Rs. 7-6-0 per annum. This amounts to less than 4 pies per member per day, which is nearly equivalent to the value of his daily supply of eggs.

It would be realised that commercially or economically such societies cannot operate with any measure of success and they may as well close down. In this connection the affairs of a Producers' society at *Bhongaon*, District *Mainpuri* (*United Provinces*) are of interest. The society was originally working at *Bewar* from 16th April 1931, to 20th August 1931. Thereafter its headquarters were shifted to *Bhongaon* where it was re-registered on 27th January 1932, with 14 members and a paid up capital of Rs. 4-2-0 only and an equal amount as working capital. After 10 months of work it closed down for good on 21st November of the same year. Information regarding the number of eggs handled by the society is not available, but during 1932, the total expenditure on freight, packing charges, contingencies, etc., was only Rs. 10-8-3. From this it is assumed that it did not do much business. The main reason for closing down the society is said to be the fact, that a customer at *Cawnpore* to whom this society was sending the eggs, withheld payment of Rs. 11-9-6. This small loss was said to be too much to be borne by the 14 members, who had a working capital of only Rs. 4-2-0. They were disappointed and left the society.

The nucleus of co-operative poultry work on the improved fowls in the north for many years has undoubtedly been at *Etah* in the *United Provinces*. The only Sale Union of 2 producers' societies exists there since 1932. Once it had three societies but the one at *Milaoli* was dissolved as the members showed no interest. The Union has now 46 members and its state of affairs may be observed from the following abstract from an annual report :—

The work of egg selling was done for about 6 months of the year only. It handled 4,172 eggs during the year, in which transaction it made a net profit of Rs. 54-3-3. This includes Rs. 50 as grant received from the Co-operative Department. The Union suffered from irregularity of orders. The members took keen interest when orders were received, but they sold away the hens

with the stoppage of the demand. The members also could not keep up the minimum weight of the eggs, which as per orders, had to be between $1\frac{1}{4}$ oz. and 2 oz. each. Such eggs were wanting, and for the smaller eggs there was no demand. The members accordingly decreased the strength of the birds, but this also resulted in not getting sufficient eggs whenever there was a demand. Even at this centre a daily supply of 100 to 300 improved eggs was considered impossible. For successful marketing of eggs, greater stress is laid on finding a market for the small eggs, i.e., $1\frac{1}{4}$ oz. and below.

Conditions are no better even in the largest society at *Martandam* (*Travancore*), which has done a considerable amount of field extension in distributing improved birds amongst its members since 1924. However, the marketing of eggs has been carried out on co-operative lines only since 1935 and efforts of these years have not yet enabled the society to find a market for all the eggs produced by its members. For instance, they are said to be producing about 10,000 eggs per week, but it finds a market only for some 2,000 larger eggs, which are brought to the society twice a week, on Monday and Thursday. It would therefore be seen that the members have to find a market themselves for the majority of eggs produced.

The *Belgaum* Society handles, both *desi* and improved eggs, and on a sale of about 4,621 eggs it made a profit of Rs. 4-8-0, which included a grant of Rs. 100 from the Co-operative Department. The *Ellur* Society handled 26,905 eggs during the year (1935-36) at a loss of Rs. 59-5-6. It however received a donation of Rs. 140 from the village improvement committee on account of which a profit of Rs. 80-10-6 could be shown.

(2) STAFF EMPLOYED.

At some of the societies the supervising officers of the Co-operative Department help in the management. At those that are run under the auspices of Christian missionaries, some member of their staff renders the necessary help. Some again employ their own staff. Generally the members help to carry on the day to day business as honorary workers. The table below gives some of the details :—

Staff at the producers' co-operatives.

Place.	Particulars and amount.
Belgaum ..	Salesman .. Rs. 5 per mensem.
Ellur ..	Secretary .. Rs. 5 per annum.
	Poultry <i>kamgar</i> .. Rs. 30 per mensem.
	2 egg collectors .. Rs. 64-8-0 per annum.
Narakkal ..	

Place.	Particulars and amount.
Martandam ..	Business manager .. Rs. 25 per mensem.
	Clerk Rs. 10 ..
	Peon Rs. 7
	Sweeper Re. 1
	Total .. Rs. 43
Amroha ..	Nil.
Etah Union ..	Secretary .. Rs. 96 per annum.
	Egg collectors .. Rs. 103-8-0 per annum.

(3) HELP RECEIVED FROM THE CO-OPERATIVE DEPARTMENT OR OTHER BODIES AND THE PROFIT AND LOSS ACCOUNT.

The provincial Governments help the co-operatives in different ways. In *Bombay Presidency*, for instance, a producers' society may get a grant of up to Rs. 300 per annum for the first 3 years, provided the above sum does not exceed half the cost of its management, or half a per cent. of the total turnover, etc., whichever is less. In the other presidencies, the Department gives the help of its staff in organising and developing the society and also towards the disposal of its produce.

The table below gives the particulars for the latest year (1935-36) for which figures are available and it would be seen that most of the societies receive some kind of grant or aid from the Departments concerned.

Aid received from Government and other sources and profit and loss account.

Place.	Amount received.	Profit or loss.
Belgaum ..	Rs. 100 for propaganda, etc.	Rs. 4-8-0 profit.
Ellur ..	Rs. 140 donation from Village Improvement Funds. Rs. 360 as salary of the poultry <i>kamgar</i> , from the Livestock Expert.*	Rs. 80-10-6 profit if donation included.
Narakkal ..	Nil ..	Year not complete.

*Besides this, 80 improved birds were also given to the members for breeding purposes.

Aid received from Government and other sources and profit and loss account—contd.

Place.	Amount received.	Profit or loss.
Martandam ..	Nil*	Rs. 362-0-0 profit.
Amroha ..	Nil ..	Rs. 13-3-5 loss.
Etah ..	Rs. 100 from Co-operative Department.	Rs. 19-5-9 loss.

It would be seen that except for the *Martandam* society, nearly all the others are being subsidised out of Government funds and are financially unsound. The producers did not benefit much, as the returns were either lost in the payment of salaries or in breakages, etc.

It seems abundantly clear that this type of co-operative can hardly be said to be working satisfactorily. The general affairs of the societies are supervised by the petty officers of the Co-operative Department. The societies have poor sales organizations, and depend either on individual orders or on some broker at a consuming centre, who is too busy to trouble about a few eggs consigned to him. The members as well as the supervising officers lack business acumen and technical experience. The turnover per month is so small and irregular that no business firm would have time to deal with them. It seems therefore a matter for serious consideration of the Co-operative Departments whether any further money or energies should be spent on such societies. If a producers' co-operative is to be established, two things are essential, viz., (1) a minimum turnover of about 2,500 eggs per day, so that proper remuneration can be paid to the staff, and (2) adequate arrangements for disposing of the eggs in the larger consuming centres.

On the other hand there are indications that if aid is given to small village egg collectors in forming co-operatives, better and lasting results can be obtained. This aspect is discussed later. In this connection it must be pointed out that it appears that in the past not in all the cases has the location of a society been selected, because the place was important for the production of eggs. The nearness of a place to a centre of co-operative activities, may have received greater attention, with the result that sufficient number of eggs could not be collected. As such it is of utmost importance that attempts should be made to organize this work only at such places where the production and trade are already well developed. In Appendix XXVII a list of 147 places is given where over 3,000 eggs are assembled daily, and it should help in selecting suitable places in future.

C.—Producers' societies in Burma.

In 1933 two egg producers' societies with a membership of 25 producers were registered. Towards the end of 1937, one more society was established with a membership of 10 producers.

*The society had borrowed a loan of Rs. 413 from two of its members for carrying out its business.

The table below illustrates the position of these societies :—

Egg producers' societies.

Registered name of the body.	Year of registration.	Number of members.	Capital.		Average number of eggs handled daily.
			Paid up share capital.	Working capital.	
			Rs.	Rs.	
Lewe Co-operative Poultry Society, <i>Lewe</i> .	1933	14	175	25	43
Shwemyo Co-operative Poultry Society, <i>Shwemyo</i> .	1933	11	155	5	41
Kantha Co-operative Poultry Society, <i>Kantha</i> . (Started on 5th October 1937).	1937	10	Nil	Nil	..
Total (For the first two only).	..	25	330	30	84

The above societies do not themselves handle eggs, but the members sell the produce to the egg collector of the *Pyinmana* Fresh Egg Association. They take loans from the Village Industry Co-operative Banks. The *Pyinmana* Association itself is, however, not a co-operative body, but is run solely by the American Baptist Mission Agricultural School and all the profits go towards the maintenance of that school. This association purchases the eggs at a fixed price from individuals or society members. In the year 1935-36 it purchased and sold improved eggs as follows :—

Eggs handled by the Pyinmana Egg Association.

	Number handled.	Rate of purchase (per dozen.)	Average rate of sale delivered (per dozen.)
		A. P.	A. P.
Large over 1½ oz.	 2,27,200	9 0	14 0
Small under 1½ oz.	 15,800	6 0	12 0

It employed 7 egg collectors on Rs. 20 per month each and a part time clerk on Rs. 10 per month. The travelling allowance of egg collectors amounted to Rs. 735. The eggs were sold to European population at *Yenangyung*, *Chauk*, *Maymyo*, *Namtu* and *Rangoon*.

During the year it made a profit of Rs. 1,809-11-0 after allowing Rs. 500 for breakages. The sum was credited to the Agricultural School, and may be regarded as the remuneration of the Superintendent of the School, who with his staff, rendered free service in managing the Association and looking after sales.

D.—Village egg collectors' (merchants') co-operative association.

Soon after the establishment of the AGMARK experimental egg grading station* in the *North-West Frontier Province*, the local village collectors taking advantage of the common facilities available there, decided to organise themselves on a co-operative basis. The Association was registered as "The Frontier Co-operative Egg Grading and Sale Association, Ltd., *Peshawar*". This was done in order to enable them to work collectively without any unfair competition, and also to ensure the correct maintenance of price and other statutory records, etc.

So far as is known, this is the first effort of its kind in organizing village egg collectors, to conduct their business co-operatively.

Prior to the amalgamation on co-operative lines, the collectors had separate businesses established over a number of years, and each one was handling several lakhs of eggs annually. They had therefore long and intimate connections with the merchants at important consuming markets, and also with the local producers and egg collectors. A few of them were already members of a Co-operative Credit Society, and as such, were also acquainted with the working of the co-operatives. All of them were literate too. Besides, they also had considerable practical experience regarding the supply, requirements, fluctuation in prices, quality, transport, etc., of eggs.

(1) WORKING DETAILS OF THE ASSOCIATION.

The paid up share capital of the Association is Rs. 2,500. During the first year, the collectors brought to the AGMARK station for grading 27,36,015 eggs or an average of 7,500 eggs per day. The eggs were consigned to merchants at *Lahore, Delhi, Simla, Karachi, Hyderabad, Bombay, Aligarh, Mhow, Indore*, etc. Complete annual figures are not yet available, but during 7 months between 1st January to 31st July 1937, the Association purchased Rs. 78,000 worth of eggs from the surrounding villages, and after grading sold them for Rs. 95,500. It paid Rs. 7,590 as railway freight and spent Rs. 1,000 on packing charges. Rs. 500 were spent on travelling expenses for securing business, etc., and there was a further expenditure of Rs. 200 on contingencies. Thus there was a saving of Rs. 8,210 during the above 7 months. After deducting for the reserve fund, a profit of Rs. 5,000 has been distributed to the members.

During the course of the first year's working, the Secretary visited most of the distant consuming markets twice, and established contact with the merchants there to study their requirements, prices,

etc. The Association also negotiated with the different railways, and on giving an assurance that the bookings would be increased and that there would be no loss of revenue to the railways, succeeded in getting the railway freights reduced on the bookings of the graded eggs, from $\frac{1}{2}$ to $\frac{1}{3}$ of the full parcel rates.

It is admitted that the Association did have the benefit of certain facilities placed at its disposal during the first year, but on the expiry of the experimental period on 27th November 1937, it purchased outright all the appliances at the egg grading station for Rs. 860. Since then it has had no financial help from any department, but the business has been built up on such sound lines that they have recently established two more egg grading stations at *Mardan* and *Havelian*, and it is reasonably expected that the profits in subsequent years would be even greater. The Association has, however demanded from time to time expert marketing advice, which is the only help that is given now. As a next step the Co-operative Department of the *North-West Frontier Province*, have already in view the starting of a "village egg producing and collecting society, etc.", in every village, and these would be affiliated to the main Association at *Peshawar*.

(2) NEED FOR EXPANDING THE VILLAGE COLLECTORS' CO-OPERATIVES.

From the above discussion it is clear that the above type of co-operatives are really useful, and should be encouraged. Here at least is found the most desirable type of business acumen and also marketing experience, which is lacking in the producers' co-operatives. For instance, it is mentioned that both at *Etah* and *Martandam* difficulty has been constantly experienced regarding the disposal of smaller eggs (below $1\frac{1}{2}$ oz.), although these eggs are as fresh as the larger ones they are able to sell. On the other hand, the Frontier Association have had no such difficulty at all. They have always been able to dispose of, not only smaller eggs than the above but also cracked, broken, and even the stale ones. While it is not the intention to lend any support to the sale of stale eggs, the fact is merely mentioned that provided there is a proper sale organisation, nothing remains unsold. If a producers' co-operative society therefore cannot sell even its small fresh eggs, there is indeed something wrong with its marketing organization.

It is therefore suggested that more co-operative associations of village collectors should be organized on the above lines. In order, however, that there should be a uniform basis of supplies, it is essential that the eggs should be properly graded. In some instances, the practice, on the part of a few, of lowering the quality has created a competition and a desire on the part of all to do likewise. This has resulted in the loss of trade. Further, the inclusion of a few stale eggs in a basket may be sufficient to give an excuse to the parties opposed to the enterprise to discredit it.

The adoption of the grading of eggs, under the Agricultural Produce (Grading and Marking) Act, 1937, should therefore form

an integral part of any co-operative egg enterprise. It is for consideration whether the Co-operative Departments should not enforce this vital aspect in the bye-laws of all the future societies, as has been done in the case of the Association under discussion.

In order to complete the co-operative cycle, between the producers and consumers, the organising of the egg distributors at the consuming centres also needs attention. It is only when the problem is tackled in its entirety and in a commercial way, that success could be achieved.

E.—Co-operative bye-laws.

The bye-laws governing the working of the co-operatives are more or less standardised and are common amongst the groups discussed on page 198. They differ, however, in minor details not only between one society and another, but also between the different areas. It is noticed from the "objects" of the existing bye-laws that the societies take upon themselves to arrange to supply birds of improved breeds, to sell the eggs, to disseminate information regarding prices, etc., at different centres, to advise in combating poultry diseases and generally to do such things as are conducive and incidental to the development and improvement of the egg trade.

The poultry breeding societies might also include in their objects, the improvement of indigenous breeds of fowls, by establishing poultry farms, etc. Again, some societies may also lay down that eggs should be tested and graded. It is, however, observed that the methods adopted by some of them (*Martandam society*, for instance), for testing the eggs are crude. Instead of using a proper candling lamp, the eggs are dipped in a dish of water and only those that lie flat are considered fresh. It would be admitted that this method apart from being slow is certainly not a reliable one.

Here also therefore the adoption of AGMARK rules for the grading of eggs should prove beneficial. Recently, however, the co-operative egg sale union at *Etah* has taken to grading of eggs under a Certificate of Authorization.

In Appendix XXXVIII are reproduced the bye-laws of the "Frontier Co-operative Egg Grading and Sale Association, Ltd., *Peshawar*". It is noticed that in all broad points they are common with the producers' society bye-laws. The main feature of the objects of these bye-laws however is to help the members in the purchase and sale of eggs and particularly in collection, grading, packing, processing, preserving, storing and marketing.

Under the rules for the guidance of the Managing Committee, the Association have included in the bye-laws that they would grade eggs according to the rules prescribed under the Agricultural Produce (Grading and Marking) Act, 1937. They have also agreed to carry out the business of marketing under the expert guidance of the Agricultural Marketing Adviser to the Government of India.

[Co-operative Marketing.

INTER-CHAPTER NINE.

India has over a lakh of co-operative societies of various kinds, but only seven are concerned with the marketing of eggs. These are all producers' co-operative societies. They are located at *Belgaum* and *Ellur* in *Bombay Presidency*, *Narakkal* in *Cochin*, *Martandam* in *Travancore State* and *Etah* and *Amroha* in the *United Provinces*. These were the only societies operating in 1935-36. The total membership amounted to 247 and the paid up and working capital amounted to a little over Rs. 2,500 or about Rs. 10 per member.

The average number of eggs handled daily by all the societies was less than 27 dozens. The *Martandam Society*, which is the largest, showed a profit of Rs. 360 in a year, the others recorded losses, in spite of the fact that they had received donations to the extent of about Rs. 700 from the co-operative department and other sources. It seems well worth while to compare this state of affairs with the Co-operative Association started in the *North-West Frontier Province* for the experimental grading and marking of eggs under the *Agricultural Produce (Grading and Marking) Act, 1937*.

The Association in the first instance consisted of 13 or 14 village merchants in the neighbourhood of *Pabbi* near *Peshawar* who, in order that they might all be in a position to make use of the egg grading machine and other equipment which the Agricultural Marketing Adviser was prepared to lend, formed themselves into a Co-operative association. The association established grading premises first at *Pabbi*, and later at *Peshawar* and arranged the work with the assistance of a grader and candler lent to them for demonstration purposes. Some of the men looked after the washing, packing and despatch, a few did the secretarial work, while others

carried on with the business of collecting eggs in the villages. During the year they established branches at other centres in the province, *e.g.*, at *Mardan*, and *Havelian*, for the supply of eggs to the grading stations.

Between the members they put up Rs. 2,500 as working capital. By the 31st July 1937, when the Co-operative Department required them to make up their books, the Association was able to show a net profit of Rs. 4,000 apart from having paid each of the members a monthly wage for their labour. Thereafter they agreed to take over the grading machine at a cost of Rs. 860 and also the grading staff and since then the station has been running purely as a commercial concern. In the course of a year's operation they have handled about 30 lakhs of eggs some of which have been sold within the province to clubs, hotels, messes, canteens, retail shops, etc., but most were despatched to down-country markets such as *Lahore, Delhi, Karachi, Bombay, etc.*

In order to establish the necessary contacts and to discuss terms of sale, etc., with buyers in different large distributing centres, the Association at its own expense, sent the Secretary and one of its members round the various markets. The Association also undertook negotiations successfully with the railway companies to get a reduction in freight by guaranteeing the despatch of larger quantities.

As a result of the operation of the Association, the price of eggs paid to producers in the villages, rose by 15 per cent., *i.e.* over 4 annas a hundred as compared with the previous year. On the other hand by selling their eggs properly graded, the Association was able to sell in the consuming markets at a price 20 per cent. above that of ungraded eggs.

It may be explained that, in order to demonstrate the possibility of obtaining a premium on graded eggs, it was essential in the first instance to despatch equal lots of ungraded and graded eggs to different markets. The merchants have adopted the practice and now always send some ungraded eggs to act as a check.

The relative prices obtained per basket of 400 eggs by the Association in the last week of December 1937 in *Lahore* market were, for example, as follows :—

AGMARK—A.—	Rs. 13-0-0.
AGMARK—B.—	Rs. 12-8-0.
AGMARK—C.—	Rs. 12-0-0.
Ungraded.	Rs. 12-0-0.

Incubation temperatures (103°F. to 105°F.) are common either in the sun or shade in many parts of India. It is, therefore, essential to speed up the collection of eggs and ensure their despatch as quickly as possible to the consuming centres. It seems clear that by the time the eggs are brought in to the ordinary weekly or bi-weekly markets in the consuming areas many of them are already stale so that the first step in improving the marketing of eggs is to speed up the system of collection at the assembling centres. From this point of view the village egg collectors occupy the key position and it is essential that they should be organised on the lines of the Frontier Co-operative Egg Grading and Sales Association.

The possibility of organising the village collectors or merchants on co-operative lines seems clearly indicated by this experiment, and that there is plenty of further scope for doing so in the immediate future may be evident from the fact, that there are about 150 known assembling centres where more than three thousand eggs are collected daily and in some as many as half a lakh of eggs per day. The question seems one worthy of attention by co-operative departments.

CHAPTER X.—HATCHERIES AND TRADE IN EGGS FOR HATCHING.

A.—General.

In *China* and *Egypt*, artificial incubation of eggs (i.e., hatching of eggs by methods other than setting them underneath the birds), has been practised since time immemorial. The keeping of eggs in heated rice or paddy husk, or the production of required warmth by burning camel dung or finely chopped straw, were some of the methods employed in early times for the hatching of eggs. The Egyptians are said to have used warmed beds of straw and warmed earth also, as other forms of early incubators. In modern times also, in the countries where the poultry industry is highly commercialised, one of its most outstanding features is the artificial hatching of eggs and the huge trade in day old chicks. This development was inevitable, as the hatching of a few eggs underneath a hen could hardly be said to keep pace with developments in other branches of eggs and poultry industries.

In late years, mechanical incubators are not only perfected considerably but they are now being built with enormous capacity. For instance, it is reported that in 1932, some of the hatcheries in the *United States of America* had installed "mammoth" type of incubators, capable of handling at least 10,00,000 eggs every three weeks. At *Cleveland (Ohio)*, a hatchery has an incubating equipment with a capacity of 10,34,000 eggs at one filling, and turns out 22,000 to 30,000 chicks per day, throughout the hatching season, Sundays and holidays included.*

B.—Hatching of eggs in India.

It has already been explained that in India, except on a few farms where small size mechanical incubators (30 to 150 egg capacity) may be used, all the eggs hatched are set underneath the broody *desi* hens. They not only hatch their own eggs but also the eggs of improved birds and of ducks. The usual period of incubation is as follows :—

Period of incubation.

Type of eggs.	Number of days.
Fowl eggs	21
Duck eggs	28
Goose eggs	30
Turkey eggs	28
Guinea-fowl eggs	26

*1933, Chicago World's Fair—A Century of Progress (Eggs).

The table below indicates the number of eggs that are estimated to be hatched annually in India, (see page 35).

Number of eggs hatched annually.

	(In lakhs).
Desi fowl eggs	5,380
Improved fowl eggs	92
Duck eggs	465
Geese eggs	21
Turkey eggs	3
Guinea-fowl eggs	130
Total	6,091

It is observed that generally a lot of 7 to 13 eggs comprises one setting. Assuming that a hen at a time hatches a setting of say, 11 eggs, and does so twice a year, about 250 lakh broody hens are required for this purpose. Often the broody hens have a special value, and although in the villages there is not much difficulty in obtaining them, sometimes extra 10 to 12 annas may have to be paid for a hen, over and above the usual price.

Most of the above eggs used for hatching are those that are produced on the holdings of the village producers, and only a few may be purchased or sold for the purpose. This aspect is already dealt with in detail under the subject of "Eggs, retained for hatching" (see page 25).

It is observed that whatever little trade there is in eggs for hatching, it is confined to the sale of eggs from the farms or individuals keeping improved poultry. Such sales generally are also confined to hatching seasons and most of them are sold between October and February. Estimates of improved eggs sold for hatching either by the farms or individuals in some of the areas are reproduced below. The number of eggs sold for hatching by the farms exclusively is, however, not available separately :—

Improved eggs sold for hatching.

Area.	Approximate number sold annually.
Bombay presidency	14,300
Baroda State	1,300
Cochin State	250
Madras presidency	8,250
Bengal	1,500
United provinces	11,150
Total	36,750*

*The figures do not include day-old chicks and eggs distributed free by Government farms, as part of their poultry improvement schemes, e.g., in *Mysore*.

In the above areas it is observed that over 572 lakhs improved eggs are produced annually, as such the actual trade or sales of these eggs amount to a negligible fraction or .0064 per cent. of the production or six eggs in ten thousand. There is practically no trade in day old chicks or ducklings at present. But from the description given below about the artificial hatching of duck eggs in Burma, and the trade in "day old ducklings", it would be seen that this aspect needs attention. For instance, *Cochin, Travancore, Bengal*, etc., are particularly suited for the development of hatcheries. Since the chicks or ducklings need no food or water for the first one or two days, a central hatchery can command a larger area for distribution purposes. The availability of healthy well hatched day old stock in large numbers, should greatly facilitate the expansion of egg production at a much faster rate than could be achieved by hatching a few eggs underneath the hens.

C.—Chinese hatcheries in Burma.

It is estimated that about 230 lakhs *desi* fowl eggs, 30 lakhs duck eggs and 2 lakhs improved fowl eggs, are hatched annually in *Burma* (see page 36). The hen eggs (*desi* and improved) are hatched by the *desi* hens but there are about a dozen hatcheries owned and managed by the Chinese, which hatch duck eggs artificially. They do not, however, handle hen eggs in this way.

It is observed that the Chinese hatcherymen first came and settled in the *Hawthawaddy* district some 30 years ago, but they have since spread to other places also e.g., *Tamwe, Bassein, Pegu* and *Moulmein*. Thirteen Chinese hatcheries are reported to be operating at present, out of which 6 are located at *Kayan*. The estimated annual output of ducklings at these hatcheries is given in the table below :—

Annual outturn of ducklings.

Town.				Number of hatcheries.	Number of ducklings produced.
Kayan	..	..	..	6	9,90,000
Pegu ..	..	..	..	2	2,00,000
Tamwe	..	..	..	2	3,65,000
Bassein	..	..	..	1	30,000
Others	..	..	..	2	1,00,000
Total ..				13	16,85,000

On an average, the hatchability is about 66 per cent. Accordingly it is estimated that about 25,27,500 duck eggs are required annually by the hatcheries for the production of the above number of ducklings. The remaining eggs (about 5 lakhs) are hatched by the hens in the usual way.

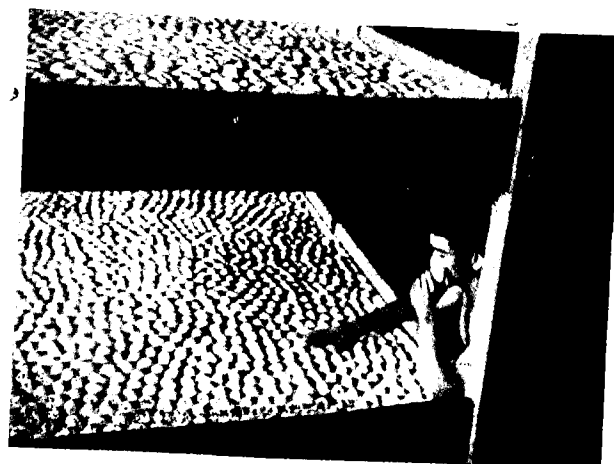


An outside view of a typical Burmese residence, with a hatchery inside.

[Note the empty baskets on the left, used for transporting "day old ducklings".]



The inside of a hatchery, showing a battery of cylinders.



An operator feeling the warmth of eggs, kept in trays during the third week of hatching.

(1) METHODS.

As said before hatcheries are owned and manned by the Chinese. The process is greatly standardised, but although they are operating in *Burma* for more than 30 years, it is said that the Burmese themselves have not been able to master the science and art of artificial hatching, as practised by the Chinese. No special buildings are needed for the work but any house with one or two large rooms is selected for the purpose (see plate facing page 214). The helpers at the hatcheries work under the direction of an expert. The equipment is very simple and consists of a series of cylinders made out of bamboo matting and buried in paddy husk. Huge trays are also provided for holding the eggs during the second half of the period. The estimated cost of equipment for handling, say, 6,000 eggs every 5 days is about Rs. 1,000. The details are given in table below :—

Cost of equipment at a Chinese hatchery in Burma.

Particulars.	Amount.		
	Rs.	A.	P.
1. 1,000 pieces of gunny cloth (<i>Shaw-hpyin</i>) size 2 feet by 2 feet, at 6 annas each	375	0	0
2. 50 bamboo egg trays at 4 annas each	12	8	0
3. 120 blankets for covering the eggs, at Re. 1 each	120	0	0
4. 2 iron pans for heating paddy, at Rs. 3 each	6	0	0
5. Cost of the wooden planks and frame-work for the troughs and shelves, paddy husk, etc.	380	0	0
6. 100 baskets for transporting day old ducklings at Re. 1 each	100	0	0
	993	8	0
or say	Rs. 1,000		

Parallel to a wall or in the middle of a room, a three feet wide space is enclosed with wooden planks in the form of a long box or trough. This is also about 3 feet in depth and 20 to 40 feet in length, according to the size of the room. The trough is first filled up with dry rice husk up to a height of about a foot from the bottom. Cylinders of uniform sizes are prepared from pieces of bamboo matting $2\frac{1}{2}$ feet wide and about 5 feet long. The ends are secured properly to prevent the matting from opening out. These are placed vertically on the paddy husk inside the trough, some 6 to 9 inches apart, and equi-distant from the wooden sides. The empty space between the matting cylinders and the trough is filled up with paddy husk. The top level of the husk is left about 3 inches below the rim of the cylinders, to prevent the husk from falling into the cylinders. The cylinders are also lined in gunny cloth (see top plate facing this page).

After the fertile duck eggs are received from the producers and before they are put into the cylinders, they are sorted out and tested thoroughly. After discarding the damaged ones and those that appear to have come in contact with water, the remaining eggs are

sounded with the fingers. Those that give a cracking sound are further discarded as infertile. Candling of the eggs is usually done only in suspected cases.

The eggs are next counted in lots of 90 and each lot is placed on a piece of thin gunny cloth measuring about 2 feet by 2 feet. By lifting the four corners of the cloth they are taken out in the open and spread upon bamboo mats. The eggs are kept in the sun for half an hour or so, depending upon the condition of the sunshine. During the time they are in the sun, they are constantly turned to afford a uniform warming and drying up.

After this preheating and drying, the eggs are re-collected, by holding the four corners of the cloth, and are brought inside the hatchery, and are placed inside a cylinder, with the gunny cloth underneath. Thereafter about 3 lb. of previously warmed paddy, which is also held in a similar piece of cloth, is placed over the lot of 90 eggs. Over this warm paddy, another lot of 90 eggs is placed in the gunny cloth, over which again warmed paddy is placed. Thus 10 layers of eggs and warmed paddy are alternately put in one cylinder or about 900 eggs in all. After this a blanket and a bamboo tray are used to cover it up, with a view to conserving as much warmth as possible. Similarly the other cylinders in the trough are also filled up and when this is done, it constitutes one charge for hatching.

The position of the layers of eggs in a cylinder is changed constantly and regularly at least twice daily, but in some instances to control the uniformity of the temperature it may have to be changed even four times a day. This is done by transferring the layers from one cylinder to an adjoining one which is emptied out, and the process is repeated till not only the bottom layers are brought up to the top but the contents of all the cylinders are transferred to other cylinders. The lifting or putting back of the eggs is always done with the help of the gunny cloth. In changing the layers, the eggs are also turned smoothly and evenly so as to have a uniform heating of all the eggs. When the position of the layers is changed, new lots of freshly warmed paddy are also introduced. This is, however, said to be necessary only for the first month of the hatching season, after which it is considered that the cylinder itself and the husk in the trough get sufficiently warmed up to take in a new charge of eggs without much of fresh warming.

Greatest attention is, however, paid to the temperature of not only each cylinder but also of each egg, as the success of the process depends entirely upon maintaining the right temperature. For this, however, no thermometers are used, but the operators feel the eggs by touching them with the eyelids or cheeks (see bottom plate facing page 215).

The first candling of the eggs is done on the fifth day. Those that do not show any indication of the germ development are sorted out to be sold for eating purposes. The fertile eggs are then marked with a small brush and coloured ink to indicate the fact of their having been examined once. A re-candling is done every fifth day,

and on each occasion a new mark is put with a different coloured ink. By looking at these marks one can therefore tell the number of days the eggs have been in incubation. On each occasion when candling takes place, new batch of eggs may also be taken in and put with the other eggs.

After the third candling, i.e., on the 15th day after putting them into the cylinders, the eggs with three marks on them are transferred to wooden trays. These trays vary in sizes, and are usually 5 feet wide and 10 to 15 feet long. They are padded with paddy husk and are covered with thick gunny cloth. They are also cambered slightly in the centre, so that the eggs may roll down to the other side. At the ends, the trays have raised strip of wood so fixed as to prevent the eggs dropping out. They are also sometimes arranged in the form of shelves 2 to 3 feet apart (see bottom plate facing page 215). After placing these eggs in the trays in a single layer, they are covered with a piece of fairly thick gunny cloth and blankets. Here also the eggs are turned regularly two or three times a day. After remaining for 12 days on the shelves a few pips* appear and on the 13th day most of the eggs hatch out. Thus it takes altogether 28 days for the hatching of duck eggs into ducklings.

Immediately upon hatching, the ducklings are put into baskets, and are covered with blankets to prevent any chances of catching a chill. On the next day they are despatched to the duck-keepers. No feed nor water is given to the ducklings for the first 3 days.

(2) SEASONS OF WORKING.

The main factors governing the above are, (a) the availability of large number of fresh fertile duck eggs, and (b) the demand of the ducklings at a time, when they could get sufficient food for quick growth. These factors are reported to vary at the different places and are, as such, treated separately.

Tamwe.—The duck-keepers of *Bauktaw, Tadagale, Ye-u* and *Tamwe* need day old ducklings almost throughout the year, for fattening purposes, and as such the hatcheries generally operate continuously with only occasional breaks. The eggs are usually supplied in lots of 3,000 to 4,000 once a week.

Kayan.—The hatching season here is only for 5 months, commencing from the middle of June and lasting till middle of November. This is due to the fact that local conditions for rearing the young ducklings are most suitable during the above months only. The hatcheries at *Kayan* are larger in size and each require 5,000 to 10,000 eggs, every fifth day during the season.

Pegu, Moulmein, etc.—The hatching season here is the same as at *Kayan* but the business is done on a smaller scale.

(3) PRICES OF EGGS FOR HATCHING.

If the market price of duck eggs is, say, Rs. 20 per thousand the hatcherymen usually pay Rs. 10 per thousand extra, for the

*A "pip" is the breaking open of the shell from inside by the unhatched chick or duckling.

expenditure incurred in proper feeding of the breeding stock, and also for providing a straw bedding to procure dry eggs, as eggs that have once become wet are not of much value for hatching purposes.

It is noticed that at *Kayan* particularly, in order to ensure a regular supply of eggs for hatching, the hatcheries also issue to the duck keepers, rice-bran, broken rice, prawn-refuse, etc., on credit, on the condition that all the eggs produced by them are sold to the hatcheries. No interest is, however, charged on this account. But when the accounts are settled, the articles supplied are charged at special rates. For instance, rice-bran worth Rs. 5 per bag may be charged for at Rs. 5-8-0, and prawn refuse worth Rs. 17 may be charged for at Rs. 18. Besides the above extra charge, the hatcheries pay extra only Rs. 3 per thousand eggs purchased for hatching, instead of Rs. 10 as in the case of *Tamwe*.

In the case of *Pegu* and *Moulmein*, it is noticed that the hatcheries do not always do business on "advance orders" for the ducklings, but often have their men hawking round the ducklings at Re. 1 per 16 or Rs. 62-8-0 per 1,000. When they receive advance orders the price is only Rs. 45 per 1,000 day old ducklings.

(4) COST OF "DAY OLD DUCKLINGS".

The process of hatching as described before is mostly manual and batches of helpers are observed to be continuously at it, night and day. Most of the work is of a nature, wherein it is observed that an entire-family, including women and children find some work to do. The helpers usually get lodging and boarding, besides a cash salary.

An example of the expenditure incurred in handling 6,000 duck eggs every five days, for 5 months, by a hatchery at *Kayan*, and the returns from the sale of ducklings and infertile eggs is given below :—

Details of expenditure and receipt.

Expenditure.	Amount.		
	Rs.	A.	P.
1. Cost of 1,80,000 eggs (6,000 eggs once in 5 days for 5 months at Rs. 22 per thousand)	3,960	0	0
2. Wages of an expert and 3 helpers at Rs. 80 per mensem ..	400	0	0
3. Lodging expenses for the above persons	200	0	0
4. House rent at Rs. 15 per mensem	75	0	0
5. Depreciation of the equipment valued at Rs. 1,000 and reckoned to last for 6 years	167	0	0
6. Cost of paddy for warming the eggs	20	0	0
7. Interest, contingencies, etc.	75	0	0
Total	4,897	0	0

Receipts.					Rs. A. P.		
1. Sale of 30,000 infertile eggs at Rs. 17 per thousand eggs	..				510	0	0
2. Sale of 1,20,000 day old ducklings at Rs. 45 per thousand	..				5,400	0	0
3. Sale of used paddy	..	..	..	..	10	0	0
				Total	..	5,920	0 0
Profit for the season..	..	..	..	..	..	1,023	0 0

It would be observed that out of 1,80,000 eggs used for hatching, 30,000 (or about 17 per cent.) are usually sold away on the fifth day, being infertile. The number of eggs actually hatched is about 1,20,000. The remaining 30,000 eggs usually fail to hatch and are discarded, or produce weak ducklings. On the above basis, the cost of producing the ducklings works out to be Rs. 36-8-0 per hundred.

[*Hatcheries and trade in eggs for hatching.*]

INTER-CHAPTER TEN.

The trade in eggs for hatching is relatively small and confined to the sale of eggs from farms or by individuals keeping improved poultry. The estimated total annual sales are somewhere in the neighbourhood of 3,000 dozens only, mainly during the hatching seasons, between November and March.

There is practically no trade at all in India at present in day-old chicks or ducklings and very little artificial hatching in incubators is done. In *Burma*, however, there are a number of large Chinese hatcheries where, under artificial conditions about 25 lakh duck eggs are handled every year producing between 16 and 17 lakhs of ducklings which are packed and despatched as day-old ducklings to the professional duck keepers or hawked round village producers at prices ranging from Rs. 20 to Rs. 45 per thousand.

The Chinese system of artificially hatching in warm rice husk seems worthy of study with a view to its possible introduction into *Bengal* and the *Cochin* *Travancore* area, particularly as it is only by applying artificial methods that rapid expansion of production can be brought about in a short time.

CHAPTER XI.—MISCELLANEOUS.

I.—WORLD TRADE IN EGGS AND EGG PRODUCTS.*

A.—Eggs.

(1) PRODUCTION.

It is impossible to present a picture of egg production in more than a small number of countries, while comparison is rendered more difficult by the incidence of production elsewhere than on farms. This in some cases may comprise a large proportion of the total output.

From available figures of poultry numbers it is evident that the fowl population has increased very substantially in most countries in comparison to pre-war years and that this increase continued generally until a few years ago. Thus between 1925 and 1930 the numbers of fowls on United Kingdom farms increased by 38 per cent. and in United States of America by 12 per cent. ; other countries showing substantial rise being Denmark and the Netherlands. In recent years, however, a peak in numbers appears to have been reached in many countries, and in several a decline has set in. In the United States of America, for example, numbers were at a maximum for recent years in 1930 and had fallen by 12 per cent. by 1935. The highest point in the United Kingdom occurred in 1934 and each subsequent year has witnessed a reduction. Other countries which have suffered declines include Denmark, Germany, Belgium and the Netherlands, although in the last-named country, official action was partly responsible.

The average egg yield per hen, in the few cases in which it is available, shows some variation as between one country and another. Differences in the method of estimation make comparisons difficult, but it may be noted that in recent years the yield seems to have averaged about 125 eggs per hen per annum in the Netherlands, about 120 in the United Kingdom, between 95 and 110 in Canada, 90 in Germany and about 80 in the United States. There is evidence that over a period of years the average yield has risen ; consequently, egg production has increased to an even greater degree than fowl numbers.

In the table below data on egg production are shown for certain countries where official estimates are available. The figures are possibly liable to considerable error, but seem to indicate roughly the trend in the period since 1930. They show that the output was still increasing in the earlier years, but that the tendency has recently been downward in some instances.

*Abstracted from the publications of the Imperial Economic Committee, London.

Production of eggs in certain countries.

(Thousand great hundreds.)

Country.	1930.	1931.	1932.	1933.	1934.	1935.	1936.
Empire countries—							
United Kingdom ..	32,492	35,100	37,500	39,508	40,142	38,842	37,708
Irish Free State* ..	11,709	..	..	..	..	9,915	10,091
Canada ..	25,050	25,763	24,996	24,276	24,377	24,404	23,993
Foreign countries—							
United States of America ..	279,408	287,017	269,233	265,233	258,383	252,108	†
Germany ..	51,200	51,700	51,250	52,000	52,000	51,600	52,350
Denmark ..	†	10,781	†	10,846	†	11,457	14,481
Japan‡ ..	22,225	25,167	29,767	28,508	29,558	30,175	†
France ..	43,970§	..	..	..	..	..	..
Netherlands ..	16,667	17,083	18,333	16,667	18,333	16,750	†
Estonia ..	770	723	819	826	890	905	928
Greece ..	†	2,828	3,350	4,241	4,280	4,555	†

(2) WORLD EXPORTS.

A large number of countries share in the world's export trade in eggs, but over half the total is supplied by countries with ports on the Baltic or North Seas. The downward trend in world exports of eggs was arrested in 1936, when exports from the chief exporting countries exceeded the 1935 figure by 10 per cent. but were 27 per cent. less than 1930. Shipments from Empire countries, which comprise only about 10 per cent. of total exports, were well maintained between 1930 and 1934, when declining exports from the Irish Free State were offset by rapidly expanding Australian shipments; the latter, however, have suffered a contraction and the total Empire exports were reduced in 1935 and 1936. Exports from Denmark, the largest supplier, continue to expand, while the reduction in Dutch exports was checked in 1936 and those from Poland, Belgium, Bulgaria, Roumania and Yugoslavia showed a definite recovery. Of the European exporting countries, however, only the Baltic and Scandinavian countries shipped more in 1936 than in 1930. Exports from Morocco have remained fairly constant over the period, but there have been substantial reductions in exports from Turkey, Russia and the United States of America.

*Twelve months to 31st May of year stated.

†Not available.

‡Twelve months to 30th June of year stated.

§ 1929.

The following table shows the trend of exports from the chief countries from 1930 to 1936, the figures being converted to number from weight where necessary, at an arbitrary rate. Consequently, they are liable to some degree of error, but the trend is probably unaffected.

Exports of eggs from the chief exporting countries.

(Thousand great hundreds.)

	1930.	1931.	1932.	1933.	1934.	1935.	1936.
Empire countries—							
Irish Free State ..	4,736	4,610	3,883	3,469	3,468	3,055	2,967
Australia (a) ..	597	992	1,684	1,062	2,172	1,737	1,850
Union of South Africa ..	606	606	539	462	311	367	385
Canada ..	19	63	27	199	200	130	120
New Zealand ..	3	11	16	33	38	35	33
Total Empire countries ..	5,961	6,282	6,149	6,125	6,189	5,324	5,155
Foreign countries—							
Denmark ..	7,195	8,119	9,206	8,919	9,380	9,769	11,682
Netherlands ..	11,327	11,493	10,674	7,596	8,574	8,240	8,632
China ..	51,36	5,094	2,966	2,956	2,663	2,490	3,307
Poland ..	7,348	6,413	4,987	3,134	2,831	3,600	3,218
Bulgaria ..	2,562	2,982	2,507	2,089	1,938	1,703	2,332
Belgium ..	4,293	4,778	5,186	2,757	1,985	1,548	1,658
Scandinavia countries (b) ..	807	785	1,711	2,001	1,911	1,687	1,568
Yugoslavia ..	4,057	3,508	2,199	2,438	1,590	1,485	1,547
Roumania ..	2,243	1,724	2,108	1,088	981	920	1,601
Morocco ..	1,318	1,136	1,192	1,321	1,292	1,391	1,359
Hungary ..	1,757	1,598	853	1,535	1,267	1,101	924
Turkey ..	2,383	3,263	3,301	2,388	1,392	811	770
Egypt ..	819	1,045	1,704	1,423	962	484	631
United States ..	2,247	1,183	655	593	606	564	600
Lithuania ..	460	508	382	240	160	229	560
Argentina ..	97	261	223	242	249	661	468
Estonia ..	207	188	176	182	289	400	365
Uruguay ..	44	122	261	396	316	581	330
France ..	2,133	713	109	39	151	167	149
Latavia ..	..	2	15	17	6	21	79
U. S. S. R. ..	1,313	2,725	957	263	161	1	13
Seven other countries (c) ..	2,491	2,036	1,398	1,201	1,387	1,479	1,453
Total foreign countries ..	60,227	59,675	52,770	42,818	40,091	38,792	48,249
Total ..	66,188	65,957	58,919	48,943	46,280	44,116	48,404

(a) Twelve months ending June 30th of following year.

(b) Finland, Norway and Sweden.

(c) Chile, Brazil, Portugal, Italy, Indo-China, Syria and Lebanon.

(3) DISTRIBUTION OF EXPORTS.

The United Kingdom took in 1936 almost all the Empire's exports of eggs, about two-thirds of those from Denmark and Poland, half the shipments from the Netherlands and China and one-third of those from Egypt. During 1936, as against 1935, the United Kingdom received larger share of the exports from each of the foreign countries, from which eggs are received, while total exports from these countries also expanded. Shipments to the United Kingdom from the Irish Free State increased from 81 per cent. of the total in 1935 to 89 per cent. in 1936. Germany, the second largest market for eggs, receives her supplies mainly from countries contiguous to her frontier. About a quarter of Danish exports and over one-third of those from the Netherlands, Hungary and Yugoslavia went to Germany in 1936, while considerably increased proportions amounting to 50 per cent. and 76 per cent., respectively, of their total exports, were received from Belgium and Bulgaria.

Appendix XXXIX shows the distribution of egg exports from the chief countries in 1935 and 1936.

(4) THE EMPIRE AS A UNIT.

The downward trend in Empire imports between 1930 and 1933 was reversed in the following two years and the upward movement was considerably accentuated in 1936, when the total net imports were slightly above the 1931 level. The United Kingdom imports, which account for about 95 per cent. of the Empire's total net imports, were in 1936 considerably heavier than in the preceding four years but 7 per cent. lower than in 1930. The decline of the Empire net exports is largely the result of reduced shipments from the Irish Free State and Australia.

The Empire as a net importer of eggs.

(Thousand great hundreds.)

	1930.	1931.	1932.	1933.	1934.	1935.	1936.
Exporting countries—							
Irish Free State	4,725	4,599	3,875	3,469	3,468	3,065	2,967
Union of South Africa ..	589	598	536	461	292	355	373
Australia*	601	991	1,684	1,961	2,171	1,736	1,650
New Zealand	2	10	16	33	38	35	33
Southern Rhodesia ..	26	23	22	14	12	6	7
Canada	(a)	57	23	196	197	127	109
Ceylon	(a)	(a)	(a)	(a)	(a)	5	3
Total net exports ..	5,943	6,278	6,166	6,134	6,178	5,319	5,142

*Cyprus, Jamaica, Bahamas (from 1935 only) and Sarawak.

(a) Net importer.

	1930.	1931.	1932.	1933.	1934.	1935.	1936.
Importing countries—							
United Kingdom	26,359	25,850	13,917	18,341	18,693	19,708	24,494
Malaya	407	315	152	170	281	306	47
Canada	272	(b)	(b)	(b)	(b)	(b)	(b)
Bermuda.. ..	17	21	18	18	16	19	21
Malta	23	40	43	66	77	63	88
Northern Rhodesia ..	..	34	18	14	14	10	7
Palestine	64	62	151	283	475	633	760
Ceylon	114	79	73	54	22	(b)	(b)
Four other countries*	19	12	10	15	28	35	51
Total net imports ..	27,275*	26,413	20,372	18,961	19,606	20,774	25,468
Empire net imports ..	21,332	20,135	14,216	12,827	13,428	15,455	20,326

(5) CHIEF IMPORTING COUNTRIES.

The reversal of the downward trend in imports into the United Kingdom in 1934 and 1935 was evidenced further in 1936, when receipts were only 7 per cent. less than in 1930 and comprised 53 per cent. of total world imports, against 41 per cent. in 1930. There was a check in 1936 to the almost continuous downward movement of imports into Germany of the previous decade, but they were less than half of those in 1930. Increasing supplies have been absorbed by Palestine, but there has been a marked falling off in imports into Austria and Italy. Imports into Switzerland declined further during 1936 but were at about the same figure as in 1930. Total imports into the countries given below fell by 24.5 million great hundreds between 1930 and 1935, but advanced by 6 million great hundreds in 1936.

In the table on the next page, conversions from a weight basis have been made where necessary.

*Twelve months ending 30th June of following year.

(b) Net exporter.

L24ICAR

Imports of eggs into the principal importing countries.
(Thousand great hundreds.)

	1930.	1931.	1932.	1933.	1934.	1935.	1936.
Empire countries—							
United Kingdom* ..	26,430	25,873	19,916	18,355	18,702	19,717	24,503
Malaya	434	337	159	190	310	338	465
Canada	291	7	4	2	3	3	12
Palestine	64	63	151	286	475	633	760
Total Empire countries ..	27,219	26,280	20,230	18,833	19,490	20,691	25,740
Foreign countries—							
Germany.. ..	21,991	19,391	19,704	12,096	10,941	9,312	10,190
Spain	2,552	3,027	3,104	5,054	4,605	4,457	(a)
France	2,002	4,219	1,716	2,098	1,601	1,428	1,908
Switzerland ..	1,834	2,087	2,245	1,930	1,993	1,865	1,818
Czechoslovakia ..	720	1,101	1,189	693	587	805	890
Austria	2,347	2,324	1,524	1,196	891	609	496
Italy	2,043	2,285	4,665	1,171	1,100	673	298
Greece	380	396	152	57	123	209	88
Philippines ..	696	1,099	990	384	140	96	128
Japan	741	1,101	15	4	..	..	1
Cuba	16	5	..	..	..	..	..
Netherlands East Indies ..	68	50	27	21	21	15	(a)
Total foreign countries ..	37,390	38,085	35,331	24,704	22,002	19,371	20,349
Total ..	64,609	64,365	55,561	43,537	41,492	40,062	46,089

(6) UNITED KINGDOM SUPPLIES.

The total supplies of eggs in the United Kingdom reached a peak in 1931: supplies showed little variation between 1932 and 1935, but the preliminary estimate for 1936 indicates a new record.

*Net imports, i.e., total imports less re-exports.

(a) Figures not available. Same figures as in 1935 in total.

Apparent consumption in the year 1936, is estimated at 158 eggs per head, against 150 in 1935 and 159 in 1931. Increasing home production coincided with declining imports in the early part of the period, but these tendencies have lately been reversed and home production comprised 61 per cent. of total consumption in 1936, against 66 per cent. in 1935 and 55 per cent. in 1930.

Supplies of eggs in the United Kingdom during the past seven years are shown in the following table. The figures include the estimates of the output, other than on agricultural holdings.

United Kingdom supplies of eggs in shell.

Year.	Production.	Net imports.	Consumption.	Consumption per capita.
	Millions.	Millions.	Millions.	Number.
1930	3,899	3,172	7,071	154
1931	4,212	3,105	7,317	159
1932	4,500	2,392	6,892	149
1933	4,741 •	2,202	6,943	149
1934	4,817	2,244	7,061	151
1935	4,661	2,366	7,027	150
1936*	4,525	2,939	7,464	158

Imports of eggs into the United Kingdom from Empire sources have shown a progressive decline since 1930, mainly owing to heavy reductions in imports from the Irish Free State, although there was a slight recovery in shipments from that country in 1936. Between 1930 and 1936 the proportion which Empire supplies bore to total imports declined from 22 to 19 per cent. There has been an increase in the quantities imported from Denmark and the Netherlands in recent years and in 1936 they were above the 1930 level. Receipts from Poland have also increased, but in 1936 were still considerably less than six years earlier. There has been an appreciable expansion in supplies from Roumania and South America, and some recovery in receipts from Belgium, which in 1936, however, were less than a quarter of those in 1930.

*Provisional estimate.

The details of imports from 1930 to 1936 are given below :—

Imports of eggs into the United Kingdom, 1930—36.

(Thousand great hundreds.)

Countries whence consigned.	1930.	1931.	1932.	1933.	1934.	1935.	1936.
Empire countries—							
Irish Free State	4,781	4,575	3,948	3,437	3,194	2,395	2,563
Australia	555	918	1,516	1,899	2,099	1,921	1,635
Union of South West Africa Territory.	467	589	526	455	300	361	372
Canada	15	47	5	183	177	98	103
Other Empire countries ..	18	12	20	38	33	41	39
Total Empire countries	5,836	6,141	6,015	6,012	5,803	4,816	4,712
Foreign countries—							
Denmark	6,728	7,549	6,392	6,234	6,383	6,564	7,987
Netherlands	3,681	3,839	1,403	1,003	944	2,678	3,800
Poland	3,613	2,687	1,874	1,681	1,942	2,015	2,564
Finland	12	59	315	478	889	641	380
Roumania	1	..	..	33	161	441	1,169
Sweden	491	339	362	202	258	273	186
Belgium	2,334	2,073	1,584	450	49	256	540
Estonia	3	12	12	49	129	174	138
Lithuania	32	75	68	19	87	147	447
Uruguay	15	73	204	160	161	165	249
U. S. S. R.	85	262	87	55	105	16	..
Argentina	77	205	101	96	41	111	369
China	1,713	1,497	850	1,397	1,415	1,220	1,357
Other foreign countries ..	1,920	1,114	728	504	377	250	755
Total Foreign countries	20,705	19,784	13,980	12,361	12,931	14,951	19,941
Total	26,541	25,925	19,995	18,373	18,734	19,767	24,653

Imports of eggs into the United Kingdom in 1936 and 1935, according to weight classification.

(Thousand great hundreds.)

Countries whence consigned.	Over 17 lb. in weight per 120.		Over 14 lb. but not exceeding 17 lb. in weight per 120.		Not exceeding 14 lb. in weight per 120.		Total.	
	1936.	1935.	1936.	1935.	1936.	1935.	1936.	1935.
Irish Free State	78	66	2,203	2,081	183	248	2,563	2,395
Australia	4	12	1,223	1,524	408	385	1,635	1,921
Union of South Africa ..	..	..	261	242	111	119	372	361
Canada	..	..	90	61	13	37	103	98
New Zealand	..	..	27	32	7	6	34	38
Other Empire Countries ..	1	3	2	..	2	..	5	3
Total Empire countries	83	81	3,905	3,940	724	795	4,712	4,816
Total Foreign countries	636	515	10,400	8,101	8,905	6,335	19,941	14,951
Total all countries	719	596	14,305	12,041	9,629	7,130	24,653	19,767

(7) PRICES.

Egg prices on the London market increased during 1936, but to a less marked extent than in the case of butter or cheese. Prices of home produced eggs in 1936 were above the level of 1932; and in the early autumn of 1937 were higher than in any year since 1930. The movement in home produced egg prices during recent years has

shown an inverse relationship to United Kingdom egg production, which, estimated from fowl numbers, increased for a number of years prior to 1934, but by the middle of 1937 had fallen to the level of 1931. Since 1934 the proportion of home produced eggs in the total supplies on the United Kingdom market has been decreasing.

The increase in prices of foreign imported eggs during 1936 was much less than in the case of home produced eggs, and may be due to the smaller home supplies and increased demand being offset by considerably heavier imports. There was an appreciable rise in prices of all eggs in 1937 at the normal peak period around October. The margin between prices of home produced and imported eggs has increased in the past few years.

Monthly prices from January, 1932, to October, 1937, of the National Mark Specials and Standards, Danish (15½ lb.) and Dutch Best Mixed (57/58) are given in Appendix XL.

Average prices for Australian and South African eggs at London in their respective seasons are given in the table below:—

Average prices of South African and Australian eggs, 1932—37.

(Per 120.)

		Australian, 16 lb.				
		1932-33.	1933-34.	1934-35.	1935-36.	1936-37.
		s. d.	s. d.	s. d.	s. d.	s. d.
September	.. ..	13 2*	12 0	11 4	12 0†	12 3†
October	.. ..	13 8	11 10	12 2	13 1	13 4
November	.. ..	13 9	12 10	12 5	12 5	13 5
December	.. ..	13 0	12 10	12 2	13 2	11 9
January	.. ..	12 2	11 9	9 6	13 2*	8 10
February	.. ..	13 0*	10 0*	8 9	9 9†	8 3*
		South African, 16 lb.				
September	.. ..	13 6*	12 6*	12 0†	12 3*	13 6*
October	.. ..	13 10	12 6	12 6	13 4	13 8
November	.. ..	14 5	13 2	12 11	12 9	13 9
December	.. ..	13 10	13 7	13 3	13 8	12 6
January	.. ..	12 4	13 0*	10 2‡	14 0	..

*Two weeks' quotations.

†One week's quotations.

‡Three weeks' quotations.

B.—Egg products.

(1) WORLD EXPORTS.

The trade in liquid eggs, albumen and yolks of eggs prepared and preserved in various ways, increased in post-war years from very small dimensions to a total of nearly 1½ million cwt. in 1929 and 1930. There was a decline to under 1 million cwt. in 1933, but a recovery followed in the next three years.

China is the source of about 95 per cent. of total world exports of egg products. Other countries play a small part in the trade, the most important being Russia and Egypt, with Australia occasionally shipping small quantities.

(2) EXPORTS FROM CHINA.

Exports of egg products from China increased further during 1936, but were 9 per cent. lower than in 1930, shipments to the United Kingdom accounting for 71 per cent. of the total, against 65 per cent. in the previous year. The rise in exports to Germany was accentuated in 1936, when they were 10 per cent. higher than in 1930.

Details of exports from China in recent years are as follows:—

Distribution of the exports of egg products from China, 1930—36.

(Thousand cwt.)

Country of destination.	1930.	1931.	1932.	1933.	1934.	1935.	1936.
United Kingdom	896	821	744	642	729	812	887
Germany	135	93	132	103	84	92	149
United States of America ..	103	58	33	25	30	89	81
France	100	89	55	53	24	24	33
Netherlands	53	56	38	35	39	31	29
Japan	36	22	10	27	24	21	27
Belgium	19	23	28	33	30	20	31
Italy	17	11	15	21	23	9	5
Spain	2	7	5	2	3	3	2
Denmark	3	3	4	3	..	..	..
Other countries	5	1	2	2	3	3	..
Total	1,369	1,184	1,066	946	989	1,104	1,244

(3) UNITED KINGDOM IMPORTS.

The two tables below show separately the imports of liquid or frozen eggs and dried eggs into the United Kingdom from 1930 to 1936. The shell-egg equivalent of the retained imports in 1936 was about 9 million great hundreds, against 8 million in 1935.

Imports of liquid and frozen eggs (whole, yolk or white) into the United Kingdom.

(Thousand cwt.)

Country whence consigned.	1930.	1931.	1932.	1933.	1934.	1935.	1936.
Australia	..	7	24	17	1	2	7
Other Empire countries ..	..	..	2	..	..	..	..
Total Empire countries ..	..	7	26	17	1	2	7
China	818	764	738	579	801	768	862
Other foreign countries ..	5	3	11	24	16	17	21
Total foreign countries ..	823	767	749	603	817	785	883
Total ..	823	774	775	620	818	787	890

Imports of dried eggs into the United Kingdom.

(Thousand cwt.)

	1930.	1931.	1932.	1933.	1934.	1935.	1936.
Albumen—							
China	14.9	17.3	18.7	18.8	16.6	16.8	22.7
Other countries	0.7	0.9	0.2	0.4	0.1	0.2	0.2
Total ..	15.6	18.2	18.9	19.2	16.7	17.0	22.9
Dried (except albumen)—							
China	12.4	8.0	4.5	5.8	4.0	10.3	11.4
Other countries	0.4	0.3	2.4	0.3	1.7	0.2	0.1
Total ..	12.8	8.3	6.9	6.1	5.7	10.5	11.5

(4) THE EMPIRE AS A UNIT.

Apart from the United Kingdom, which is a large net importer, the trade in egg products of Empire countries is very small; Australia in the 1935-36 season returned to the position of a net exporter, which she had lost in 1934-35. The Empire in 1936 was a net importer to the extent of over two-thirds of shipments from China.

II.—NOTE ON PROCESSING.*

It has already been stated that the processing of eggs, i.e., the manufacture of egg products, as frozen or dried eggs, etc., has not been attempted in India. The possibilities of this being undertaken in the near future have, however, been indicated. As such a brief description of the utilization of egg products and of the broad lines of the process of their manufacture, would be found useful.*

A.—Utilization of egg products.

In countries where the preparation and manufacture of food-stuffs is greatly industrialised, it is observed that frozen, dried and liquid eggs are particularly popular with bakeries, hotels and manufacturers of foods, for making up large recipes by weight or volume. This is particularly due to the fact that the quantity to be used, may be accurately determined with these products, whereas the yield from a case of eggs in shell is uncertain. Also, an inspection of a random sample from a single container of egg products would generally show the quality of the entire consignment. At present, however, frozen, dried or liquid egg products are not available in suitable household packages. The table below illustrates the uses to which the various forms of egg products are put in countries where they are consumed :—

Uses for eggs in their various forms.

Uses.	Shell.		Frozen.					Dessicated or dried.		
	Fresh or storage eggs.	Inedible eggs.	Mixed or whole eggs.	Frozen egg whites.	Plain yolk.	Salt yolk.	Sugar yolk.	Glycerine yolk.	Mixed or whole eggs.	Albumen or whites.
Baking powder ..	×		×	×	×		×	×		
Biscuits, cookies ..	×		×	×	×		×	×	×	×
Cake baking, dark ..	×			×	×		×	×		×
Cake baking, white ..	×			×	×				×	×
Candies, confections ..				×						×
Clarifying wines ..									×	
Custards ..	×				×		×			×

*The text in this section is generally based upon extracts from "Marketing Poultry Products" by Benjamin and Pierce.

× Denotes usage of eggs.

Uses.	Shell.		Frozen.						Dessicated or dried.			
	Fresh or storage eggs.	Inedible eggs.	Mixed or whole eggs.	Frozen egg whites.	Plain yolk.	Salt yolk.	Sugar yolk.	Glycerine yolk.	Mixed or whole eggs.	Albumen or whites.	Yolk.	Liquid.
Doughnuts ..	x		x		x		x	x	x		x	x
Egg noodles ..	x		x		x				x		x	x
Food beverages ..	x		x	x	x		x		x		x	
Ice cream ..	x		x	x			x		x		x	x
Icings and meringues ..	x		x	x	x					x		x
Leather tannings ..		x								x		
Macaroni ..	x		x		x				x		x	x
Mayonnaise ..	x				x	x	x	x				x
Medicinals ..				x	x					x		
Pancake and other prepared flours.									x		x	
Pie ..	x		x						x			x
Prepared puddings ..	x			x					x		x	x
Salad dressing ..	x		x		x	x	x	x				x
Adhesive purposes ..										x		
Cement for bottle and jar cups.												
Egg shampoo ..										x		
Fertilizer ..		x										
Fixing agent for pigment colors in art.										x		
Gilding books in book-binding.										x		
Mending broken chinaware									x	x		
Photography ..										x		
Polish for leather furs ..										x		
Printer's ink ..										x		
Sizing for paper ..										x		
Soap making (Germany) ..										x	x	
Textile dying ..										x		
Varnish and oils for art paintings.										x		

X Denotes usage of eggs.

B.—Freezing.

In a modern egg freezing plant, the eggs as received from the collecting centres, are usually chilled at about 40°F. before candling. Thereafter they are candled, also in a chilled room, and the good eggs are passed on immediately to the breaking room where the temperature is about 60°F. The chilled condition of the egg contents facilitates the operation of opening and separating.

The breaking of eggs is done by trained operators. In order to detect mustiness or other foreign odours which eggs sometimes absorb, every egg is smelled as it is opened. A keen and correct sense of smell is extremely important, for one mistake may spoil a whole 30-pound container of good eggs. When yolks and whites are to be frozen separately, the opened egg is dropped into a special cup, fitted with a separating ring. The ring goes over the egg in such a way that it cuts off the white, and upon tipping the cup the yolk and white are easily separated.

From the breaking tables the egg matter passes through a series of baffle plates or other devices, for removing any bits of shell that may have fallen in it and for straining the product. In order to obtain a homogeneous product, the matter is thoroughly churned before being poured into containers, and is then placed in sharp freezers. In some instances 5 per cent. glycerine or 10 per cent. sucrose or a substantial amount of salt is added to yolks before freezing. One of the advantages of glycerine, sugar or salted yolk is that it thaws out smoothly without the usual danger of gummy or lumpy particles forming in the finished product. Since churning generally destroys the beating quality of albumen, it is not prepared in the same way as the whole egg matter or the yolks. It is poured directly into the containers of about 30 lb. capacity, and placed in the sharp freezers. Certain emulsifying agents may sometimes be added to the albumen or whole eggs also, so that the confectionery, etc., made therefrom is of a superior texture and volume, and does not become stale soon.

In rapid operation the whole process, from the opening of the eggs to placing of the filled container in the freezer, takes only about eight minutes. It is observed that the frozen product, if properly prepared from fresh eggs and held at the correct temperature, shows practically no deterioration in quality, even after 2½ years of storage.

C.—Drying.

Among the most popular processes of drying eggs are the (1) belt, (2) spray, and (3) pan methods.

(1) BELT METHOD.

As the name implies the device for "belt drying", consists of an endless aluminium belt about 4 feet wide. This passes slowly

through a chamber about 100 feet long, having a temperature up to 160°F. The whole-egg matter is applied thinly at one end of the moving belt until six or eight layers have been added. Then after sufficient drying the product is scraped off. This results in the product called the flaked egg, and for specific purposes such as the making of special varieties of cakes, it has been preferred by bakeries even though the product does not keep so well as that made by other methods. The dried product must be kept in cold storage, at a steady temperature between 40° and 50°F. Albumen cannot be satisfactorily dried by this method.

(2) SPRAY METHOD.

Many of the spray egg driers are like the milk driers, but slightly modified for egg drying. The spray method consists of spraying the egg mixture, under a pressure of 1,500 lb. to 3,000 lb. per square inch, through fine nozzles into a chamber heated at 150°F. and sometimes kept at a slight vacuum. The moisture is removed from the egg matter almost instantaneously, and it falls to the floor of the drying chamber as a dry powder. Spray dried powder is more soluble than belt dried flake product. Such a powder can be kept satisfactorily in dry storage without refrigeration for about a year. Modern spray driers running continuously, produce about two tons of dry whole egg or yolk in twenty-four hours.

(3) PAN DRYING OF ALBUMEN.

Until 1932, practically all dried albumen was produced in China. The albumen, separated from the yolk was poured through a fine sieve into wooden casks, each holding about 700 lb. After 36 to 60 hours, depending on the exact temperature, the albumen began to ferment, and a scum rose to the top. When bubbling had practically ceased, the fermenting was controlled by adding about 2 ounces of aqua ammonia and 3 ounces of alcohol per 100 lb. of the matter. The clear liquid white was then poured into trays, about 12 inches in diameter and 1½ inches deep. These trays were then placed on racks in the drying room. The temperature in this room was held at about 120°F. for the first 18 hours, and then slowly raised to about 140°F. The trays were kept there for another 20 to 25 hours. The dried albumen was then removed from the pans and placed on tables to cure for 24 hours more, when it was considered ready for packing.

Although the spray method has been generally considered unsuitable for albumen, certain workers have recently obtained very good results with it. Their discovery consists of adding a certain amount of acid to the powdered spray dried albumen, after which it serves for beating and other purposes as well as the usually favoured crystal product dried in pans. This method avoids the disagreeable odours resulting from the fermentation involved in the Chinese method of pan drying. Modern equipment for the pan drying of

albumen has recently been developed, whereby stainless steel or glass-lined containers are used. The pan dried albumen has a transparent flaky or crystal appearance.

D.—Grading and testing.

Information about the standards of egg products in other countries is not available, but the Egg Products Association of America, Inc., have prescribed specific grades of spray and granular yolk, whole egg and crystal albumen. The standards set up by the Association are given below.

Standards of quality for albumen.

1. Fancy Hen (Chicken) Albumen Crystals :

Appearance	..	..	Bright clear crystals.
Siftings	..	..	Not to exceed 20%.
Odour	..	..	No objectionable odour.
Beating	..	..	Beat 90% to 100% with good consistency, minimum 6½ in. after levelling.

2. Prime Hen (Chicken) Albumen crystals :

Appearance	..	..	Bright clear crystals.
Siftings	..	..	Not to exceed 20%.
Odour	..	..	No objectionable odour.
Beating	..	..	Beat 80% to 100% with good consistency minimum 5½ in. after levelling.

3. Fair Hen (Chicken) Albumen crystals :

Appearance	..	..	Fairly clear crystals.
Siftings	..	..	Not to exceed 20%.
Odour	..	..	Slight odour permissible.
Beating	..	..	Beat 70% to 85% with good consistency minimum 5½ in. after levelling.

4. Poor Hen (Chicken) Albumen crystals :

Appearance	..	..	Unimportant.
Siftings	..	..	Not to exceed 20%.
Odour	..	..	Unimportant.
Beating	..	..	Beat 50% to 70% with fair consistency minimum 4½ in. after levelling.

5. Non-beating Hen (Chicken) Albumen crystals :

Appearance	..	..	Unimportant.
Siftings	..	..	Not to exceed 20%.
Odour	..	..	Unimportant.
Beating	..	..	No test necessary.

6. Chicken Albumen Siftings, Duck Albumen, and Duck Albumen Siftings, to be sold under the same descriptions.

Standards of quality for yolk and whole egg.

1. Prime Spray Hen (Chicken) Egg Yolk :

Taste	..	..	Sweet and wholesome.
Texture	..	..	Smooth and velvety.
Solubility	..	..	Good.
Colour	..	..	Good bright yellow appearance.

2. No. 2 Spray Hen (Chicken) Egg Yolk :

Same requirements as Prime except colour is not guaranteed.

3. Summer Cargo Spray Hen (Chicken) Egg Yolk :

Same as No. 2 quality, but "Summer Cargo" must be mentioned.

4. Prime Granular Hen (Chicken) Egg Yolk.

Taste	..	..	Sweet and wholesome.
Colour	..	..	Bright deep yellow, as nearly uniform as possible.

5. No. 2 Granular Hen (Chicken) Egg Yolk :

Taste	..	..	Sweet and wholesome.
Colour	..	..	Not guaranteed.

6. Prime Spray Whole Hen (Chicken) Egg :

Taste	..	..	Sweet and wholesome.
Texture	..	..	Smooth and velvety.
Colour	..	..	Good.
Albumen	..	..	Contents about 33% on try basis.

7. No. 2 Spray Whole Hen (Chicken) Egg :

Taste	..	..	Sweet and wholesome.
Texture	..	..	Smooth and velvety.
Colour	..	..	Not guaranteed.
Albumen	..	..	Contents about 33% on dry basis.

NOTE: The same methods of determining the grades are applied to duck yolk, with the exception that the colour reads "bright reddish orange".

The usual method of testing crystal albumen is to soak 1½ ounces of albumen (80 per cent. flakes and 20 per cent. siftings) in 15 ounces of water over-night. The following morning the solution is placed in the 10-quart bowl of the Hobart electric whipper, and the machine operated for 1½ minutes at second speed, and for 1½ minutes at third speed. The whipper is then removed and after replacing all adherent material in the bowl, the contents are levelled off and the depth measured in inches.

FINAL INTER-CHAPTER.

GENERAL CONCLUSIONS AND RECOMMENDATIONS.

The object of marketing surveys is to secure better prices and returns for producers. Fortunately in the case of eggs the ways of doing this are simple, obvious and inexpensive.

Expansion of the Market.

Some increase in sales on the local market may be expected from improved distribution, but a higher general rate of consumption will only be achieved gradually. There is a growing tendency for vegetarians (who constitute the bulk of the population) to include eggs in their diet; those who are disinclined to take life in any form are perhaps beginning to appreciate the fact that there is no life in an infertile egg. Further, the growing interest in dietetics as a result of nutrition research work is leading to a realisation of the importance of eggs as a source of the proteins, at present so lacking in the ordinary diet of the people. But expansion of the internal market, as a result of these tendencies, must be slow and a matter of time.

For a more rapid expansion, hope must, therefore, lie in the export trade. At present there is a world export trade of something like 50 million long hundreds (120) fresh eggs, of which about one half is absorbed by the British Empire—mainly by the United Kingdom. In addition, the world exports of liquid eggs, yolks and albumen, amount to over 1½ million cwt. China holds 95 per cent. of this export trade and about 2/3rds of her exports go to the United Kingdom. The Indian export trade to Ceylon and *Burma* has been subject to serious restrictions in the last few years, and it is a matter for serious consideration whether this trade cannot be more

than compensated for by opening up a connection in those products with the biggest buyer, viz., the United Kingdom. *Bengal, Cochin-Travancore* and *Madras Presidency* are the heaviest producing and exporting areas and their production is capable of further expansion. The establishment of factories in those areas for the production of frozen or liquid eggs, yolks and albumen offers an obvious and promising method of expanding the market.

Expansion of Production.

To work up this export trade to an economic level it is necessary to develop production further in the selected areas referred to. So far there has been no organised attempt to create a market in India for "day-old chicks or ducklings" produced by artificial means. In *Burma* conditions are different and the business in production and sale of day-old ducklings particularly is highly organised. There is much scope for development on these lines in India.

The development of the marketing of eggs and poultry calls for more attention on the part of Agriculture and Livestock Departments. So far their efforts appear to have been directed mainly to the introduction of breeds of imported fowls. Little has been done for *desi* poultry, and ducks have been almost entirely neglected. The modern urge towards mixed production will, it is hoped, secure for the poultry industry its rightful place in the agricultural economy of this country.

Need for statistics.

In the matter of statistics generally, there is great need for a census of the poultry and duck population in this country and of the production of eggs. It would be a great help if poultry could be included along with the

next cattle census in 1940, and it would be useful if on the farms of agricultural departments more records were maintained particularly of the egg production of *desi* hens and ducks, both of which are, as a rule, given very little attention.

The provision of statistics of this kind would help to dispel the ignorance of the outside world and of persons in this country who would be interested in developing the export trade both of eggs and of egg products such as dried or frozen liquid eggs, etc., for the production of which two areas appear to be particularly suitable viz., *Bengal* and the *Cochin|Travancore* area.

Elimination of waste.

Losses in gathering the eggs are estimated at over *Rs. 14 lakhs* a year. This is largely due to the present haphazard methods of keeping poultry and could be greatly reduced by the provision of better housing and nesting for the poultry and the use of a little wire netting. Some attention and effort on the part of those interested in rural reconstruction should be able to improve matters considerably in this direction.

Breakages in the course of collection, transport and distribution are high and amount to about *Rs. 15 lakhs* per annum. Transport agencies are scarcely to blame for this since the containers used are much too fragile for the purpose. Improved rigid containers, preferably in the form of boxes, are urgently needed and the use of some kind of packing material between the different layers of eggs would go a long way in reducing the amount of damage.

The staling of eggs in the course of marketing also gives rise to very large losses which are estimated to amount to about *Rs. 28 lakhs* a year. More rapid and

systematic collection of the eggs in the producing areas would eliminate much of this waste. The ordinary weekly or bi-weekly market does not provide a suitable channel for the assembling of eggs. It seems essential that collectors should go round the villages daily and bring in the eggs, but they have to be organised in order to ensure that this is done regularly and systematically. The report indicates various ways in which this could be done, but perhaps one of the most promising lines of approach is to organise village collectors or merchants on a co-operative basis.

Staling in the course of transport is an important factor and some improvement in the way of the provision of insulated and refrigerated transport facilities is required, but even where they exist at present, such facilities are not fully made use of by senders to distant markets, and it would appear to be necessary on the part of the railway companies to educate the parties concerned and induce them to make use of such facilities. There is also a need for more cold stores conveniently situated at rail-head in the larger consuming centres, but no doubt in this case also the cold storage concerns would have to undertake a certain amount of educational work in order to have them fully made use of.

It would simplify the problem if the large wholesale distributors at the various centres formed themselves into an Association to establish wholesale markets for eggs in the neighbourhood of such cold stores and ensure that the facilities were fully made use of. The question of providing such cold stores near the rail-head in consuming centres is one which might receive the consideration of the various railway companies.

A trade in hard-boiled eggs already exists in a small way and its further expansion affords an attractive proposition, since hard-boiled eggs play a prominent part

in the Indian cuisine for the preparation of curries, salads, etc. The bearing of this on the problems of breakage and staling in transport are obvious.

Reduction of price risks.

The average seasonal fluctuation in prices is about 20 per cent., being low at the period of peak production March/April and higher later on, during the cold weather. The daily fluctuation in prices is as much as 10 or 12 per cent. at times. Price risks on this account tend to keep the margin of distribution relatively high. The use of short period cold storage would largely eliminate the daily price variations and even the cost of long period cold storage would be well covered by the present seasonal price fluctuation.

Market gluts would be prevented and a better organisation of distribution would be ensured, if more adequate information regarding supplies and prices could be made rapidly available to all concerned. At present there is a complete lack of information on these points, and it is a matter for consideration whether there should not be some kind of central organisations for the provision of market news and the better control of supplies. With the establishment of more egg grading and packing stations, for example, it might be possible to form such a body on the lines of the Egg Central in England which is constituted of the "National Mark" packing stations.

Improved price returns.

Apart from eliminating over *half a crore of rupees* worth of loss due to wastage on the lines indicated above experience has shown that the proper AGMARK grading and marking of eggs brings in enhanced returns to the extent of 15 to 20 per cent. The process of candling

in front of a bright light so as to eliminate stale eggs and the subsequent sorting, according to size is a comparatively simple and inexpensive process which benefits both producer and consumer. There is, therefore, need for the rapid expansion of organised grading and marking stations under the Agricultural Produce (Grading and Marking) Act, 1937.

This report shows how easily and readily this can be done with much profit. Since the village collector occupies the key position it would appear to be a comparatively simple matter for the local marketing staffs and co-operative departments concerned to undertake this work, particularly as there are at least 150 centres already in existence where anything up to half a lakh of eggs are assembled daily.

APPENDICES.

NOTE.—In going through some of the Appendices it may be noticed, that the figures in the different columns may not always tally arithmetically. This is due to the clipping of the original figures to lakhs, but in doing so the arithmetical accuracy could not be maintained. The difference on the whole is, however, insignificant and does not generally exceed half a per cent.

APPENDIX I.

Methods adopted in the different areas for determining the number of birds.

A—HENS.

Kashmir State.

Desi hens.—The keeping of hens is mainly confined to the Mohammedans. There are about 8,942 towns and villages in the State, with an average of about 75 houses in each. Of these about 75 per cent. or 5,03,728 are estimated to keep poultry. Enquiry further shows that an average mohammedan house keeps about 2 *desi* hens or pullets. Thus a total of about 10 lakhs laying pullets and hens for the State is estimated.

North-West Frontier Province.

Desi hens.—Of about 4.8 lakhs houses in the urban and rural area of the province, enquiries show that only about 30 to 40 per cent. in the urban and 50 to 90 per cent. in the rural areas keep hens. The proportion of total houses keeping poultry, and the number of hens per house, vary in each of the five districts. Accordingly, it is calculated that on the whole about 2.7 lakhs houses are keeping poultry, and the total number of laying pullets and hens in the province are estimated at about 9.4 lakhs.

Improved hens.—Only a few are kept in the towns, cantonments and on the Government farms, and their total number is estimated to be about 1,050, out of which about 530 only are laying pullets and hens.

Punjab.

Desi hens.—As pointed at the beginning of Chapter I, a poultry census was taken by the Agricultural Department (under the direction of the Poultry Expert) in 1932. A few villages were selected in each of the 28 districts and the number of hens kept in the district per hundred persons was determined. Accordingly, the total number of hens in the Punjab was calculated to be about 63.3 lakhs of which 90 per cent. were taken as laying pullets and hens. Unfortunately it has not been possible to check the previous figure of 1932 to see if there has been any variation since, but as a result of the present survey it is considered that the proportion of laying pullets and hens to the total hens, *viz.*, 90 per cent. is rather high. It has accordingly been reduced to 55 per cent., which works out to about 34.8 lakhs laying pullets and hens for the Punjab.

Patiala State.

Desi hens.—A printed form was sent to the *patwaries** in all the villages and towns of the State and the number of hens, etc., was filled in after due enquiry at each village. The total number of laying hens and pullets thus worked up to 31,874. Similarly, the number of improved pullets and hens was found to be about 1,276.

Delhi Province.

Desi hens.—(*Urban area*).—There are about 98,483 occupied houses in the urban area. Considering only the houses of Mohammedans, Christians and certain castes of the Hindus, it is found that only 1 house in a hundred keeps hens, and on an average 2 *desi* pullets and hens are kept per house for the production of eggs. Thus the total number of laying pullets and hens is estimated at 2,000 birds.

*Petty revenue officials.

(*Rural area*).—An official enquiry in most of the 365 villages of the province shows that only about half (180) keep poultry. The number of hens kept per village varies from 375 to 1,087 and the returns show that there are about 3,860 *desi* pullets and hens in the 180 villages. The provincial estimate of the *desi* laying pullets and hens is, therefore, 5,860.

Improved hens.—Including the hens kept on the two fairly large commercial poultry farms, and some found at some of the private houses in the urban area, the number of improved pullets and hens is estimated to be 2,400. The official returns from the rural area show only about 100 improved pullets and hens, all of which are in only one or two villages. Thus the provincial estimate is 2,500 laying pullets and hens.

Sind.

From an enquiry in a few representative villages the total number of *desi* hens in the province is estimated to be about 15 lakhs, of which about a third or 5 lakhs are pullets and hens. Improved poultry is negligible.

Baroda State.

On return of the questionnaires sent out to all the villages in the State, the number of *desi* pullets and hens is found to be 1.5 lakhs. Improved birds are negligible.

Bombay Presidency.

Desi hens.—Contrary to the method generally practised in the other areas, the number of hens in this Presidency has been worked backwards, from the figures of consumption of eggs.

Urban consumption.—Five important towns (Bombay, Ahmedabad, Poona, Surat and Melagaon) have been selected, and their population from the Census Report according to different religions is taken into account. The estimated consumption of eggs in the above five towns is about 2.5 lakhs per day, or about 941.7 lakhs per annum. Enquiries further show that the annual per capita consumption of eggs for the different communities is 600 eggs for Jews, 400 for Parsees, 350 for Christians, 50 for the Mohammedans and 12 for the Hindus. As many as 60 per cent. of the Hindus are also said to be egg eaters. On the above basis the annual consumption of eggs, for the entire urban population of the Presidency, is calculated to be 1,275.5 lakhs.

Rural consumption.—The consumption of eggs by the different communities in the rural area is less than in the case of urban population, although here also about 60 per cent. of the Hindus are said to be egg eaters. The per capita consumption for Jews is 200 eggs. In the case of Parsees and Christians it is 100 each, and for persons of tribal religions it is 20 each. For Muslims and Hindus it is 20 and 12 eggs respectively. Accordingly, the annual consumption amongst the total rural population is estimated at about 1,384.4 lakhs eggs.

The consumption for the whole Presidency thus works up to 2,660 lakhs eggs per annum. Taking into consideration the annual inter-provincial import and export of eggs, the imports are greater by about 121.1 lakhs. The consumption of eggs produced within the Presidency is thus 2,660—121.1 or 2,538.9 lakhs. An addition of 10 per cent. to this is necessary, to account for eggs that are produced but cannot be consumed for eating purposes (3 per cent. due to non-collection on account of the ravages of wild animals and birds, 3 per cent. used for hatching and 4 per cent. lost due to spoilage, etc.). Thus the total annual consumption of eggs for the Presidency is estimated to be 2,792.7 lakhs.

These eggs however also include duck eggs and improved hen eggs, and it is estimated that the annual production of these two is 8.86 lakhs, the balance, 2,783.91 lakhs, being *desi* hen eggs. At the rate of 60 eggs per annum produced per *desi* bird, the estimated number of *desi* hens in the Presidency is 46.3 lakhs.

It would appear that the indirect method adopted above leaves various loopholes for errors to creep in, so that the figures arrived at should be considered only as approximations.

Improved hens.—Records of various Government and private farms as well as the estimates of the numbers kept by a few individuals show, that the number of improved birds is not more than 15,000 of which 5,000 are laying hens.

Mysore State.

Desi hens.—A poultry census was taken in 13 villages of *Sira taluk* in *Tumkur* district and on its basis, an estimate for the number of birds in the State has been made. Caste restrictions permit only 44 communities out of 55, to rear poultry. On the basis that only about 8.8 lakhs houses in the State are keeping poultry at an average of 2 hens per house, the number of *desi* hens is estimated to be 17.6 lakhs.

Improved hens.—There are only a few places in the State where these are found and their number is estimated at 6,000 laying pullets and hens.

Coorg.

Enquiries and estimates by *nads** show that the province has about 52,000 *desi* hens of which about a half are laying pullets and hens. The number of improved laying pullets and hens is about 700 only.

Cochin State.

Desi hens.—Immediately prior to the marketing surveys, the State had undertaken in 1934 an economic survey of nine typical villages during the course of which the number of hens (including improved hens) per village was found to be 803. On the above basis, for the 308 village units (including 36 villages as equivalent to 12 towns) the number of laying pullets and hens has been estimated at 2.4 lakhs.

Improved hens.—Further enquiries show that 4 per cent. of the laying birds are of an improved type and their number is thus calculated to be about 10,000.

Travancore State.

Desi hens.—It has already been pointed out that in 1925 a poultry census was taken by the (Y. M. C. A.) Rural Reconstruction Centre, *Martandam*, in two villages comprising some 204 houses. It was further observed that in *South Travancore*, there were 2,55,596 occupied houses of which about two-thirds keep hens. On the basis that each house has three laying birds, the number of *desi* laying pullets and hens in *South Travancore* is estimated to be 5.1 lakhs. So far as *South Travancore* was concerned, the results of this survey are considered to hold good generally even under the present conditions. For the *Central, Northern and hill range* divisions, however, estimates are based on fresh enquiries. In the above areas there are 6.7 lakhs occupied houses and enquiries show that 25 to 50 per cent. of the houses do not keep hens, and of the remaining which do, possess generally 2 to 4 laying pullets and hens. On this basis the total for the

*Local divisions

above three areas is estimated to be about 18.7 lakhs laying pullets and hens, and for the whole State 23.8 lakhs *desi* pullets and hens.

Madras Presidency.

Desi hens.—A poultry census taken through the help of village officials in 25 representative villages in the different parts* of the Presidency, shows that about 37.5 per cent. of the houses are keeping poultry. From a random sampling it was further observed that a house (with an average of 5 persons) kept 2 *desi* pullets and hens. On this basis, 15 *desi* hens are kept per hundred persons in the Presidency. It is estimated that 70.1 lakhs birds are kept by the total population of 46.74 millions. Since a part of the Presidency was transferred to the newly formed province of Orissa, the number has subsequently been reduced to 66.1 lakhs.

Improved hens.—An estimate of the few places where these are generally kept, shows that the number of the laying pullets and hens is roughly 15,000.

Nizam's Dominions.

Desi hens.—A survey of a number of typical villages, during which the *desi* laying pullets and hens were actually counted, puts their figure at 0.2 to 1.4 per house. In the urban area, the number is 1.6 per house. Accordingly, for the whole State the number of *desi* pullets and hens is estimated to be about 37.4 lakhs.

Improved hens.—They are generally kept in large towns only and their strength is estimated to be about 12,600 for the whole State.

Central Provinces.†

The number of *desi* pullets and hens in *Central Provinces* and *Berar* is estimated to be about 22.2 lakhs and in the 14 States, about 9.7 lakhs.

The number of improved hens is estimated at 5,715 for *Central Provinces* and *Berar* and at only 30 for the 14 States.

United Provinces.

Approximately 67 places and areas having a population of 35,870 persons have been visited in 33 districts of the provinces, wherein 728 persons (about 2 per cent. of the population) are found to keep 4,404 laying hens including pullets.

The hen population is found to represent 70 per cent. *desi*, 7 per cent. pure-breds and 23 per cent. crosses between the first two. As some of the crosses are not much different from their *desi* parents, and as their proportion is by no means unalterable, they are counted together with the *desies* and their combined number is estimated to be 53.5 lakhs. The number of improved hens is likewise estimated to be 4.5 lakhs.

Bihar.

Desi hens.—Only Mohammedans, low caste Hindus, tribal population, Anglo-Indians and Europeans, generally keep poultry. The proportion of

*West coast, Ceded districts, Northern Circars, Central area and Southern districts.

†The Marketing Survey of Central Provinces included also 14 States of: Nandgaon, Surguja, Jashpur, Khairagarh, Raigarh, Udaipur, Sakhi, Kanker, Korea, Saragarh, Basti, Bastar, Changbhanekar and Kawardha.

the numbers keeping the hens varies however with each community, and also in each of the divisions. For instance, 60 to 70 per cent. of the Mohammedans, 15 to 40 per cent. of the low caste Hindus, 25 to 70 per cent. of the tribal population and 25 to 50 per cent. of the Anglo-Indians and Europeans are estimated to keep hens, in the different divisions. On the above basis it is calculated that the province of Bihar has about 39.4 lakhs of *desi* pullets and hens.

Improved hens.—Enquiries show that their proportion to the *desi* birds is small and in the different divisions it varies from 2 to 4 per cent. The total number for the province is estimated to be about 12 lakhs pullets and hens.

Orissa.

Desi hens.—The impending separation of the province had been kept in view and estimates of the area (*Chhota Nagpur* division) proposed to be separated from Bihar, have been arrived at separately. It is estimated that there are 2.3 lakhs *desi* pullets and hens. To this have been further added 4.0 lakhs *desi* birds on account of the transfer of *Ganjam* district and part of *Visagapatam* district from *Madras Presidency*, making in all 6.3 lakhs *desi* pullets and hens for Orissa.

Improved hens.—A previous estimate of the *Chhota Nagpur* division gives the figure of 4,700 for improved birds, and since the areas transferred from *Madras Presidency* have only a negligible number of these, the above figure has been taken as total for the province of Orissa.

Bengal.

Desi hens.—Mohammedans, Christians and low caste Hindus mainly keep poultry, and about 34.6 lakhs families only among them. The number of laying pullets and hens works up to 88.8 lakhs.

Improved hens.—Considering the size of the Presidency, the number of improved poultry is indeed small. These are found to be mainly kept on a few farms by individuals in large towns, and their number is estimated to be 2,030 laying pullets and hens on the whole.

Assam.

Desi hens.—Some 30 typical villages were selected in each district, and information has been collected regarding (i) the number of holdings rearing hens, and (ii) the number of hens per holding. The average number of laying pullets and hens per holding varies from 1.25 to 2 in the different districts and there are about 4 lakhs holdings keeping hens. Accordingly about 5.8 lakhs *desi* pullets and hens are estimated for the province.

Burma.

Desi hens.—From the enquiries made in several village tracts it is estimated that their total number in 6,916 village tracts is about 9.5 lakhs *desi* pullets and hens.

Improved hens.—Similar enquiries show that there are 21,400 improved pullets and hens. They are however concentrated in a few districts only.

Other areas.

The areas given above comprise over 1.3 million square miles or 73 per cent. of the total area of the country. In arriving at the number of

hens in the remaining areas*, three main facts have been taken into account, viz., (a) the nature of the territory, (b) density and classes of human population therein, and (c) the density of poultry and human population in surveyed areas where conditions are most identical to the area under estimation.

B—DUCKS.

Travancore State.

Ducks are generally kept in large flocks only by a few persons. There are only about 300 duck-keepers each possessing a flock of about 500 laying ducks or about 1.5 lakhs ducks in all. These duck-farmers are generally concentrated in a few *talukas* of *Central Travancore* lying towards the sea-coast and back-waters. For the remaining area of the State, a further 10 per cent. of the above number has been added to make a total of about 1.65 lakhs laying ducks for the whole State. /

Madras Presidency.

The method adopted in the *Madras Presidency* is rather ingenious. At all important markets the ratio of marketable duck eggs to hen eggs, is 2 : 3. The number of eggs laid annually per duck and hen are 120 and 50 respectively. On equating these ratios, the proportion of ducks to hens works out as 2 : 3 :: 120 : 50 or 100 : 360 or 1 : 3.6. The figure 3.6 has been rounded off to 4 and the ratio of ducks to hens is taken to be 1 : 4. As the number of *desi* hens (70.11 lakhs) in the Presidency is arrived at as a result of a census, on the above basis the number of laying ducks is calculated to be 17.5 lakhs. This number has been subsequently reduced to 16.7 lakhs due to transfer of the eastern districts to the new province of *Orissa*.

Bengal.

In *Bengal*, only the Mohammedans, Hindus and Christians generally keep ducks, and the methods adopted for determining the number of hens, is followed for ducks also.

Burma.

Conditions of duck-farming are indeed peculiar in *Burma*. Not only their keeping is confined to certain districts, but a majority of the birds are hatched by professional hatchery men and not by the duck-keepers as is the case in India. It is reported that there are thirteen principal hatchery-men who are all Chinese and of whom eight are established at *Kayan* in *Lower Burma*. They hatch annually some 17 lakhs ducklings. After allowing 2.5 lakhs as casualties, and a further 10 lakhs for table ducks, the number of ducklings hatched and reared for production of market eggs is estimated to be about 4.5 lakhs. Besides these it is estimated that in the other areas there are nearly 2.4 lakhs laying ducks. Thus the total number of laying ducks for *Burma* has been estimated to be about 6.9 lakhs.

[NOTE.—In other areas, either the number of ducks was found to be negligible or the methods adopted for their estimation have been common to those adopted for the number of hens.]

*Comprising of Agency area of North-West Frontier Province, British Baluchistan, Baluchistan States, Punjab States (excluding Patiala State but including 18 Simla Hill States), Rajputana, Central India States, Western India States, Gujarat Agency, Deccan States, Madras States (excluding Cochin and Travancore), Eastern States (excluding 14 Central Provinces States), Bundelkhand Agency, United Provinces States, Bengal States, Assam States and Eastern States of Burma.

APPENDIX II. Production of *Desi* Hen Eggs.

	Estimated number of total birds. (Lakhs). (1)	Estimated number of layers. (Lakhs). (2)	Number of eggs laid annually per bird. (3)	Annual production of eggs. (Lakhs). (4)	Proportion of total production Per cent. (5)	Number lost before collection.		Number collected. (Lakhs). (8)
						Per cent. (6)	Number. (Lakhs). (7)	
1. Kashmir State	40.3	10.0	50	503.7	1.8	7.5	37.7	465.9
2. North-West Frontier Province ..	26.0	9.4	49	469.5	1.7	1	4.6	464.9
3. North-West Frontier Province Agency Areas ..	13.7	4.6	49	223.3	0.8	1	2.2	226.1
4. British Baluchistan	4.5	1.6	49	81.2	0.3	1	0.8	80.4
5. Baluchistan States	6.7	2.4	49	120.6	0.4	1	1.2	119.4
6. Punjab	63.3	34.8	55	1,915.4	7.0	1	19.1	1,896.3
7. Patiala State	0.5	0.3	60	19.1	0.1	Neg.	Neg.	19.1
8. Punjab States (excluding Patiala State) ..	3.9	2.1	60	131.7	0.5	Neg.	Neg.	131.7
9. Delhi Province	0.3	0.05	60	3.5	Neg.	3	0.1	3.4
10. Rajputana	20.6	3.4	60	206.9	0.8	4	8.2	198.7
11. Central India States	14.0	2.3	60	140.6	0.5	4	5.6	135.0

APPENDIX II—contd.
Production of Desi Hen Eggs.

	Estimated number of total birds. (Lakhs). (1)	Estimated number of layers. (Lakhs). (2)	Number of eggs laid annually per bird. (3)	Annual production of eggs. (Lakhs). (4)	Proportion of total production. Per cent. (5)	Number lost before collection.		Number collected. (Lakhs). (8)
						Per cent. (6)	Number. (Lakhs). (7)	
12. Sind	15.0	5.0	55	275.0	1.0	Neg.	Neg.	275.0
13. Khairpur State ..	1.9	0.6	55	33.0	0.1	Neg.	Neg.	33.0
14. Western India States ..	1.1	0.7	60	44.5	0.2	4	1.7	42.7
15. Gujrat Agency ..	0.02	0.006	60	0.4	Neg.	4	0.01	0.38
16. Baroda State ..	5.0	1.5	60	90.0	0.3	4	3.6	86.4
17. Bombay Presidency ..	92.7	46.3	60	2,783.9	10.2	3	83.5	2,700.3
18. Deccan States ..	5.2	2.6	60	157.6	0.6	3	4.7	152.8
19. Mysore State ..	55.0	17.6	60	1,066.4	3.9	3.5	37.3	1,029.1
20. Coorg ..	1.2	0.2	30	7.7	Neg.	2	0.1	7.6
21. Cochin ..	4.6	2.3	50	118.7	0.4	2	2.3	116.3
22. Travancore ..	67.0	23.8	50	1,155.9	4.2	4	46.2	1,109.7

23. Madras States (excluding Travancore and Cochin)	3.2	0.6	32	21.7	0.1	3	0.6	21.0
24. Madras Presidency ..	316.3	66.1	51	3,371.5	12.3	2	67.4	3,304.1
25. Nizam's Dominions ..	57.6	37.4	62	2,321.9	8.5	1	23.2	2,298.6
26. Central Provinces ..	40.3	22.2	48	1,066.0	3.9	5	53.3	1,012.7
27. Central Provinces States (14)	17.7	9.7	48	468.2	1.7	5	23.4	444.8
28. Eastern States (excluding Central Provinces States).	15.4	8.4	48	407.1	1.5	5	20.3	386.8
29. Bundelkhand Agency ..	3.7	0.6	60	37.5	0.1	4	1.5	36.0
30. United Provinces ..	162.3	53.5	70	3,779.3	13.8	1	37.7	3,741.6
31. United Provinces States ..	4.0	1.3	70	94.0	0.3	1	0.9	93.1
32. Bihar ..	106.3	39.4	60	2,358.3	8.6	2	47.1	2,311.1
33. Orissa ..	24.4	6.3	50	317.9	1.2	2	6.3	311.6
34. Bengal ..	449.0	88.8	36	3,189.0	11.7	3	95.6	3,093.3
Bengal States ..	15.3	3.1	36	112.9	0.4	3	3.3	109.5
36. Assam ..	51.5	5.8	41	263.2	1.0	0.69	1.8	261.4
37. Assam States ..	2.8	0.3	41	13.9	0.1	0.69	0.09	13.8
Total India ..	1,711.3	514.75	53	27,376.0	(100)	2.34	641.4	26,733.58
1. Burma ..	33.5	9.5	40	383.2	98.5	3	11.4	371.7
2. Eastern States of Burma ..	0.5	0.15	40	6.0	1.5	3	0.1	5.9
Total ..	34.0	9.65	40	389.2	(100)	2.95	11.5	377.6

APPENDIX III.

Production of Improved Hen Eggs.

	Estimated number of total birds, (Thou- sands). ₁	Estimated number of layers. (Thou- sands). ₂	Number of eggs laid annually per bird. (Thou- sands). ₃	Annual production of eggs. (Thou- sands). ₄	Proportion of Total production Per cent. ₅	Number lost before collection.		Number collected. (Thou- sands). ₈
						Per cent. ₆	Number. (Thou- sands). ₇	
1. North West Frontier Province	1.0	0.5	100	53	0.1	1	0.5	52.5
2. Punjab	3.0	0.9	110	105.6	0.1	0.2	0.2	105.3
3. Patiala State	3.9	1.2	130	165.8	0.2	Neg.	Neg.	165.8
4. Delhi Province	5.0	2.5	110	275	0.4	5	13.7	261.2
5. Rajputana	1.8	0.9	110	100	0.1	5	5.0	95
6. Central India States	1.8	0.9	110	100	0.1	5	5.0	95
7. Western India States	1.8	0.9	110	100	0.1	5	5.0	95
8. Bombay Presidency	15.0	5.0	85	425	0.5	2	8.5	416.5
9. Deccan States	4.5	1.5	85	127.5	0.2	2	2.5	124.9
10. Mysore State	18.0	6.0	120	720	0.9	3.5	25.2	694.8

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11. Coorg	3.1	0.7	100	69.3	0.1	2	1.3	67.9
12. Cochin	19.5	10.0	110	990	1.3	2	19.8	970.2
13. Travancore	207.2	71.5	100	7,150.2	9.0	4	286.0	6,864.1
14. Madras Presidency	68.0	15.0	102	1,530.6	1.9	2	30.6	1,500
15. Nizam's Dominions	19.3	12.6	127	1,600.2	2.0	1	16.0	1,584.1
16. Central Provinces	7.6	5.7	120	686	0.9	5	34.3	651.7
17. United Provinces	1,368.1	451.4	120	54,177	68.4	1	541.7	53,635.2
18. United Provinces States	34.3	11.3	120	1,359.2	1.7	1	13.5	1,345.6
19. Bihar	334.1	123.9	72	8,925.1	11.3	2	178.5	8,746.6
20. Orissa	10.6	4.7	65	310.2	0.4	2	6.2	304.0
21. Bengal	8.7	2.0	83	171.8	0.2	3	5.1	166.7
22. Bengal States	3.3	0.8	83	67.1	0.1	3	2.0	65.1
Total India	2,139.6	729.7	103	79,208.6	100	1.51	1,200.6	78,007.2
Burma	75.0	21.4	101	2,179.3	100	0.5	10.8	2,168.4

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Note.—In the other areas the number of improved birds is negligible.

APPENDIX IV.
Production of Duck Eggs.

	Estimated number of total birds. (Lakhs). (1)	Estimated number of layers. (Lakhs). (2)	Number of eggs laid annually per bird. (3)	Annual production of eggs. (Lakhs). (4)	Proportion of total production. Per cent. (5)	Number lost before collection.		Number collected. (Lakhs). (8)
						Per cent. (6)	Number. (Lakhs). (7)	
1. North-West Frontier Province ..	0.3	0.2	100	23.3	0.5	1	0.2	23.1
2. Punjab ..	1.0	0.8	50	40.0	0.8	2	0.8	39.2
3. Patiala State ..	0.06	0.005	120	0.6	Neg.	Neg.	Neg.	0.6
4. Sind ..	0.1	0.01	40	0.6	Neg.	Neg.	Neg.	0.6
5. Bombay Presidency ..	0.2	0.1	150	15.0	0.3	5	0.7	14.2
6. Mysore State ..	0.1	0.04	100	4.0	0.1	1	0.04	3.9
7. Coorg ..	0.01	0.008	100	0.8	Neg.	2	0.01	0.7
8. Cochin ..	0.7	0.5	120	71.5	1.4	2	1.4	70.1
9. Travancore ..	2.2	1.5	120	198.0	3.8	1	1.9	196.0
10. Madras Presidency ..	51.4	16.7	126	2,115.3	40.9	5	105.7	2,009

11. Nizam's Dominions ..	0.7	0.5	61	30.5	0.6	1	0.3	30.1
12. Central Provinces ..	0.2	0.1	80	11.6	0.2	5	0.4	11.0
13. Central Provinces States (14)	0.07	0.03	40	1.5	Neg.	5	0.07	1.5
14. United Provinces ..	5.1	3.4	100	342.3	6.6	1	0.3	341.9
15. United Provinces States	0.2	0.1	100	17.1	0.3	1	0.1	16.9
16. Bihar ..	1.4	1.3	130	174.3	3.4	2	3.4	170.8
17. Orissa ..	2.7	1.0	127	135.2	2.6	4.1	5.6	129.5
18. Bengal ..	72.3	23.7	75	1,778.5	34.4	3	53.3	1,725.2
19. Bengal States ..	1.4	0.4	75	34.6	0.7	3	1	33.5
20. Assam ..	26.1	4.3	39	172.6	3.4	0.77	1.3	171.3
21. Assam States ..	0.2	0.04	39	1.6	Neg.	0.77	0.01	1.6
Total India ..	166.3	54.833	90	5,168.9	100	3.41	176.53	4,991.7
Burma ..	20.6	6.7	180	1,224.7	100	5	61.2	1,163.5

Note.—In the other areas the number of ducks is negligible.

APPENDIX V.
Production of Goose Eggs.

	Estimated number of total birds.	Estimated number of layers.	Number of eggs laid annually per bird.	Annual production of eggs.	Proportion of total production. Per cent.	Number lost before collection.		Number collected.
	(1)	(2)	(3)	(4)	(5)	Per cent.	Number.	(8)
1. North-West Frontier Province	..	..	10	13,500	0.4	1	135	13,365
2. Punjab	..	15,000	12	1,20,000	4.0	Neg.	Neg.	1,20,000
3. Delhi Province	..	500	14	3,500	0.1	Neg.	Neg.	3,500
4. Mysore State	..	1,500	15	7,500	0.2	Neg.	Neg.	7,500
5. Coorg	..	561	20	6,000	0.2	Neg.	Neg.	6,000
6. Cochin	..	164	25	1,875	0.1	2	37	1,838
7. Travancore	..	675	30	13,500	0.4	Neg.	Neg.	13,500
8. Nizam's Dominions	..	3,077	2,000	60,000	2.0	1	600	59,400
9. Central Provinces	..	14,639	2,660	31,200	1.0	5	1,558	29,642
10. United Provinces (14)	..	2,133	400	4,800	0.2	5	240	4,560
11. United Provinces	..	9,986	6,600	79,200	2.7	Neg.	Neg.	79,200
12. United Provinces States	..	333	200	2,400	0.1	2	11,400	2,400
13. Bihar	..	71,200	57,000	5,70,000	19.0	2	11,400	5,58,600
14. Orissa	..	7,200	5,800	58,000	1.9	2	1,160	56,840
15. Bengal	..	98,015	64,000	19,80,000	65.9	3	59,400	19,20,500
16. Assam	..	6,000	4,000	52,000	1.8	Neg.	Neg.	52,000
Total	2,33,983	1,57,525	19	30,03,475	(100)	2.48	74,530	29,28,945

Note.—In the other areas the number of geese is negligible.

APPENDIX VI.
Production of Turkey Eggs.

	Estimated number of total birds.	Estimated number of layers.	Number of eggs laid annually per bird.	Annual production of eggs.	Proportion of total production. Per cent.	Number lost before collection.		Number collected.
						Per cent.	Number.	
1. North-West Frontier Province	500	350	45	15,750	3.9	1	157	15,593
2. Delhi Province	150	100	50	5,000	1.2	Neg.	Neg.	5,000
3. Mysore State	3,000	2,000	50	1,00,000	24.8	Neg.	Neg.	1,00,000
4. Cochin	924	460	25	11,500	2.9	2	230	11,270
5. Travancore	3,500	1,750	50	87,500	21.7	Neg.	Neg.	87,500
6. Nizam's Dominions	750	500	60	30,000	7.4	1	300	29,700
7. Central Provinces	654	400	20	8,000	2.0	5	400	7,600
8. United Provinces	6,598	4,350	30	1,30,500	32.4	Neg.	Neg.	1,30,500
9. United Provinces States	288	200	30	6,000	1.5	Neg.	Neg.	6,000
10. Bihar	435	175	16	2,800	0.7	2	56	2,744
11. Bengal	300	200	30	6,000	1.5	3	180	5,820
Total India	17,099	10,485	38	4,03,050	(100)	0.32	1,323	4,01,727

Note.—In the other areas the number of turkeys is negligible.

Production of Guinea-fowl Eggs.

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Total India

Laying Records of Desi Hens.

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APPENDIX IX.
Laying Records of Improved Hens.

Source.	Number of birds recorded.	Average number of eggs laid per bird.												Annual number of eggs per bird.	Average number adopted for all improved hens in the respective area.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.		
<i>Bombay Presidency.</i>															
1. Mission Farm, Sangli ..	78	12.9	10.6	9.4	9.4	12.4	12.9	12.0	7.8	8.4	7.6	7.6	10.4	121.4	..
2. Mission Farm, Valada ..	40	14.0	10.8	9.6	8.3	7.2	8.5	5.2	6.4	9.2	10.9	7.9	10.0	108.0	..
3. Kirloskar Farm, Kirloskarwadi.	44	11.9	10.16	11.9	10.1	11.0	11.8	11.1	9.1	8.9	9.2	8.4	9.7	123.26	..
4. Private Farm, Bhilawadi, District Satara.	26	8.8	10.6	11.6	12.3	11.3	13.6	13.2	9.6	8.5	8.3	8.5	8.4	124.7	..
5. Private Farm, Sangola .. (District Sholapur).	18	8.7	7.3	9.7	7.2	6.7	7.4	15.5	15.8	17.4	16.4	11.4	13.9	137.4	..
<i>Bombay Presidency (Average)</i>	..	12.0	10.3	10.3	9.5	10.5	11.4	10.9	8.7	9.5	9.4	8.3	10.2	121.0	85
6. State Farm, Hyderabad (Nizam's Dominions.)	3	21.7	20.0	16.7	16.7	13.3	8.3	8.3	1.7	1.7	13.3	20.0	21.7	163.4	127

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APPENDIX IX—contd.
Laying Records of Improved Hens—contd.

Source.	Number of birds recorded.	Average number of eggs laid per bird.												Annual number of eggs per bird.	Average number adopted for all improved hens in the respective area.
		January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.		
7. Mr. Barton Wright's Farm, Trichur (Cochin).	26	10	12	15	14	14	13	15	13	12	10	4	6	138	100
8. Government Farm, Hoar (Madras Presidency).	34	12.7	11.5	12.4	12.2	12.9	12.5	10.5	11.6	10.3	11.9	11.6	13.0	132.1	102
9. United Provinces Poultry Association, Lucknow (U. P.).	17	22.2	19.7	20.8	14.0	6.4	10.0	14.4	8.4	7.0	..	12.1	21.7	156.7	120
10. Government Farm, Patna (Bihar.)	42	12.4	10.9	17.1	12.4	16.0	13.5	12.2	8.3	9.2	4.1	6.0	13.0	135.1	72
11. Government Farm, Dacca (Bengal).	58	10.5	10.6	11.5	11.0	11.8	7.8	7.3	4.5	12.3	9.5	9.5	10.7	117.0	83
<i>All India Average</i>	..	12.0	10.9	12.0	10.8	11.7	11.2	10.8	8.5	10.0	8.9	8.4	10.9	126.1	103
12. College Farm, Mandalay (Burma).	31	9.8	11.8	11.7	11.9	8.2	9.8	8.3	8.8	7.3	6.0	5.0	9.0	107.6	101

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APPENDIX X.

Retention of Desi Hen Eggs.

	Number of eggs collected. (Lakhs). (1)	Retained by the producers.					Total retained. (Lakhs). (6)	Balance available. (Lakhs). (7)
		For eating.		For hatching.				
		Per cent. (2)	Number (Lakhs). (3)	Per cent. (4)	Number (Lakhs). (5)			
1. Kashmir State	465.9	10	46.5	25	116.4	162.9	303.0	
2. North-West Frontier Province	464.9	10	46.4	33	153.4	199.8	265.1	
3. North-West Frontier Province Agency Areas	226.1	10	22.6	33	74.6	97.2	128.9	
4. British Baluchistan	80.4	10	8.0	33	26.5	34.5	45.9	
5. Baluchistan States	119.4	10	11.9	33	39.4	51.3	68.1	
6. Punjab	1,886.3	10.7	202.9	8.3	157.3	360.2	1,536.0	
7. Patiala State	19.1	10	1.9	5	0.9	2.8	16.2	
8. Punjab States (excluding Patiala State)	131.7	10	13.1	5	6.5	19.7	111.9	
9. Delhi Province	3.4	50	1.7	20	0.7	2.4	1.0	
10. Rajputana	198.7	40	79.4	30	59.6	139.1	59.6	
11. Central India States	135.0	40	54.0	30	40.5	94.5	40.5	

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12. Sind	275.0	8	22.0	5	13.7	35.7	239.3
13. Khairpur State	33.0	8	2.6	5	1.6	4.2	28.8
14. Western India States	42.7	40	17.1	30	12.8	29.9	12.9
15. Gujarat Agency	0.38	20	0.07	12.5	0.048	0.12	0.25
16. Baroda State	86.4	20	17.2	12.5	10.8	28.0	58.3
17. Bombay Presidency	2,700.3	45	1,215.1	3	81.0	1,296.1	1,404.2
18. Deccan States	152.8	45	68.8	3	4.5	73.4	79.4
19. Mysore State	1,029.1	34	349.8	34	349.8	699.7	329.3
20. Coorg	7.6	1.3	0.1	33	2.5	2.7	4.8
21. Cochin	116.3	24.5	28.4	8.1	9.4	37.9	78.3
22. Travancore	1,109.7	15	166.4	10	110.9	277.4	832.2
23. Madras States (excluding Travancore and Cochin)	21.0	20	4.2	10	2.1	6.3	14.7
24. Madras Presidency	3,304.1	2	66.0	18	594.7	660.8	2,643.3
25. Nizam's Dominions	2,298.6	22	505.7	8	183.8	689.6	1,609.0
26. Central Provinces	1,012.7	23	232.9	34	344.3	577.2	435.4
27. Central Provinces States (14)	444.8	25	111.2	50	222.4	333.6	111.2
28. Eastern States (excluding Central Provinces States)	386.8	25	96.7	50	193.4	290.1	96.7
29. Bundelkhand Agency	36.0	40	14.4	30	10.8	25.2	10.8
30. United Provinces	3,741.6	10	374.1	10	374.1	748.3	2,993.2

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APPENDIX X—contd.

Retention of Desi Hen Eggs—contd.

	Number of eggs collected. (Lakhs). (1)	Retained by the producers.					Total retained. (Lakhs). (6)	Balance available. (Lakhs). (7)
		For eating.		For hatching.				
		Per cent. (2)	Number. (Lakhs). (3)	Per cent. (4)	Number. (Lakhs). (5)			
31. United Provinces States ..	93.1	10	9.3	10	9.3	18.6	74.5	
32. Bihar ..	2,311.1	59.21	1,368.4	18.79	434.2	1,802.6	508.4	
33. Orissa ..	311.6	22	69.2	18	56.9	126.2	185.3	
34. Bengal ..	3,093.3	3.0	92.8	50	1,546.6	1,639.4	1,453.9	
35. Bengal States ..	109.5	3.0	3.3	50	54.7	58.0	51.5	
36. Assam ..	261.4	41.8	109.3	28.7	75.0	184.3	77.0	
37. Assam States ..	13.8	41.8	5.9	28.7	3.7	9.7	4.07	
Total ..	26,733.58	20.34	5,439.17	20.12	5,379.04	10,819.42	15,912.92	
1. Burma ..	371.7	6	22.9	60.9	226.5	249.5	123.2	
2. Eastern States of Burma..	5.9	6	0.3	60.9	3.5	3.8	3.1	
Total India ..	377.6	6	23.2	60.91	230.0	253.3	124.3	

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APPENDIX XI.

Retention of Improved Hen Eggs.

	Number of eggs collected. (Thousand).	Retained by the producers.						Total retained. (Thousands).	Balance Available. (Thousands).
		For eating.		For hatching.					
		Per cent.	Number. (Thousands).	Per cent.	Number. (Thousands).				
					2	3	4			5	6	7
1. North-West Frontier Province	52.5	10	5.2	33	17.3	22.5	30.0		
2. Punjab ..	105.3	Neg.	Neg.	60	63.2	63.2	42.1		
3. Patiala State ..	165.8	10	16.5	5	8.2	24.8	141		
4. Delhi Province ..	261.2	40	104.5	30	78.3	182.8	78.3		
5. Rajputana ..	95.0	40	38	30	28.5	66.5	28.5		
6. Central India States ..	95.0	40	38	30	28.5	66.5	28.5		
7. Western India States ..	95.0	40	38	30	28.5	66.5	28.5		
8. Bombay Presidency ..	416.5	Neg.	Neg.	15	62.4	62.4	354.0		
9. Deccan States ..	124.9	Neg.	Neg.	15	18.7	18.7	106.2		
10. Mysore State ..	694.8	34	236.2	34	236.2	472.4	222.3		
11. Coorg ..	67.9	4	2.7	6	4	6.7	61.1		

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APPENDIX XI—contd.
Retention of Improved Hen Eggs—contd.

	Number of eggs collected. (Thousand).	Retained by the producers.						Total retained. (Thousands).	Balance Available. (Thousands).
		For eating.		For hatching.					
		Per cent.	Number. (Thousands).	Per cent.	Number. (Thousands).				
					3	6			
1	2	3	4	5	6	7			
12. Cochin	970.2	24.5	237.6	4.05	39.6	277.2	693.0		
13. Travancore	6,864.1	15	1,029.6	10	686.4	1,716	5,148.1		
14. Madras Presidency	1,500.0	4	60	6	90	150	1,350.0		
15. Nizam's Dominions	1,584.1	22	348.5	15	237.6	586.1	998.0		
16. Central Provinces.. ..	651.7	23	149.8	34	221.5	371.4	280.2		
17. United Provinces	53,635.2	10	5,363.5	10	5,363.5	10,727	42,908.1		
18. United Provinces States	1,345.6	10	134.5	10	134.5	269.1	1,076.5		
19. Bihar	8,746.6	59.21	5,178.8	18.79	1,643.4	6,822.3	1,924.3		
20. Orissa	304.0	59.2	180.0	18.8	57.1	237.1	66.8		
21. Bengal	166.7	3.0	5.0	60.0	100.0	105.0	61.7		
22. Bengal States	65.1	3.0	1.9	60.0	39.0	40.9	24.2		
Total India	78,007.2	16.88	13,167.9	11.77	9,186.4	22,355.0	55,651.6		
Burma	2,168.4	7.7	167.2	6.2	179.0	346.3	1,827		

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APPENDIX XII
Retention of Duck Eggs

	Number of eggs collected. (Lakhs). 1	Number retained by producers.					Total retained. (Lakhs). 6	Balance available. (Lakhs). 7
		For eating.		For hatching.				
		Per cent. 2	Number. (Lakhs). 3	Per cent. 4	Number. (Lakhs). 5			
1. North-West Frontier Province.	23.1	6	1.4	33	7.7	9.1	14.5	
2. Punjab	39.2	3.06	1.2	15.3	6.0	7.2	32.0	
3. Patiala State	0.6	3.0	0.01	3.0	0.01	0.03	0.5	
4. Sind	0.6	2	0.01	5	0.03	0.04	0.6	
5. Bombay Presidency	14.2	5	0.7	60	8.5	9.2	4.9	
6. Mysore State	3.9	7	0.2	7	0.2	0.5	3.4	
7. Coorg	0.7	2	0.01	3	0.02	0.03	0.7	
8. Cochin	70.1	4.4	3.2	1.5	1.07	4.3	65.8	
9. Travancore	196.0	5	9.8	5	9.8	19.6	176.4	
10. Madras Presidency	2,003.5	2	40.1	3	60.2	100.4	1,909.0	
11. Nizam's Dominions	30.1	22	6.6	8	2.4	9.0	21.1	

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APPENDIX XII—contd.

Retention of Duck Eggs.

	Number of eggs collected. (Lakhs). (1)	Retained by the Producer.					Total retained. (Lakhs). (6)	Balance available. (Lakhs). (7)
		For eating.		For hatching.		Number. (Lakhs). (5)		
		Per cent. (2)	Number. (Lakhs). (3)	Per cent. (4)				
12. Central Provinces ..	11.0	20	2.2	50	5.4	7.6	3.2	
13. Central Provinces States ..	1.5	20	0.3	50	0.7	1.0	0.4	
14. United Provinces ..	341.9	10	34.1	10	34.1	68.3	273.5	
15. United Provinces States ..	16.9	10	1.6	10	1.6	3.3	13.5	
16. Bihar ..	170.8	50	85.4	5	8.5	93.9	76.8	
17. Orissa ..	129.5	15.1	19.6	3.5	4.5	24.2	105.3	
18. Bengal ..	1,725.2	5.0	86.2	15.0	258.8	345.0	1,380.2	
19. Bengal States ..	33.5	5.0	1.7	15.0	5.0	6.7	26.8	
20. Assam ..	171.3	38.2	65.5	28.8	49.3	114.8	56.4	
21. Assam States ..	1.6	38.2	0.6	28.8	0.4	1.0	0.5	
Total India ..	4,991.7	7.2	360.43	9.3	464.23	825.2	4,165.5	
Burma ..	1,163.5	Neg.	Neg.	2.55	29.6	29.6	1,133.7	

APPENDIX XIII.

Retention of Goose Eggs.

	Number of eggs collected.	Retained by the Producers.						Total retained.	Balance available.
		For eating.		For hatching.		Number.			
		Per cent.	Number.	Per cent.	Number.				
							(2)			(3)	(4)	(5)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)		
1. North-West Frontier Province	13,365	Neg.	Neg.	95	12,696	12,696	669		
2. Punjab ..	120,000	Neg.	Neg.	Mostly	120,000	120,000	Neg.		
3. Delhi Province ..	3,500	Neg.	Neg.	Mostly	3,500	3,500	Neg.		
4. Mysore State ..	7,500	Neg.	Neg.	Mostly	7,500	7,500	Neg.		
5. Coorg ..	6,000	Neg.	Neg.	Mostly	6,000	6,000	Neg.		
6. Cochin ..	1,838	25	459	15	276	725	1,103		
7. Travancore ..	13,500	Neg.	Neg.	50	6,750	6,750	6,750		
8. Nizam's Dominions ..	59,400	5	2,970	95	56,430	59,400	Neg.		
9. Central Provinces ..	29,642	Neg.	Neg.	Mostly	29,642	29,642	Neg.		
10. Central Provinces States (14)	4,560	Neg.	Neg.	Mostly	4,560	4,560	Neg.		

APPENDIX XIII.

Retention of Goose Eggs—contd.

	Number of eggs collected.	Retained by the producers.				Total retained.	Balance available.
		For eating.		For hatching.			
		Per cent.	Number.	Per cent.	Number.		
	1	2	3	4	5	6	7
11. United Provinces ..	79,200	Neg.	Neg.	Mostly	79,200	79,200	Neg.
12. United Provinces States ..	2,400	Neg.	Neg.	Mostly	2,400	2,400	Neg.
13. Bihar ..	5,58,600	20	1,11,720	7	39,102	150,822	4,07,778
14. Orissa ..	57,840	20	11,368	7	3,978	15,346	41,494
15. Bengal ..	19,20,600	10	1,92,060	90	17,28,540	19,20,600	Neg.
16. Assam ..	52,000	25	13,000	35	18,200	31,200	20,800
Total India ..	29,28,945	11.32	3,31,577	72.33	21,18,774	24,50,351	4,78,594

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APPENDIX XIV.

Retention of Turkey Eggs.

	Number of eggs collected.	Retained by the producers.				Total retained.	Balance available.
		For eating.		For hatching.			
		Per cent. (2)	Number. (3)	Per cent. (4)	Number. (5)		
	(1)					(6)	(7)
1. North-West Frontier Province.	15,593	17	2,650	33	5,145	7,795	7,798
2. Delhi Province ..	5,000	Neg.	Neg.	Mostly	5,000	5,000	Neg.
3. Mysore State ..	1,00,000	Neg.	Neg.	Mostly	1,00,000	1,00,000	Neg.
4. Cochin ..	11,270	25	2,817	15	1,690	4,507	6,763
5. Travancore ..	87,500	Neg.	Neg.	30	26,250	26,250	61,250
6. Nizam's Dominions ..	29,700	5	1,485	95	28,215	29,700	Neg.
7. Central Provinces ..	7,600	5	380	95	7,220	7,600	Neg.
8. United Provinces ..	1,30,500	Neg.	Neg.	Mostly	1,30,500	1,30,500	Neg.
9. United Provinces States ..	6,000	Neg.	Neg.	Mostly	6,000	6,000	Neg.
10. Bihar ..	2,744	Neg.	Neg.	Mostly	2,744	2,744	Neg.
11. Bengal ..	5,820	30	1,746	70	4,074	5,820	Neg.
Total India ..	4,01,727	2.25	9,078	78.86	3,16,839	3,25,916	75,811

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APPENDIX XV.
Retention of Guinea-Fowl Eggs.

	Number of eggs collected.	Retained by Producers.				Total retained.	Balance available.
		For eating.		For hatching.			
		Per cent. (2)	Number. (3)	Per cent. (4)	Number. (5)			(7)	(8)
1. North-West Frontier Province.	2,000	10	200	33	660	860	1,140
2. Punjab ..	19,60,000	3	60,000	25	5,00,000	5,60,000	14,00,000
3. Patiala State ..	1,32,300	7	9,260	10	13,230	22,490	1,09,810
4. Delhi Province ..	8,100	Neg.	Neg.	Mostly	8,100	8,100	Neg.
5. Mysore State ..	25,500	Neg.	Neg.	Mostly	25,500	25,500	Neg.
6. Cochin State ..	5,880	25	1,470	15	882	2,352	3,528
7. Travancore State ..	27,000	Neg.	Neg.	25	6,750	6,750	20,250
8. Nizam's Dominions ..	2,88,000	5	14,400	95	2,73,600	2,88,000	Neg.
9. Central Provinces ..	71,089	15	10,663	60	42,653	53,316	17,773
10. United Provinces ..	232,02,010	10	23,20,201	50	11,60,100	139,21,206	92,80,804
11. United Provinces States ..	9,07,559	10	90,755	50	4,53,779	5,44,534	3,63,025
12. Bihar ..	4,04,250	15	60,637	10	40,425	1,01,062	3,03,188
13. Orissa ..	56,350	15	8,452	10	5,635	14,087	42,263
Total India	270,90,038	9.5	25,76,038	47.88	129,72,219	165,48,257	115,41,781

APPENDIX XIX.

Baking experiments.

Local bakers do not generally use duck eggs in making of cakes, etc. The general opinion is that duck eggs are not as "light" as hen eggs and that cakes made from the former do not rise or bake so well. To verify this, a small experiment was made with cakes made from both the types of eggs. A common recipe was followed as under :—

4 oz. flour.
4 oz. sugar.
2 oz. butter.
2 eggs (3.5 oz. in weight).

After mixing the sugar with butter and adding the flour, the beaten eggs were added to the mix. In beating the white of duck eggs, it was observed that it did not rise as much as the white of the hen eggs. After thoroughly mixing, the batter was put in baking tins of same size (4 inches in diameter and 3 inches high). The baking continued for 50 minutes, and it was observed that both the cakes were ready in about the same time.

It was noticed that the cake made out of hen eggs rose about 3 inches in the centre, while the one made from duck eggs rose only 1½ inches. The texture of the duck egg cake was inferior, as would be seen from the top plate facing page 45.

With yolks only.

In this experiment the baking was done with whole eggs, i.e., with both the white and yolk together. When, however, only the yolks were used, it was found that there was a considerable improvement in the quality of the cake made out of duck eggs. To get the required weight of yolks, 5 large hen eggs and 5 small duck eggs were taken, and 2½ oz. of yolk was used in either case. The quantity of other ingredients, size of baking tins and the time taken for baking, etc., were the same as used in the cakes made from whole eggs.

It was found in this second experiment that there was no difference between the two cakes. The texture, size, etc., was nearly the same as would be seen from the bottom plate facing page 45. There was no appreciable difference in the flavour too. Since the yolks of the duck eggs are generally of a deeper shade than those of the hen eggs, the colour of the cake made from duck yolks, was no doubt slightly darker than the usual light lemon shade.

The two experiments were no doubt crude. For instance, the rising properties of flour used were unknown and so also the temperature of the oven. The use of baking powders was intentionally avoided. The experiments, however, go to show that under proper conditions, e.g., temperature, quality of flour, proportion of eggs used, the use of baking powder, etc., it may reasonably be expected that as good confectionery could be made out of the duck eggs as with the hen eggs.

APPENDIX XVI—contd.

The number and proportion of Hen Eggs (Desi and Improved) and Duck Eggs in each area.

	Desi hen eggs.		Improved hen eggs.		Duck eggs.	
	Production (Lakhs).	Percentage of total number of eggs produced in the area.	Production (Lakhs).	Percentage of total number of eggs produced in the area.	Production (Lakhs).	Percentage of total number of eggs produced in the area.
26. Central Provinces ..	1,066.0	98.3	6.86	0.6	11.6	1.1
27. Central Provinces States (14).	468.2	99.7	Neg.	..	1.5	0.2
28. Eastern States (excluding 14 Central Provinces States).	407.1	100.0	Neg.	..	Neg.	..
29. Bundelkhand Agency ..	37.5	100.0	Neg.	..	Neg.	..
30. United Provinces ..	3,779.3	81.0	541.7	11.6	342.3	7.4
31. United Provinces States	94.0	75.4	13.59	10.9	17.1	13.7
32. Bihar ..	2,358.3	89.9	89.25	3.4	174.3	6.7
33. Orissa ..	317.9	69.7	3.1	0.7	135.2	29.6
34. Bengal ..	3,189.0	64.2	1.7	0.03	1,778.5	35.8
35. Bengal States ..	112.9	76.2	0.67	0.5	34.6	23.5
36. Assam ..	263.2	60.4	Neg.	..	172.6	39.6
37. Assam States ..	13.9	89.7	Neg.	..	1.6	10.3
Total India ..	27,376.0	82.1	791.88	2.4	5,189.4	16.5
1. Burma ..	383.2	23.5	21.79	1.3	1,224.7	76.2
2. Eastern States of Burma	6.0	100.0	Neg.	..	Neg.	..
Total Burma ..	389.2	23.8	21.79	1.3	1,224.7	74.9

APPENDIX XVII.
Monthly export of Eggs from Tuticorin (Madras Presidency) to Ceylon.

	1930-31.		1931-32.		1932-33.		1933-34.		1934-35.		1935-36.		1936-37.	
	Lakhs.	Percentage to annual.	Lakhs.	Percentage to annual.	Lakhs.	Percentage to annual.	Lakhs.	Percentage to annual.	Lakhs.	Percentage to annual.	Lakhs.	Percentage to annual.	Lakhs.	Percentage to annual.
April ..	10.70	9.4	6.31	6.4	6.01	6.7	4.59	6.3	5.59	29.1	0.2	9.4	.08	3.2
May ..	9.36	8.2	4.58	4.7	5.87	6.5	3.83	5.3	4.27	22.2	0.2	9.4	.05	2.0
June ..	7.95	7.0	5.29	5.4	6.01	6.7	4.05	5.6	5.05	26.3	0.2	9.4	.19	7.6
July ..	9.20	8.0	6.00	6.1	5.7	6.4	5.90	8.1	3.42	17.8	0.2	9.4	.15	6.0
August ..	10.46	9.1	7.91	8.1	8.14	9.1	6.30	8.7	0.13	0.7	0.2	9.4	.19	7.6
September ..	9.36	8.2	10.09	10.3	8.80	9.8	9.16	12.6	0.18	0.9	0.2	9.4	.38	15.1
October ..	13.32	11.6	12.05	12.3	10.48	11.7	9.39	12.9	0.13	0.7	0.2	9.4	.29	11.5
November ..	11.92	10.4	10.52	10.7	10.86	12.1	6.45	8.9	0.10	0.5	0.2	9.4	.17	6.8
December ..	9.17	8.0	11.19	11.4	8.88	9.9	6.13	8.5	0.16	0.8	0.2	9.4	.52	20.7
January ..	6.66	5.8	9.55	9.8	6.93	7.7	4.34	6.0	0.05	0.3	.08	3.8	.12	4.8
February ..	8.85	7.7	7.69	7.8	6.64	7.4	5.96	8.2	0.05	0.3	.08	3.8	.22	8.7
March ..	7.57	6.6	6.85	7.0	5.38	6.0	6.44	8.9	0.08	0.4	.16	7.6	.15	6.0
Total ..	114.52	(100)	98.03	(100)	89.70	(100)	72.54	(100)	19.21	(100)	2.12	(100)	2.51	(100)

APPENDIX XVIII.
Monthly Demand for farm produced improved Eggs (1936).

Name of the Farm.	Monthly sale of eggs.												Total production.	Percentage of sales to production.
	January	February	March	April	May	June	July	August	September	October	November	December		
Reverend Looy's Farm, Bangalore.	2,400	2,400	2,400	2,100	2,100	2,100	1,920	1,920	2,400	2,400	2,400	2,400	26,940	96.8
U. P. P. A. Model Farm, Lucknow.	2,212	2,273	2,440	1,159	696	798	1,390	1,590	1,768	1,445	2,080	2,146	19,987	84.6
Government Central Poultry Farm, Kirtan, Poona.	826	1,033	1,112	1,392	1,388	1,393	1,373	1,114	907	1,518	1,318	1,144	14,288	79.0
Liverstock Research Station, Howrah, Madras Presidency.	382	140	673	1,072	1,066	773	530	447	946	186	297	397	6,909	45.4
Government Experimental Farm, Kankar, Bihar.	1,325	1,161	1,313	1,118	1,115	899	373	775	640	1,027	979	607	11,722	86.4
Government Poultry Farm, Gurdaspur, Punjab.	90	163	510	494	1,180	763	607	460	173	324	171	133	5,162	45.6
Paraguri Poultry Farm Assam.	1,450	1,533	575	180	101	593	699	737	896	910	301	1,585	9,664	86.9
Total	8,095	8,396	9,253	7,415	7,646	7,183	7,498	7,063	7,720	7,810	7,546	8,411	1,20,616	78.4
Percentage of monthly sales to the annual.	9.8	8.9	9.7	7.8	8.1	7.6	7.9	7.4	8.2	8.3	8.0	8.9 (100 0)	..	..

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APPENDIX XXIII.
Monthly wholesale prices of Duck Eggs in Bengal.
(In rupees and annas per thousand.)

	1929.	1930.	1931.	1932.	1933.	1934.	1935.	1936.	Average 1929-36.	Monthly Index.
January ..	Rs. as. 32 0	24 12	15 0	14 8	12 8	12 8	11 12	Rs. as. 14 4	Rs. as. 17 3	103
February ..	33 0	23 12	20 0	18 8	10 10	13 8	12 8	14 4	18 4	109
March ..	30 0	21 12	15 0	15 4	10 10	11 0	12 0	12 12	16 1	96
April ..	26 4	22 0	17 12	10 8	9 6	12 4	10 8	10 12	14 15	89
May ..	27 8	25 0	13 0	12 0	13 4	11 8	13 0	9 4	15 9	93
June ..	27 12	21 0	15 4	12 8	12 8	10 8	12 0	12 0	15 7	92
July ..	25 0	21 0	15 0	13 4	13 4	12 8	15 12	12 12	16 1	96
August ..	29 0	23 0	14 0	14 8	14 6	12 0	13 0	13 0	16 10	99
September ..	30 0	26 4	22 6	15 0	14 8	14 0	12 12	16 12	18 15	113
October ..	27 8	28 0	22 0	22 0	17 0	14 4	13 4	14 0	19 12	118
November ..	22 0	26 0	17 0	17 12	14 0	10 8	14 4	12 4	16 12	100
December ..	22 0	20 0	12 12	14 0	11 12	10 0	13 0	13 12	14 11	88
Average	27 11	23 9	16 10	14 10	12 13	12 1	12 13	13 0	16 11	(100)

APPENDIX XX.
Monthly arrivals of Eggs at Important Markets.
 (Expressed in terms of percentages to the annual.)

	Punjab.			Delhi.			Sind.		Baroda.		Bombay.	
	Lahore.	Rawal-	Average.	1933	1934	Average.	Karachi, Hyderabad		Average.	Baroda.	Bombay (c).	
	(a)	pindi. (d)	%	%	%	%	1934	1935	%	(b)	1934	1935
January ..	14.7	8.9	11.8	13.7	12.0	12.9	11.1	12.0	11.55	8.7	8.5	8.9
February ..	13.6	3.1	8.35	14.6	14.9	14.8	10.4	8.6	9.5	9.0	8.3	8.8
March ..	9.4	18.2	13.8	10.9	7.8	9.3	7.6	8.7	8.25	9.5	9.3	10.2
April ..	4.9	14.9	9.9	6.0	4.9	5.4	7.4	7.0	7.2	12.1	6.5	6.7
May ..	2.3	7.3	4.8	4.8	3.5	4.1	7.6	7.7	7.6	13.2	5.7	5.6
June ..	1.2	7.3	4.25	1.9	3.7	2.9	5.8	6.1	5.9	9.5	7.3	6.3
July ..	0.7	7.1	3.9	2.8	4.4	3.6	5.4	5.8	5.6	4.9	8.1	9.4
August ..	0.8	21.5	11.15	3.1	3.8	3.4	6.1	5.4	5.7	5.1	8.1	7.9
September ..	0.9	4.6	2.75	4.2	4.3	4.2	6.2	6.2	6.2	6.9	10.5	9.1
October ..	8.8	4.9	6.85	9.0	11.3	10.2	8.5	8.3	8.4	10.1	7.5	7.8
November ..	19.6	1.3	10.45	13.2	13.8	13.5	11.1	11.3	11.2	6.9	8.8	9.1
December ..	23.1	0.9	12.0	15.8	15.6	15.7	12.8	12.9	12.9	5.1	11.4	10.2
Total annual quantity in maunds.	2,402	329	2,731	3,516	3,841	3,678	4,381	4,929	4,905	566	50,752	51,597
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
												51,180

(e) From North-West Frontier Province only.

(b) From Billimora only.

(c) Total of arrivals by rail at Victoria Terminus, Bynulla and Bombay Central Stations, and also by country boats.

APPENDIX XX—contd.

	Kathiawar. (a)					Mysore.	Madras.	Nizam's Dominions.		Central Provinces.	Central India States.
	Porbandar.	Morvi.	Navsagdi.	Bhavnagar.	Average.			Hyderabad and Secunderabad.	Average.		
	1934-35. %	1934-35. %	1934-35. %	1934-35. %	%	1934-35. %	1934-35. %	1934 %	1935 %	1934-35. %	Mhow (c)
January ..	18.6	8.3	13.8	12.1	13.3	8.4	11.1	7.6	12.6	10.3	8.6
February ..	11.5	12.8	11.0	16.2	13.1	12.2	10.4	10.0	9.9	10.0	8.6
March ..	6.4	6.8	7.3	6.9	6.8	8.2	10.2	8.7	11.0	10.0	6.9
April ..	2.6	3.8	3.7	1.7	2.8	5.8	3.5	7.1	5.6	6.3	7.8
May ..	1.3	2.2	..	..	0.9	5.9	3.4	6.9	3.8	5.2	4.3
June ..	5.1	3.0	7.3	5.2	5.1	5.8	4.2	4.6	2.5	3.4	6.9
July ..	7.0	12.8	6.4	5.2	7.7	4.0	6.7	7.5	4.7	6.0	8.6
August ..	4.5	7.5	8.3	8.7	7.2	6.5	10.6	8.4	6.0	7.1	11.2
September ..	7.7	13.5	7.3	8.1	9.1	8.7	9.4	8.2	7.2	7.7	11.2
October ..	18.6	11.3	11.0	16.8	14.9	13.2	13.0	11.2	10.6	10.8	10.4
November ..	7.7	6.7	13.8	11.6	9.8	11.3	10.1	9.4	13.5	11.6	8.6
December ..	9.0	11.3	10.1	7.5	9.3	10.0	7.4	10.4	12.6	11.6	6.9
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
Total annual quantity in maunds.	156	133	109	173	571	3,598	18,022	680	815	748	116

(a) From Billimora only.

(b) Through South Indian Railway only.

(c) From Central Provinces only.

APPENDIX XX—concl'd.

	Bihar.		Bengal.		United Provinces.										India.	
	Patna.		Calcutta.		Saharanpur.		Dehra Dun.		Allahabad.		Benares.		Lucknow.		Average.	
	1935 %	1936 %	1934 %	1935 %	1933 %	1934 %	1933 %	1934 %	1933 %	1934 %	1933 %	1934 %	1933 %	1934 %	1935 %	1936 %
January ..	14.0	10.8	8.0	8.2	2.3	..	..	..	24.7	10.2	34.2	15.2	18.6	10.3	14.7	9.3
February ..	12.1	12.5	6.4	5.45	6.8	..	..	..	16.5	9.2	16.0	14.9	16.9	7.6	11.0	8.3
March ..	7.4	7.6	5.8	11.8	3.7	..	2.2	..	14.3	8.7	5.2	7.4	9.1	10.2	7.7	8.6
April ..	4.2	2.7	3.6	5.45	2.3	10.3	3.9	..	3.8	..	1.6	6.3	4.1	7.4	4.7	5.2
May ..	1.6	4.1	4.3	18.2	6.8	19.3	11.2	..	0.8	..	..	3.6	3.2	2.0	1.7	4.9
June ..	2.6	4.6	6.5	5.45	12.0	4.9	16.2	..	..	..	..	3.6	1.2	1.4	..	6.0
July ..	4.6	5.1	6.4	9.1	18.0	17.1	19.1	..	..	2.6	3.6	6.9	1.6	2.8	..	7.1
August ..	6.0	6.8	11.5	8.2	22.6	9.4	11.2	..	..	5.1	10.9	4.2	4.0	4.6	5.2	8.9
September ..	6.5	5.4	9.1	10.0	15.9	12.1	21.9	3.3	7.5	5.1	7.8	4.8	4.6	3.6	1.7	8.9
October ..	9.8	11.9	10.5	5.45	3.0	23.3	13.6	7.5	16.8	6.2	7.6	6.9	6.9	7.3	6.2	9.0
November ..	14.5	14.0	10.6	2.7	4.5	3.6	1.7	11.3	21.9	7.8	11.4	14.9	14.4	22.3	11.3	10.4
December ..	16.7	14.5	19.4	10.0	3.0	..	..	18.8	20.4	6.7	18.2	14.9	19.8	22.4	12.9	13.4
Total annual quantity in maunds.	768	369	1,137	34,045	110	133	223	178	133	196	193	525	500	57	1,232	122,660

(a) From Calcutta only.

APPENDIX XXI.

Monthly wholesale prices of Desi Hen Eggs.
(In rupees and annas per thousand.)

	Jan- uary.	Feb- ruary.	March.	April.	May.	June.	July.	August.	Sep- tember.	October.	Novem- ber.	Decem- ber.	Average.
North West Frontier Province (1935).	Rs. as. 20 13	Rs. as. 18 2	Rs. as. 15 9	Rs. as. 15 9	Rs. as. 15 9	Rs. as. 16 15	Rs. as. 18 2	Rs. as. 18 2	Rs. as. 18 2	Rs. as. 18 2	Rs. as. 18 2	Rs. as. 18 2	Rs. as. 17 10
Punjab (1934)	25 0	23 2	21 14	21 14	20 10	20 0	20 10	20 10	20 10	20 10	23 12	25 0	22 0
Delhi (1935)	27 8	24 8	25 12	22 5	19 13	21 6	22 4	22 13	23 8	24 6	25	31 9	24 4
Baroda (1934-35)	25 15	24 12	24 9	27 11	29 15	31 4	29 7	33 15	28 9	26 10	29 7	29 1	28 7
Bombay (1934-35)	24 8	22 14	23 6	25 10	26 15	27 10	27 4	29 2	26 7	25 14	27 6	26 7	26 2
Cochin (1935)	18 0	17 0	16 0	17 0	18 0	20 0	25 0	22 0	26 0	18 0	21 0	20 0	19 13
Travancore (1935)	15 10	15 12	15 5	15 10	16 11	18 12	24 11	18 15	20 5	17 3	18 12	18 12	18 1
Madras (1937)	20 0	20 0	20 0	22 14	20 0	19 8	22 14	20 0	20 0	20 0	20 0	20 0	20 7
Nizam's Dominions (1936).	32 2	32 2	27 14	27 14	27 14	30 0	30 0	30 0	30 0	30 0	30 0	32 2	30 0
Bengal (1929-36)	18 15	17 15	14 3	12 15	16 4	18 13	19 14	20 0	24 3	23 6	19 6	16 4	18 8
Assam (1936)	19 8	18 8	18 0	18 0	21 8	23 8	26 8	27 8	27 8	26 8	25 8	25 8	23 3
Average ..	22 9	21 6	20 3	20 11	21 3	22 8	24 4	23 15	24 2	22 13	23 8	23 15	22 9
Monthly Index ..	100	95	89	92	94	100	108	106	107	101	104	106	(100)

APPENDIX XXII.
Monthly wholesale prices of Hen Eggs in Bengal.
(In rupees and annas per thousand).

	1929.	1930.	1931.	1932.	1933.	1934.	1935.	1936.	Average 1929-36.	Monthly Index.
	Rs. as.	Rs. as.	Rs. as.	Rs. as.	Rs. as.	Rs. as.	Rs. as.	Rs. as.	Rs. as.	
January ..	32 0	28 0	20 0	14 0	12 8	16 8	13 8	14 12	18 15	102
February ..	33 0	20 4	18 0	16 8	10 10	20 4	12 12	12 4	17 15	97
March ..	30 0	19 10	12 12	9 6	10 10	10 8	10 12	9 12	14 3	77
April ..	25 0	16 0	12 4	11 0	9 10	9 8	9 8	10 12	12 15	70
May ..	25 0	20 8	13 0	18 0	15 8	12 0	12 4	13 8	16 4	88
June ..	40 0	21 0	18 4	14 4	12 8	15 0	12 0	17 8	18 13	102
July ..	35 4	21 0	15 0	20 12	18 12	14 8	16 12	16 12	19 14	107
August ..	26 8	29 8	15 0	17 0	17 0	19 8	15 8	20 0	20 0	108
September ..	32 8	27 12	24 4	21 0	24 4	20 12	19 12	23 0	24 3	131
October ..	35 0	28 0	21 4	22 0	20 0	19 8	20 0	21 0	23 6	126
November ..	35 0	27 0	20 0	17 12	12 0	11 0	14 8	17 12	19 6	105
December ..	22 0	24 0	15 8	14 8	11 12	13 8	13 0	15 12	16 4	84
Average	30 15	23 9	17 2	16 6	14 10	15 3	14 3	16 1	18 8	(100)

APPENDIX XVI.

The number and proportion of Hen Eggs (Desi and Improved) and Duck Eggs in each area.

	Desi hen eggs.		Improved hen eggs.		Duck eggs.	
	Produc- tion (Lakhs).	Percent- age of total number of eggs pro- duced in the area.	Produc- tion. (Lakhs).	Percent- age of total number of eggs pro- duced in the area.	Produc- tion. (Lakhs).	Percent- age of total number of eggs pro- duced in the area.
1. Kashmir ..	503.7	100.0	Neg.	..	Neg.	..
2. North West Frontier Province.	469.5	95.1	0.5	0.1	23.3	4.8
3. North West Frontier Province Agency Areas.	228.3	100.0	Neg.	..	Neg.	..
4. British Baluchistan ..	81.2	100.0	Neg.	..	Neg.	..
5. Baluchistan States ..	120.6	100.0	Neg.	..	Neg.	..
6. Punjab ..	1,915.4	97.9	1.05	0.05	40.0	2.05
7. Patiala State ..	19.1	89.7	1.6	7.5	0.6	2.8
8. Punjab States (excluding Patiala State).	131.7	100.0	Neg.	..	Neg.	..
9. Delhi Province ..	3.5	56.0	2.75	44.0	Neg.	..
10. Rajputana ..	206.9	99.5	1.0	0.5	Neg.	..
11. Central India States ..	140.6	99.3	1.0	0.7	Neg.	..
12. Sind ..	275.0	99.8	Neg.	..	0.6	0.2
13. Khairpur State ..	33.0	100.0	Neg.	..	Neg.	..
14. Western India States ..	44.5	97.8	1.0	2.2	Neg.	..
15. Gujarat Agency ..	0.4	100.0	Neg.	..	Neg.	..
16. Baroda State ..	90.0	100.0	Neg.	..	Neg.	..
17. Bombay Presidency ..	2,783.9	99.3	4.25	0.2	15.0	0.5
18. Deccan States ..	157.6	99.2	1.27	0.8	Neg.	..
19. Mysore State ..	1,066.4	98.9	7.2	0.7	4.0	0.4
20. Coorg ..	7.7	83.8	0.69	7.5	0.8	8.7
21. Coochin ..	118.7	59.4	9.9	4.9	71.5	35.7
22. Travancore ..	1,155.9	81.1	71.5	5.1	198.0	13.8
23. Madras States (excluding Coochin and Travancore).	21.7	100.0	Neg.	..	Neg.	..
24. Madras Presidency ..	3,371.5	61.3	15.3	0.3	2,115.3	38.4
25. Nizam's Dominions ..	2,321.9	98.0	16.0	0.7	30.5	1.3

APPENDIX XXIV.

Weekly, monthly and annual prices of Hen Eggs in Gujarat (Bombay Presidency).
(In rupees and annas per hundred).

Month.	Week.	Pardi. 1929.	Chikhli. 1930.	Gamdavi. 1931.	Gamdavi. 1932.	Chikhli. 1933.	Gamdavi. 1934.	Average. 6 years.
		Ra. A. P.	Ra. A. P.	Ra. A. P.	Ra. A. P.	Ra. A. P.	Ra. A. P.	Ra. A. P.
January	1st ..	4 0 0	4 2 0	3 6 0	2 15 6	2 14 9	2 7 0	3 5 0
	2nd ..	3 15 0	3 14 4	3 2 9	2 14 6	2 13 0	2 7 0	3 3 0
	3rd ..	3 14 0	3 11 9	3 0 0	2 12 0	2 12 0	2 7 0	3 1 0
	4th ..	3 4 0	3 12 6	2 15 0	2 10 3	2 10 0	2 8 0	2 15 0
	Average ..	3 12 0	3 14 0	3 2 0	2 13 0	2 12 0	2 7 0	3 2 0
February	1st ..	3 6 0	3 10 6	3 0 0	2 10 0	2 8 6	2 8 0	2 15 0
	2nd ..	3 10 0	3 9 6	3 1 6	2 11 0	2 8 0	2 7 6	3 0 0
	3rd ..	3 9 0	3 7 3	3 2 0	2 15 0	2 8 0	2 4 9	3 0 0
	4th ..	3 6 0	3 7 9	3 1 11	2 14 4	2 8 0	2 1 3	2 15 0
	Average ..	3 8 0	3 9 0	3 1 0	2 12 0	2 8 0	2 5 0	2 15 0

March	1st ..	3 4 0	3 4 0	3 2 9	2 14 0	2 8 0	2 0 9	2 14 0
	2nd ..	3 2 0	3 4 9	3 0 9	2 12 0	2 8 0	2 2 9	2 13 0
	3rd ..	4 0 0	3 13 9	3 2 0	2 10 0	2 8 0	2 5 3	3 1 0
	4th ..	4 6 0	4 7 9	3 0 0	2 14 0	2 6 0	2 7 0	3 4 0
	Average ..	3 11 0	3 12 0	3 1 0	2 12 0	2 7 0	2 4 0	3 0 0
April ..	1st ..	4 10 0	4 9 0	2 14 4	3 2 0	3 1 0	2 9 6	3 8 0
	2nd ..	4 9 0	4 8 0	3 7 3	3 4 3	3 1 0	2 14 9	3 10 0
	3rd ..	3 11 0	4 4 3	4 2 5	3 10 9	3 7 9	2 15 6	3 11 0
	4th ..	3 8 0	4 6 9	4 6 0	3 8 0	2 10 6	2 6 9	3 8 0
	Average ..	4 2 0	4 7 0	3 11 0	3 6 0	3 1 0	2 12 0	3 9 0
May ..	1st ..	3 14 0	4 10 0	4 12 0	2 12 6	2 9 3	2 5 9	3 8 0
	2nd ..	4 15 0	5 2 9	4 8 3	2 11 0	2 12 3	2 10 3	3 13 0
	3rd ..	4 6 0	5 4 0	3 10 0	3 3 0	3 5 3	3 0 0	3 13 0
	4th ..	4 7 0	4 0 9	3 8 0	3 7 3	2 10 3	2 11 6	3 7 0
	Average ..	4 6 0	4 12 0	4 1 0	3 0 0	2 13 0	2 10 0	3 10 0

APPENDIX XXIV—contd.

Weekly, monthly and annual prices of Hen Eggs in Gujarat (Bombay Presidency).
(In rupees and annas per hundred).

Month.	Week.	Pardi.	Chikhli.	Gamdavi.	Chikhli.	Gamdavi.	Gamdavi.	Average. 6 years'.
		1929.	1930.	1931.	1932.	1933.	1934.	
June ..	1st ..	Rs. A. P. 4 13 0	Rs. A. P. 3 8 6	Rs. A. P. 3 13 3	Rs. A. P. 3 3 0	Rs. A. P. 2 8 0	Rs. A. P. 2 11 2	Rs. A. P. 3 7 0
	2nd ..	4 9 0	4 5 11	4 0 9	2 11 0	2 8 0	3 5 6	3 9 0
	3rd ..	4 1 0	4 7 0	4 2 0	2 12 6	2 9 0	3 4 0	3 9 0
	4th ..	3 9 0	4 3 6	3 8 9	3 1 0	2 13 6	3 0 0	3 6 0
	Average ..	4 4 0	4 2 0	3 14 0	2 15 0	2 9 0	3 1 0	3 8 0
July ..	1st ..	3 7 0	4 4 6	3 8 0	2 14 9	2 12 0	2 15 0	3 5 0
	2nd ..	3 12 0	4 6 6	3 8 0	2 11 9	2 10 6	2 14 8	3 5 0
	3rd ..	4 1 0	4 3 6	3 10 0	3 9 9	3 0 0	2 14 0	3 9 0
	4th ..	4 3 0	4 5 9	3 11 0	3 9 6	3 0 0	3 0 0	3 10 0
	Average ..	3 14 0	4 5 0	3 9 0	3 3 0	2 13 0	2 15 0	3 7 0

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August ..	1st ..	4 5 0	4 4 9	3 12 0	3 9 6	3 4 6	3 2 0	3 12 0	3 12 0
	2nd ..	4 6 0	4 9 3	4 4 3	3 8 0	3 3 9	3 7 6	3 14 0	3 14 0
	3rd ..	4 4 0	4 6 9	4 9 3	3 8 0	3 2 0	3 10 0	3 15 0	3 15 0
	4th ..	4 2 0	4 4 6	4 4 10	3 4 0	3 3 0	3 9 0	3 13 0	3 13 0
	Average ..	4 4 0	4 6 0	4 3 0	3 7 0	3 4 0	3 7 0	3 13 0	3 13 0
September ..	1st ..	4 0 0	4 6 11	3 13 9	3 0 0	3 2 3	3 4 0	3 10 0	3 10 0
	2nd ..	3 14 0	4 8 3	3 10 0	2 13 9	3 0 6	2 14 4	3 8 0	3 8 0
	3rd ..	4 3 0	4 5 3	3 3 9	2 14 3	3 1 6	2 12 0	3 7 0	3 7 0
	4th ..	3 12 0	3 10 8	3 3 0	2 15 3	2 14 9	2 12 0	3 3 0	3 3 0
	Average ..	3 15 0	4 4 0	3 8 0	2 15 0	3 1 0	2 16 0	3 7 0	3 7 0
October ..	1st ..	3 10 0	3 12 3	3 2 3	2 14 9	2 14 0	2 12 9	3 0 9	3 0 9
	2nd ..	3 10 0	3 12 0	3 0 9	2 12 0	2 12 3	2 11 0	3 2 0	3 2 0
	3rd ..	3 11 0	3 13 7	3 1 3	2 11 4	2 12 0	2 9 0	3 2 0	3 2 0
	4th ..	3 10 0	3 12 11	3 2 3	2 15 9	2 11 6	2 9 7	3 2 0	3 2 0
	Average ..	3 10 0	3 13 0	3 0 0	2 13 0	2 12 0	2 11 0	3 2 0	3 2 0

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APPENDIX XXIV—*contd.*

Weekly, monthly and annual prices of Hen Eggs in Gujarat (Bombay Presidency).
(In rupees and annas per hundred).

Month.	Week.	Pardi.	Chikhli.	Gamdavi.	Chikhli.	Gamdavi.	Average. 6 years*.
		1929.	1930.	1931.	1932.	1933.	1934.
November	1st	Rs. A. P. 3 14 0	Rs. A. P. 4 3 3	Rs. A. P. 3 8 6	Rs. A. P. 2 13 6	Rs. A. P. 2 14 9	Rs. A. P. 3 5 0
	2nd	4 1 0	4 2 0	3 6 0	3 1 3	2 15 6	3 6 0
	3rd	4 4 0	4 4 11	3 6 6	3 2 9	3 0 6	3 8 0
	4th	4 5 0	4 6 0	3 5 0	3 4 9	2 14 4	3 8 0
	Average	4 2 0	4 4 0	3 6 0	3 1 0	2 15 0	3 7 0
December	1st	4 10 0	4 3 10	3 6 0	3 2 0	3 0 0	3 8 0
	2nd	4 12 0	4 0 3	3 7 2	3 2 0	3 1 3	3 9 0
	3rd	4 5 0	3 14 10	3 8 3	3 0 0	2 14 4	3 7 0
	4th	4 8 0	3 12 0	3 3 9	3 0 0	2 13 3	3 6 0
	Average	4 9 0	4 0 0	3 6 0	3 1 0	2 15 0	3 7 0
Annual Average		4 0 0	4 2 0	3 8 0	3 0 0	2 12 0	3 6 0

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APPENDIX XXV.

Types of Containers used for packing and transport of Eggs.

	Box.		Basket.		Pot.		Jar.	
	Approximate cost (without packing material).	Standard capacity (Number of eggs).	Gross weight in seers (packed).	Approximate cost (without packing material).	Standard capacity (Number of eggs).	Gross weight in seers (packed).	Approximate cost (without packing material).	Standard capacity (Number of eggs).
North-West Frontier Province— (a) Peshawar, Hazara and Kohat districts. (b) Bannu and Dera Ismail Khan districts.	As.	960(h)	50(h)	As.	400(h)*	20(a)	As.	..
Punjab	..	..	..	..	..	..	..	..
Sind	..	..	..	..	..	..	..	..
Delhi	..	..	..	..	..	..	..	..
Patiala	..	..	..	..	..	..	..	..
Bombay Presidency— (a) Gujarat (b) Deccan (c) Cutch	8-0	240(h)	.. (h)	..	..	..	..	..
Tamravnore	..	..	..	..	..	..	..	..
Madras Presidency	8-0	225(d)	12(g)	..	..	..	..	..

*Reference—(h)—hen eggs.
(a) Bamboo basket.
(b) Pithi twig basket.
(c) Deadwood case.

(d) duck eggs.
(e) Wooden box or case.
(f) Earthen pot held in Bamboo basket.
(g) Bamboo, Arhar, Jowar or cane baskets.

(h) Mulberry twig basket.
(i) Earthen jar.

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	Box.			Basket.			Pot.			Jar.		
	Approximate cost (without packing material).	Standard capacity (Number of eggs).	Gross weight in seers (packed).	Approximate cost (without packing material).	Standard capacity (Number of eggs).	Gross weight in seers (packed).	Approximate cost (without packing material).	Standard capacity (Number of eggs).	Gross weight in seers (packed).	Approximate cost (without packing material).	Standard capacity (Number of eggs).	Gross weight in seers (packed).
Nizam's Dominions	..	..	..	1.5	650(A)	30(a)	..	..	..	..	..	..
Central Provinces	..	..	..	..	450(A) or 225(A)	20	..	..	..	..	..	..
United Provinces—	..	..	40(b)	..	550(A)	24(h)	..	..	..	..	..	..
(a) Saharanpur	0 10-0	700(A)	..	2-0	..	..	..	..	..	0 2	400(A)	30(f)
(b) Meerut, etc.	..	..	..	..	..	..	..	..	..	..	..	..
(c) Najibabad	..	..	..	..	..	..	..	..	..	..	..	..
Bihar	..	..	..	..	..	..	..	..	..	..	..	..
Bengal	..	..	..	1.5	500(A)	20	..	..	..	..	..	..
Assam—	..	..	..	3-0	1,000(A)	40	..	..	..	..	..	..
(a) Surma Valley	..	..	..	3-0	500(d)	30	..	..	..	1 0	2,500(A) or 2,000(d)	5 mda. (f)
(b) Assam Valley	..	..	..	4-0	800(A)	40(a)	..	..	..	..	..	..
Barma	0 13-0	500(d)	25 vms or 45 seers (b)	2-0	600(d)	40(a)	..	..	..	..	..	..
	..	..	..	1-0	700(A)	20(a)	..	..	..	..	..	..
	..	..	..	..	400(h)	..	..	..	..	..	..	..

*Reference—(A)—hen eggs.

(a) Bamboo basket.

(d) Pitch twig basket.

(e) Dealwood case.

(d) duck eggs.

(b) Wooden box or case.

(c) Earthen pot held in Bamboo basket.

(A) Bamboo, Arhar, Jaso or cane baskets.

(c) Mulberry twig basket.

(f) Earthen jar.

APPENDIX XXVI.

Preliminary trial with improved Containers.

The trial was carried out during August 1937, at Pabbi in the North-West Frontier Province and was confined to the study of different kinds of packing materials and various sizes of boxes.

Boxes of different dimensions were used. To make them conspicuous they were painted red outside. Two wooden dummy eggs were also attached to the sides, to indicate that the boxes contained eggs (see the top plate facing page 115).

Eleven consignments packed in boxes were sent from Pabbi to Karachi, a distance of about 1,027 miles. In these consignments 4,798 eggs were transported. As a "control" a basket of the local type was despatched simultaneously, as also an improved basket of Travancore type. Thus 950 eggs were transported in baskets. For packing material saw-dust, wood-wool and Sargara grass were used. In one box, imported paste-board filler trays were used. Particulars of the trial are summarised below :—

Summary of the trial.

Serial No.	Number of consignments sent.	Container with inside dimensions.	Weight of empty box.	Capacity (Eggs).	Packing material.				
					Kind.	Quantity used.	Weight of packed container.	Weight of package per hundred eggs.	Percentage of break-ages.
		Boxes.	Sr. Ch.			Sr. Ch.	Sr.	Ch.	
1	2	24" × 12" × 12"	6 15	177—725	Saw-dust	8 8	48	35	1.6
2	2	24" × 12" × 12"	6 15	360	Paste-board fillers.	0 12	25	34	Nil.
3	3	24" × 15" × 8"	6 4	500—525	Wood-Wool.	0 8	31	21	0.8
4	2	18" × 12" × 12"	5 10	480—500	Wood-Wool.	0 7	28	19	2.7
5	2	18" × 12" × 12"	5 10	575—600	Sargara grass.	0 12	32	17	1.5
6	1	16" × 10" × 10"	2 11	300—325	Sargara grass.	0 6	20	15	0.3
11	Average	..	..	..	..	..	..	..	1.15
		Baskets.							
1	1	Peshawar	1 0	400	Sargara grass.	0 8	17	6	6.2
2	1	Travancore	2 8	500	Sargara grass.	1 0	23	11	1.2

It would be seen that the first five types of the boxes were rather heavy, as they were made out of silk-cotton tree wood (*Bombax Malbaricum*). This wood itself is not heavy, but the planks used were $\frac{1}{2}$ inch thick, and there were several battens and heavy iron handles, as would be seen from the illustration facing page 115. The box No. 6 was made out of "Silver fir" (*Picea or Abies*) wood having much thinner planks and its weight was proportionately less. Provided they are dry, both the above kinds of timber are suitable for the making of egg containers, as they are odourless, light and cheap.

It would be further seen that the average percentage of breakage in boxes is about 1 per cent. against the breakage of over 6 per cent. in the *Peshawar* type of basket but only about 1.2 per cent. in the improved *Travancore* basket. It was also observed that in the matter of packing, handling, etc., and also in the extent of breakages, a smaller and lighter type of box provided greater safeguard to the eggs.

Packing materials.

Four types of packing materials were used and their prices at *Peshawar* were as under :—

- | | |
|--------------------------------|--|
| (1) Wood-wool | Rs. 5 per maund. |
| (2) <i>Sargara</i> grass | 14 annas per maund. |
| (3) Saw-dust | 5 annas per maund. |
| (4) Paste-board fillers | Approximately 12 annas for a set of 12, for packing 360 eggs. These fillers are returnable, and with careful use may last for several trips. |

So far as the lightness goes, wood-wool tops the list, but it does not appear to be a suitable packing material as it occupies more space, and pressing it down results in occasional breaking of eggs. For instance, in a box measuring 18 inches $\times$ 12 inches $\times$ 12 inches only about 480 eggs could be packed with wood-wool but with *Sargara* grass as many as 575 could be packed, i.e., nearly 20 per cent. more. Dry *Sargara* grass is also light and is an excellent packing material, when beaten up. It is however available only locally and grows in the hills. It resembles good quality hay, and, indeed, any crisp dry and sweet smelling grass or hay does well as a packing material. Saw-dust is found to be unsuitable, as it packs too firmly and considerable quantities of it are required, which means so much extra weight. For instance, 8½ seers of saw-dust was required for packing 700 eggs, against only 1 seer of *Sargara* grass for packing an equal number.

The packing materials were used in between the layers of eggs, and also in lining the boxes. The time taken was from 20 to 30 minutes for packing each box which included also the counting of eggs. With a little practice however this could be considerably reduced. The paste-board fillers are no doubt the best, but they are not available in India, and an attempt to get them made at the Indian paper mills proved futile.

Costs.

In the above trial the extra freight due to extra weight of boxes over the baskets was Rs. 4-13-0. On the inward journey, the weight of the 11 empty boxes was about 1 maund and 20 seers. Between *Karachi* and *Pabbi* the return freight on the empties at one-fourth full parcel rate is Rs. 2-3-0 per maund, or Rs. 3-5-0 for the 11 boxes. Hence the total difference on sending the above consignment of eggs by returnable boxes

was Rs. 8-2-0 more, than what would have been the cost if it was packed in baskets.

If, however, the eggs were despatched in the usual way by *Peshawar* type of baskets, the damage would have been at least 6 per cent. as was the case with the "control" basket that was sent. This should however be taken as an exceptionally low figure, as cases of 25 to 30 per cent. damages are quite common. Even at 6 per cent., it would mean a damage to at least 288 eggs, which valued at 6 annas per dozen would mean a loss of Rs. 9. With the use of boxes only about 60 eggs were damaged and the loss due to breakages was reduced to Rs. 1-14-0 only.

The point is, that the above trial cost Rs. 8-2-0 by way of extra weight and return freight on the empties, whereas the saving in the damage has been only Rs. 7-2-0. The cost of packing material is also not charged, but is about 8 annas in all. The cost of boxes is also extra and because the number made was small, it is rather high, at about Rs. 4 each. The trial has however indicated the ways and means for designing a lighter, smaller and cheaper type of container. It should also provide a greater scope for ventilation (see the bottom plate facing page 115). Trials with this revised type of box are to be undertaken shortly.

The cost of this improved container could now be reduced to about Rs. 1-8-0 for holding 350 to 400 eggs, and if it makes 10 trips, including the return freight, its cost per trip would be about 3 annas which is equal to the cost of the basket. It should, however, be pointed out that a box is always likely to be heavier than the baskets as used at present, but even if it could reduce the damage by 5 per cent., it would pay the merchants to use it instead.

If for any reason the use of boxes turns out to be more expensive or at places they cannot be used on a large scale, the adoption of the *Travancore* type of basket and its proper packing as described at page 107, should be seriously considered. The experiment with the above type of basket has indicated that it can also reduce the breakages to about one per cent.

APPENDIX XXVII.

Important assembling centres for Eggs.

NOTE.—The numbers indicated for each centre are only approximate and show the minimum and maximum numbers that are collected there, according to different seasons.

Serial No.	Name of the assembling centre.	Approximate number of eggs assembled daily.
<i>North-West Frontier Province.</i>		
1	Havelian	3,000—5,000
2	Jahangira Road	3,000—5,000
3	Mardan	5,000—10,000
4	Peshawar	5,000—10,000
5	Taru Jabba	3,000
<i>Punjab.</i>		
6	Gujarat	3,000—5,000
7	Jullundur	5,000—10,000
8	Kurali	3,000—5,000 (G)
9	Lawrencepur	3,000—5,000
10	Mankiala	3,000—5,000
11	Multan	3,000—5,000
12	Nakodar	3,000—5,000
13	Rupar	3,000—5,000
14	Shah-Kote-Malsian	5,000—10,000
<i>Patiala.</i>		
15	Bassi-Pathanan	3,000—5,000 (G)
16	Patiala	3,000
17	Rajpura	3,000
<i>Sind.</i>		
18	Hyderabad	3,000—5,000
19	Karachi	3,000—5,000
20	Larkana	3,000
21	Sukkur	3,000

(G) Guinea-fowl eggs are also available at these places.

APPENDIX XXVII—contd.

Serial No.	Name of the assembling centre.	Approximate number of eggs assembled daily.
<i>Baroda State.</i>		
22	Anawal	3,000—5,000
23	Billimora	10,000—25,000
24	Rankuwa	5,000—10,000
<i>Bombay Presidency.</i>		
25	Belgaum	3,000—5,000
26	Bijapur	3,000
27	Bulsar	3,000—5,000
28	Chickli	3,000—5,000
29	Dhalgaon	5,000—10,000
30	Dungri	3,000—5,000
31	Hubli	3,000—5,000
32	Igatpuri	3,000
33	Jarla	3,000—5,000
34	Kolhapur	5,000—10,000
35	Manmad	3,000
36	Navasari	5,000—10,000
37	Pardi	5,000—10,000
38	Sangola	5,000—10,000
39	Vadala	3,000—5,000
<i>Mysore.</i>		
40	Chintamani	5,000—10,000
41	Kolar	3,000—5,000
<i>Cochin.</i>		
42	Ernakulam	25,000—50,000*
43	Trichur	5,000—10,000*

*Duck eggs are also available at these places.

APPENDIX XXVII—contd.

Serial No.	Name of the assembling centre.	Approximate number of eggs assembled daily.
<i>.. Travancore.</i>		
44	Aralmoodu	10,000—25,000*
45	Chengannur	10,000—25,000*
46	Chenganacherry	10,000—25,000*
47	Edathuva	10,000—25,000*
48	Kalerkavilla	10,000—25,000*
49	Kayencolam	3,000—5,000*
50	Karuugol	10,000—25,000*
51	Kottarakkara	5,000—10,000*
52	Kottayam	10,000—25,000*
53	Martandam	3,000—5,000*
54	Mavelikara	10,000—25,000*
55	Paracode	10,000—25,000*
56	Quilon	10,000—25,000*
57	Sasthamakotta	10,000—25,000*
58	Thoduvetty	10,000—25,000*
59	Trivandrum	3,000—5,000*
<i>Madras Presidency.</i>		
60	Bezwada	10,000—25,000*
61	Calicut	10,000—25,000*
62	Coimbatore	5,000—10,000
63	Cocoonada	10,000—25,000*
64	Madura	5,000—10,000*

*Duck eggs are also available at these places.

APPENDIX XXVII—contd.

Serial No.	Name of the assembling centre.	Approximate number of eggs assembled daily.
<i>Madras Presidency—contd.</i>		
65	Masulipatam	10,000—25,000*
66	Ongole	10,000—25,000
67	Palghat	10,000—25,000*
68	Polachi	10,000—25,000*
69	Salem	3,000—5,000
70	Tanur	10,000—25,000*
71	Tenali	10,000—25,000*
72	Tirur	10,000—25,00*
73	Trichinopoly	5,000—10,000*
74	Tuticorin	10,000—25,000
75	Vellore	3,000—5,000
76	Vizagapatam	5,000—10,000*
<i>Nizam's Dominions.</i>		
77	Gulbarga	3,000—5,000
<i>Central Provinces.</i>		
78	Gondia	3,000
79	Khandwa	3,000
<i>Bihar and Orissa.</i>		
80	Chakraharpur	3,000—5,000
81	Cuttak	3,000—5,000
82	Dharbangha	3,000
83	Dinapore	3,000—5,000
84	Gaya	3,000

*Duck eggs are also available at these places.

APPENDIX XXVII—contd.

Serial No.	Name of the assembling centre.	Approximate number of eggs assembled daily.
<i>Bihar and Orissa—contd.</i>		
85	Ghatsila	3,000
86	Jhajha	3,000
87	Jamalpur	3,000
88	Jamshedpur	3,000—5,000
89	Khurda Road	3,000—5,000
90	Muzaffarpur	3,000—5,000
91	Patna	3,000—5,000
92	Puri	3,000
93	Purulia	3,000
94	Ranchi	3,000—5,000
95	Sini	3,000
<i>United Provinces.</i>		
96	Amroha	3,000—5,000
97	Bareilly	3,000—5,000
98	Bulandshahr	5,000—10,000 (G)
99	Gorakhpur	5,000—10,000
100	Gajraula	3,000—5,000
101	Gulaothi	3,000—5,000
102	Jhansi	5,000—10,000
103	Kakori	3,000—5,000
104	Malihabad	3,000—5,000
105	Muzaffarnagar	5,000—10,000
106	Rampur	3,000—5,000
107	Raudauli	3,000—5,000

(G) Guinea-fowl eggs are also available at these places.

APPENDIX XXVII—contd.

Serial No.	Name of the assembling centre.	Approximate number of eggs assembled daily.
<i>United Provinces—contd.</i>		
108	Saharanpur	5,000—10,000 (G)
109	Sambhal Hatim Sarai	3,000—5,000
110	Shahabad	3,000—5,000
111	Sitapur	3,000—5,000
112	Thana-Bhawan	5,000—10,000
<i>Bengal.</i>		
113	Brahmanbari	10,000—25,000*
114	Chandpur	5,000—10,000*
115	Chittagong	25,000—50,000*
116	Daulatganj	50,000—80,000*
117	Dhulian Ganges	10,000—25,000*
118	Feni	10,000—25,000*
119	Gaibanda	5,000—10,000*
120	Gauripur	10,000—25,000*
121	Munshiganj	5,000—10,000*
122	Murshidabad	10,000—25,000*
123	Narayanganj	25,000—30,000*
124	Nawabganj	10,000—25,000*
125	Rohanpur	10,000—25,000*
126	Sajinipara	10,000—25,000*
127	Samsi	5,000—10,000*
128	Seraiganj	10,000—25,000*

(G) Guinea-fowl eggs are also available at these places.

*Duck eggs are also available at these places.

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APPENDIX XXVII—*contd.*

Serial No.	Name of the assembling centre.	Approximate number of eggs assembled daily.
<i>Assam.</i>		
129	Gauhati	3,000—5,000
130	Habiganj	5,000—10,000*
131	Itakhola	5,000—10,000
132	Noajan	3,000—5,000
133	Rangia	3,000—5,000
134	Shillong	3,000—5,000
135	Tinsukia	10,000—25,000
<i>Burma.</i>		
136	Bassein	3,000—5,000*
137	Bauktaw	3,000—5,000*
138	Hmawbi	5,000—10,000*
139	Kamayut	3,000—5,000*
140	Kayan	25,000—50,000*
141	Mandalay	3,000—5,000
142	Moulmein	5,000—10,000*
143	Pegu	5,000—10,000*
144	Pyapon	5,000—10,000*
145	Pyinmana	3,000—5,000
146	Tamwe	3,000—5,000*
147	Yindaw	5,000—10,000

*Duck eggs are also available at these places.

APPENDIX XXVIII.

Form of License (by auction), for collection of Eggs for export from Bansda State (Bombay Presidency).

(1) The permit is given from _____ to _____
(Indian year _____ till the end of the month of *Ashwin*).*

(2) The licensee must keep a shop for the sale of eggs in *Bansda* town.

(3) The licensee shall hold the right of purchasing eggs from all the villages and *Hatwada* except *Dabalfatia*. Offers should, therefore, be made for both the areas.

(4) The highest bidder at the auction would be required to deposit one-tenth of his bid. If he fails to accept his bid on approval of the State, the right of purchase of eggs would be re-auctioned. If the bid received at re-auction is less than the original, the deficit shall have to be met by the first bidder. In case higher offer is received, the first bidder would have no right over the excess.

(5) Apart from the bid agreed upon, the licensee has not to pay any other charge to the State.

(6) The licensee must purchase all eggs brought for sale by producers, but the purchase of stale eggs depends on the option of the former. The producers can export stale eggs directly with a written consent of the licensee.

(7) The licensee presents a permit book, which would be duly attested by Revenue Office, in order to have exemption of tax from the *Hatwada* Octroi.

(8) The licenser shall purchase all eggs, and would keep adequate establishment for the purpose, to avoid complaints from the producers that there is no buyer of eggs.

(9) The minimum purchase price to be paid to producers is fixed for a dozen of twelve eggs, which licensee must pay. If the market prices of eggs fluctuate widely outside the State limits, the purchase price of eggs from the producers would be adjusted accordingly by the Revenue Department of the State and the licensee shall have to abide by it. On no account the licensee can pay less to the producers than the prescribed charge by the State. There should be no complaints from the producers in the above connection.

(10) If for any reason the licensee desires to appoint a sub-licensee or transfer of license to some one else, he would be required to apply to the State in writing. If the request is approved, a transfer fee of Rs. 5 (five only) would be charged.

(11) The licensee shall have to pay as deposit Rs. 150 as acceptance of his bid by the State, which sum shall be refunded to him on the expiry of the license.

*The Indian month of *Ashwin* corresponds generally with the English months of September-October.

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APPENDIX XXIX.

Markets and Market Charges.

	Name of Market.	Ownership.	Charges.	
			Type of Charge.	Amount.
North-West Frontier Province.	Abbottabad ..	Municipal Committee.	Octroi ..	4 annas per 100 eggs.
Do. ..	Haripur ..	Do. ..	Do. ..	3 pies per 2 dozen eggs.
Do. ..	Peshawar ..	Do. ..	Do. ..	6 pies per rupee worth of eggs.
Do. ..	Kohat ..	Do. ..	Nil ..	Nil.
Do. ..	Banna and Mardan ..	Do. ..	Nil ..	Nil.
Do. ..	Dera Ismail Khan ..	Do. ..	Octroi ..	8 pies per dozen eggs.
Punjab ..	Egg and Poultry Section, Tollinton Market, Lahore.	Do. ..	Stall rent ..	Rs. 5 per month.
Delhi ..	Gol Market, New Delhi.	New Delhi Municipal Committee.	Shop rent ..	Rs. 12 per month.
Sind ..	14 Karachi Markets	Municipality	Stall rent ..	Rs. 8 to Rs. 10 per month, according to size and position.
Bombay ..	Crawford Market, Bombay.	Municipality ..	Stall rent. ..	Rs. 10 to Rs. 30 per month.
Do. ..	Grant Road, Bombay.	Do. ..	Do. ..	Do.
Do. ..	Nal Bazar, Bombay	Do. ..	Do. ..	Do.
Do. ..	Kolaba ..	Do. ..	Do. ..	Do.
Do. ..	Chira Bazar ..	Do. / ..	Do. ..	Do.
Madras Presidency	Municipal Markets	Municipality ..	Market rent ..	Rs. 2-4 to Rs. 3 per month.
Nizam's Dominions	Chak Market, Hyderabad	..	Market fee ..	4 pies per rupee worth of eggs.
Do. ..	Secunderabad General Market.	..	License fee ..	Rs. 1 per year per retailer.
Central Provinces	Jubbulpore Cantonment Egg and Poultry Market.	Cantonment Authorities.	Rent License fee	Rs. 1 per Stall per month, 4 annas per Stallholder.

APPENDIX XXX.

Approximate annual inter-provincial and inter-State movement of Eggs (by rail, road and water) including export through ships stores.
(In lakhs.)

Exported from	Imported into																						Supplies to ships.	Others.	Burma.	Total.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																					
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	North-West Frontier Province.	Punjab.	Patiala State.	Delhi.	Rajputana.	Central India States.	Sind.	Western India States.	Baroda.	Bombay.	Mysore.	Coorg.	Cochin.	Travancore.	Madras Presidency.	Nizam's Dominions.	Central Provinces.	United Provinces.	Bihar.	Bengal.	Assam.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
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APPENDIX XXIX—contd.

	Name of Market.	Ownership.	Charges.	
			Type of Charge.	Amount.
United Provinces	Agra ..	Municipal Board	Market Charges	6 pies daily.
Do. ..	Cawnpore ..	Do. ..	Do. ..	6 pies daily.
Do. ..	Lucknow ..	Do. ..	Rent ..	Rs. 20 per month.
Do. ..	Do. ..	Do. ..	Do. ..	Rs. 6 per month.
Do. ..	Do. ..	Do. ..	Do. ..	Rs. 4-8 per month.
Do. ..	Do. ..	Do. ..	Do. ..	Rs. 5 per month.
Do. ..	Allahabad ..	Do. ..	Do. ..	Rs. 1-8-0 to Rs. 3 per month.
Do. ..	Bareilly ..	Do. ..	Do. ..	Rs. 5 to Rs. 10 per month.
Do. ..	Meerut Cantonment.	Cantonment Board.	Do. ..	Rs. 18 per month.
Do. ..	Dehra Dun ..	Private ..	Do. ..	Rs. 10 to Rs. 15 per month.
Do. ..	Mussoorie ..	Do. ..	Do. ..	Rs. 60 to Rs. 10 Seasonal.
Do. ..	Naini Tal ..	Do. ..	Do. ..	Rs. 120 to Rs. 18 for the season.
Do. ..	Do. ..	Municipal Board	Do. ..	Rs. 150 to Rs. 20 for the season.
Bihar ..	Jamshedpur ..	Tata Steel Company.	Do. ..	Rs. 15 per month per stall.
Do. ..	Patna ..	Municipality ..	Do. ..	Rs. 20 per month per seller.
Bengal ..	Beithak Knana, Calcutta.	Private ..	Do. ..	Rs. 8 per month (minimum).
Do. ..	New Market, Calcutta.	Municipality ..	Rent ..	From 15 annas per day
Do. ..	Dacca, Narayan-ganj, Chittagong and Sirajganj.	Private ..	Do. ..	Rs. 4 to Rs. 8 per month per stall.
Assam ..	Shillong ..	Khasi Siems ..	Do. ..	Rs. 1 per month for each compartment

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APPENDIX XXXI.
Market Quality of Desi Hen Eggs.

Place where examined.	Approximate age of eggs when examined (days).	Minimum weight and percentage to total examined.				Calculated weight per hundred eggs. lb. oz.	Appearance.		Colour of shell.		Interior quality.		
		1½ oz. (Per cent.)	1½ oz. (Per cent.)	1½ oz. (Per cent.)	Below 1½ oz. (Per cent.)		Clean. (Per cent.)	Dirty. (Per cent.)	White. (Per cent.)	Other tints (Per cent.)	Fresh. (Per cent.)	Cooking. (Per cent.)	Stale. (Per cent.)
1. Srinagar ..	2	3	4	5	6	7	8	9	10	11	12	13	14
2. Peshawar ..	13	5	32	56	7	8-6	48	52	50	50	59	32	9
3. Lahore ..	5	18	52	27	3	9-7	70	30	35	65	72	25	3
4. Patiala ..	10	20	50	25	5	9-2	80	20	30	70	70	28	2
5. Delhi ..	5	12	27	50	11	8-8	31	69	42	58	72	24	4
6. Karachi ..	8	3	44	50	1	8-10	12	88	35	65	37	58	5
7. Hyderabad (Sind) ..	10	10	15	35	40	7-13	85	15	40	60	40	40	5
8. Baroda ..	11	10	10	50	30	7-14	80	20	30	70	60	38	8
9. Bombay ..	3	5	70	20	5	9-0	80	20	85	15	70	28	2
10. Baroli ..	12	5	45	15	35	8-3	60	40	50	50	69	26	5
11. Bijapore ..	4	2	30	46	22	8-1	44	56	76	24	68	27	8
12. Belgaum ..	10	3	43	31	23	8-4	27	73	11	89	12	74	14
13. Bangalore ..	5	3	32	45	20	8-1	28	72	20	80	80	19	1
14. Ernakulam ..	8	8	55	25	12	8-12	90	10	60	40	65	30	5
15. Kottarakk ..	5	4	32	54	10	8-5	72	28	38	62	64	30	6
16. Kottarakk ..	7	15	41	24	20	8-10	10	90	20	80	67	30	3

APPENDIX XXXI—contd.
Market Quality of Desi Hen Eggs—contd.

Place where examined.	Approximate age of eggs when examined (days).	Minimum weight and percentage to total examined.				Calculated weight per hundred eggs. lb. oz.	Appearance.		Colour of shell.		Interior quality.		
		1½ oz. (Per cent.)	1½ oz. (Per cent.)	1½ oz. (Per cent.)	Below 1½ oz. (Per cent.)		Clean. (Per cent.)	Dirty. (Per cent.)	White. (Per cent.)	Other tints. (Per cent.)	Fresh. (Per cent.)	Cooking. (Per cent.)	Stale. (Per cent.)
		1½ oz. (Per cent.)	1½ oz. (Per cent.)	1½ oz. (Per cent.)	Below 1½ oz. (Per cent.)		lb. oz.						
16. Madras ..	2	3	4	5	6	7-13	21	79	36	64	73	25	2
17. Hyderabad (Deccan) ..	12	6	17	44	33	7-13	21	79	36	64	73	25	2
18. Nagpur ..	7	10	20	50	14	8-6	85	15	95	5	70	28	2
19. Agra ..	5	3	12	58	27	7-11	43	57	32	68	76	23	2
20. Lucknow ..	4	10	41	38	11	8-11	45	55	90	10	53	41	7
21. Jhansi ..	4	27	15	47	11	8-13	53	48	86	14	57	41	2
22. Bareilly ..	3	3	30	45	22	8-0	49	51	91	9	43	52	6
23. Bareilly ..	3	19	44	25	12	8-14	56	44	93	7	56	43	2
24. Patna ..	9	3	6	70	21	7-11	81	19	44	56	80	16	4
25. Dinspore ..	8	5	4	60	31	7-9	68	32	38	62	76	20	4
26. Calcutta ..	10	6	20	49	25	7-15	90	10	10	90	85	10	5
27. Lakhna ..	4	8	30	43	20	8-4	84	16	12	88	90	7	3
28. Shillong ..	4	5	50	16	30	8-10	28	72	24	76	74	24	2
Average ..	7	8	33	41	18	8-5	56	44	47	53	65	30	5
Burma ..	5	23	53	15	10	8-3	93	8	70	30	64	34	

APPENDIX XXXII.
Market Quality of Duck Eggs.

Place where examined.	Approximate age of eggs when examined (days).	Minimum weight and percentage to total examined.				Calculated weight per hundred eggs. lb. oz.	Appearance.		Interior quality.		
		2½ oz. (Per cent.)	2½ oz. (Per cent.)	2 oz. (Per cent.)	1½ oz. (Per cent.)		Clean. (Per cent.)	Dirty. (Per cent.)	Fresh. (Per cent.)	Cooking. (Per cent.)	Stale. (Per cent.)
		2½ oz. (Per cent.)	2½ oz. (Per cent.)	2 oz. (Per cent.)	1½ oz. (Per cent.)						
1. Delhi ..	2	3	4	5	6	13-2	8	9	10	11	12
2. Bangalore ..	6	10	36	38	16	13-11	50	50	46	51	3
3. Trichur ..	7	20	45	25	10	13-11	23	77	60	35	5
4. Ernakulam ..	3	59	35	1	5	14-14	20	80	83	12	5
5. Trivandrum ..	4	79	14	2	5	15-3	2	98	78	16	6
6. Madras ..	6	30	51	5	5	14-8	10	90	60	38	2
7. Nagpore ..	6	66	18	10	6	14-13	13	87	80	15	5
8. Patna ..	5	30	59	8	3	14-5	42	58	89	9	2
9. Dinspore ..	10	6	9	70	15	12-9	35	65	82	13	5
10. Calcutta ..	8	6	11	71	12	12-11	85	15	79	18	3
11. Shillong ..	8	5	34	41	20	11-15	35	65	90	5	5
Average ..	6	30	29	27	14	13-11	29	71	37	60	3
Burma ..	6	19	64	12	5	14-0	64	36	67	30	3

APPENDIX XXXIII.

Agricultural Produce (Grading and Marking) (Eggs) Rules.

1. *Short title and application.*—(1) These rules may be called the Agricultural Produce (Grading and Marking) (Eggs) Rules, 1937.

(2) They shall apply to hens' and ducks' eggs produced in India.

2. *Grade designations.*—Grade designations to indicate the quality of eggs are set out in column 1 of Schedule I.

3. *Definition of quality.*—The quality indicated by such grade designations is set out, against such designations, in columns 2 and 3 of Schedule I in respect of hens' eggs and in columns 4 and 5 thereof in respect of ducks' eggs.

4. *Grade designation marks.*—(1) The grade designation mark to be marked on each egg shall consist of the word AGMARK together with the grade designation, placed centrally in a circle of not less than $\frac{1}{4}$ inch diameter.

(2) The grade designation mark to be attached to each package of eggs shall consist of a label bearing the design set out in Schedule II, specifying the grade designation and of the following colour :—

Grade designation.					Colour of label.
Special	..	..	..	..	White.
A	..	..	..	..	Red.
B	..	..	..	..	Blue.
C	..	..	..	..	Yellow.

NOTE.—Where a package contains eggs of two or more grades, separate labels of appropriate colour shall be attached giving the particulars in respect of the eggs of each grade in the package.

5. *Methods of marking.*—(1) The grade designation mark shall be marked legibly on each egg in indelible ink on the shell by means of a rubber stamp.

(2) The grade designation mark label shall be attached by means of a lead seal bearing the word "AGMARK" to each package of eggs, and shall clearly show the following particulars :—

- Grade designation of the eggs ;
- Number of eggs ;
- Nett weight of eggs ;
- Name of the grading station ;
- Date of despatch.

6. *Methods of packing.*—(1) Containers may be either returnable or non-returnable. They shall be clean and suitable for the purpose. All packages shall have a closed sealed cover.

(2) Packing material, if used, shall be clean, dry and sweet, free of any taint liable to impart an objectionable flavour to the eggs.

(3) Hen and duck eggs shall be packed separately. Eggs of different grades shall also be packed separately, as far as possible. If of more than one grade are packed in one container, a layer of clean paper or clean straw shall be placed between the different grades.

SCHEDULE I.

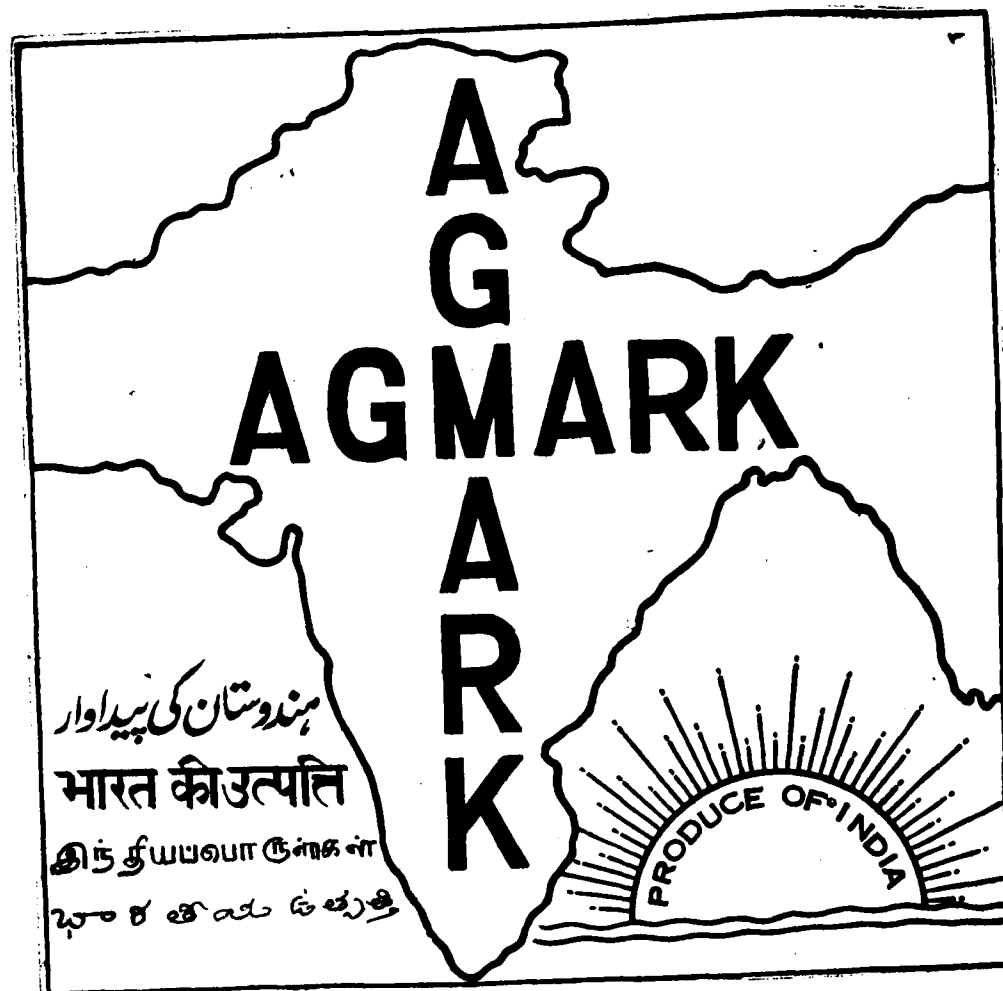
Grade designations and definition of quality of eggs (hen and duck) produced in India.

Grade designations.	Definition of quality.			
	Hen eggs.		Duck eggs.	
	Minimum weight.*	State or condition.	Minimum weight.*	State or condition.
1	2	3	4	5
	Ozs.		Ozs.	
Special	1 $\frac{1}{2}$	The eggs must not have been preserved by any process and must be free from taint ; the shell must be clean, free from stain, sound, of normal texture and shape. The contents must be free from bluish, the yolk central and translucent or faintly but not clearly outlined and freely mobile ; the white must be translucent and clear, and the air space must not exceed three-eighths of an inch in depth.	2 $\frac{1}{2}$	The eggs must not have been preserved by any process, the shell must be clean, free from stain and sound, the yolk central, visible but not dense, and freely mobile. The white must be translucent, firm and not watery.
A	1 $\frac{1}{4}$		2 $\frac{1}{4}$	
B	1 $\frac{1}{4}$		2	
C	1 $\frac{1}{4}$		1 $\frac{1}{4}$	

* To allow for accidental errors in grading a tolerance of 1 drachm in the weight of any egg may be permitted.

SCHEDULE II.

Grade designation mark for packages of eggs.



APPENDIX XXXIV.
Results of Grading of "Agmark" Eggs at Peshawar.

Months (1937).	Total eggs brought for grading.	Cracked.		Staff.		A—Grade.		B—Grade.		C—Grade.		Small.	
		Number.	Per. centage to column (2).	Number.	Per. centage to column (2).	Number.	Per. centage to column (2).	Number.	Per. centage to column (2).	Number.	Per. centage to column (2).	Number.	Per. centage to column (2).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
January ..	2,62,872	4,479	1.8	600	0.2	71,544	28.3	1,25,640	49.6	48,490	19.2	2,219	0.9
February ..	1,97,299	1,490	0.8	477	0.2	43,282	21.9	1,08,084	54.8	42,384	21.5	1,618	0.8
March ..	1,49,267	1,001	0.7	2,007	1.3	35,159	23.6	82,255	55.1	27,319	18.3	1,626	1.0
April ..	4,07,128	2,302	0.6	8,771	2.2	97,447	23.9	2,00,625	49.3	82,500	22.7	5,483	1.3
May ..	5,86,339	3,037	0.6	17,593	3.0	1,34,063	22.8	2,74,517	46.8	1,46,480	25.0	10,649	1.8
June ..	2,43,184	1,303	0.6	5,437	2.2	54,071	22.2	1,21,664	50.0	68,542	24.1	2,177	0.9
July ..	84,188	454	0.5	1,438	1.7	22,908	27.3	41,801	49.7	16,822	20.0	675	0.8
August ..	74,267	711	0.9	1,326	1.8	20,169	27.2	35,348	47.6	16,106	21.7	607	0.8
September ..	85,384	519	0.6	1,753	2.0	21,921	25.7	38,041	44.6	22,170	26.0	980	1.1
October ..	1,63,544	372	0.2	3,368	2.1	43,813	26.8	77,578	47.4	36,099	22.1	2,314	1.4
November ..	2,76,448	347	0.1	2,572	0.9	82,005	29.6	1,40,278	50.8	49,543	17.6	2,703	1.0
December ..	2,16,095	188	0.1	1,281	0.6	74,853	34.7	1,08,053	50.0	31,430	14.5	291	0.1
Total ..	27,36,015	16,203	0.6	46,633	1.7	7,01,324	25.6	13,53,774	49.5	5,86,849	21.5	31,242	1.1

APPENDIX XXXV.
Results of Grading of "Agmark" Eggs at Travancore.

Months.	Total eggs brought for grading.	Cracked.		Stale.		A-Grade.		B-Grade.		C-Grade.		Small.	
		Number.	Per-centage to column (2).	Number.	Per-centage to Column (2).	Number.	Per-centage to column (2).	Number.	Per-centage to column (2).	Number.	Per-centage to column (2).	Number.	Per-centage to column (2).
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1937.													
February ..	103,306	1,823	1.8	3,479	3.4	8,591	8.3	54,926	53.2	33,094	32.0	1,392	1.3
March ..	68,270	1,017	1.5	3,185	4.6	3,491	5.1	32,440	47.5	28,120	38.3	2,017	3.0
April ..	47,050	613	1.3	2,771	5.9	3,491	7.4	23,448	49.8	15,190	32.3	1,537	3.3
May ..	41,220	1,094	2.7	1,393	3.4	3,823	9.3	20,637	49.9	12,783	31.0	1,542	3.7
June ..	189,313	2,444	1.5	2,313	1.4	16,817	10.6	73,759	45.7	56,810	35.7	8,170	5.1
July ..	227,669	3,495	1.5	1,973	0.9	33,125	15.9	92,326	40.5	80,959	35.5	12,393	5.7
August ..	182,700	2,966	1.6	3,039	1.7	32,514	17.8	73,125	39.5	69,775	32.7	12,361	6.7
September ..	217,400	4,992	2.3	7,965	3.7	36,945	17.0	77,821	35.8	70,079	32.3	19,598	9.0
October ..	180,600	2,872	1.9	5,066	3.3	32,243	14.8	56,923	37.8	50,294	28.4	13,203	8.8
November ..	140,660	2,328	1.6	6,839	4.9	22,130	15.7	46,493	33.1	49,510	35.2	13,310	9.5
December ..	183,900	2,868	1.5	7,445	4.0	33,573	18.4	62,731	34.1	60,334	33.8	16,604	9.2
1938.													
January (up to 15th only)	63,200	723	1.4	2,793	5.3	12,966	24.3	17,350	23.6	15,083	28.3	4,364	8.2
Total ..	1,575,308	17,574	1.7	49,944	3.1	288,613	14.8	629,573	40.0	530,030	33.6	104,879	6.3

APPENDIX XXXVI.

Conditions for the Certificate of Authorisation under the Agricultural Produce (Grading and Marking) Act, 1937.

- (a) Grade designation marks shall only be applied to the articles mentioned in the certificate of authorisation and at the premises therein mentioned ;
- (b) During the operation of the certificate the holder thereof shall, at all reasonable times, give access to the premises named therein to any person duly authorised by the Agricultural Marketing Adviser or by the Central Government and shall afford him facilities for ascertaining that marking is being correctly performed ;
- (c) The holder of the certificate will keep a record of the number of packages marked with each grade designation mark and will permit any person duly authorised by the Agricultural Marketing Adviser or by the Central Government to examine the record .
- (d) The holder of the certificate will permit any duly authorised person to take samples of any graded produce or to open and inspect any package bearing a grade designation mark, provided that all samples shall be paid for ;
- (e) Any person authorised in this behalf by the Agricultural Marketing Adviser or by the Central Government may cancel or remove a grade designation mark from any produce which is the property of the holder of the certificate in the possession of the holder of the certificate or of his agent, should such produce be found by such person not to comply with the definition of quality prescribed for that article ;
- (f) All rules made under the Agricultural Produce (Grading and Marking) Act shall be observed ;
- (g) Any certificate of authorisation may be cancelled, revoked, modified or suspended by the Agricultural Marketing Adviser or by any other person authorised by the Central Government in that behalf, provided that 14 days' notice in writing shall be given to the certificate holder at the address stated on the certificate and an opportunity given him for showing cause why his certificate should not be cancelled, revoked, modified or suspended ;
- (h) Any holder of a certificate of authorisation may, with the written consent of the Agricultural Marketing Adviser, use a replica of the AGMARK design on his business papers and catalogues ; and
- (i) Any stencil, rubber stamp, punch or other instrument or label required for marking produce in the prescribed manner shall only be obtained from the Agricultural Marketing Adviser or a person authorised by him, shall be kept in safe custody by the holder of the certificate and shall, so far as may be, be returned to the Agricultural Marketing Adviser or such authorised person when the certificate ceases to be valid.

APPENDIX XXXVII.
Weekly retail prices of "AGMARK" and ungraded eggs, ex-merchants' shop, Calcutta.
[In rupees, annas and pies.]

Week ending on	Graded.						Weighted average Price.*		Ungraded.			Price Difference.	
	Prices per score.						per score.	per hundred.	Prices per score.			per score.	per hundred.
	A	B	C	Small.	Rs. a. p.	Rs. a. p.			Minimum.	Maximum.	Average.		
							Rs. a. p.	Rs. a. p.				Rs. a. p.	Rs. a. p.
4th December 1937	0 12 0	0 10 0	0 8 0	0 6 0	0 7 11	2 7 9	..	Not given	..	..	..	..	..
11th December 1937	0 12 0	0 10 0	0 8 0	0 6 0	0 7 11	2 7 9	0 7 11	0 7 6	0 7 3	+0 0 8	+0 3 4	+0 0 10	+0 3 4
18th December 1937	0 12 0	0 10 0	0 8 0	0 6 0	0 7 8	2 6 3	0 7 8	0 8 0	0 7 6	+0 0 2	+0 0 10	+0 0 10	+0 0 10
26th December 1937	0 12 0	0 9 0	0 8 0	0 6 0	0 7 8	2 6 3	0 7 0	0 8 0	0 7 6	+0 0 2	+0 0 10	+0 0 10	+0 0 10
1st January 1938	0 12 0	0 9 0	0 8 0	Not given	..	..	0 6 0	0 7 0	0 6 6	+0 0 3	+0 1 3	+0 1 3	+0 1 3
9th January 1938	0 12 0	0 9 0	0 8 0	0 6 0	0 7 8	2 6 3	0 7 0	0 8 0	0 7 0	+0 0 2	+0 0 10	+0 0 10	+0 0 10
16th January 1938	0 12 0	0 9 0	0 8 0	0 6 0	0 7 8	2 6 3	0 7 0	0 8 0	0 7 6	+0 0 2	+0 0 10	+0 0 10	+0 0 10
22nd January 1938	0 12 0	0 9 0	0 8 0	0 6 0	0 7 8	2 6 3	0 7 0	0 8 0	0 7 6	+0 0 2	+0 0 10	+0 0 10	+0 0 10
29th January 1938	0 12 0	0 8 0	0 7 0	0 5 0	0 6 8	2 1 5	0 6 0	0 7 0	0 6 6	+0 0 2	+0 0 10	+0 0 10	+0 0 10
6th February 1938	0 12 0	0 8 0	0 7 0	0 5 0	0 6 9	2 1 7	0 6 0	0 7 0	0 6 6	+0 0 3	+0 1 3	+0 1 3	+0 1 3
13th February 1938	0 12 0	0 9 0	0 7 0	Not given	..	..	0 6 0	0 7 0	0 6 6	..	..	..	..
19th February 1938	0 12 0	0 9 0	0 7 0	0 5 0	0 7 0	2 3 1	0 6 0	0 7 0	0 6 6	+0 0 6	+0 2 6	+0 2 6	+0 2 6
26th February 1938	0 12 0	0 10 0	0 8 0	0 7 0	0 8 2	2 8 9	0 6 0	0 7 0	0 6 6	+0 1 8	+0 9 4	+0 9 4	+0 9 4
27th and 28th February 1938†	0 12 0	0 9 0	0 8 0	0 7 0	0 7 10	2 7 3	0 6 0	0 7 0	0 6 6	+0 1 4	+0 7 8	+0 7 8	+0 7 8
								Average	0 7 0	+0 0 7	+0 2 10	+0 2 10	+0 2 10 or 8.3% increase.

*Station was closed on 28th February 1938.

NOTE.—The figures relating to weeks for which complete information is not available have been omitted in working out the averages.

*A.—3.5 per cent.
B.—29.8 per cent.
C.—42.2 per cent.
Small—19.5 per cent.
Omitted & stale—5.0 per cent. (Not valued).

APPENDIX XXXVIII.

Bye-laws of the Frontier Co-operative Egg Grading and Sale Association, Limited, Peshawar.

1. This Society shall be called the Frontier Co-operative Egg Grading and Sale Association, Limited, Pabbi, and its registered address shall be at Railway Station, Pabbi, Post Office Pabbi, Tahsil Nowshera, District Peshawar.

OBJECTS.

2. Its objects are to promote the economic interest of its members and more particularly :

- (1) to help the members in the purchase and sale of eggs and particularly in collection, grading, packing, processing, preserving, storing and marketing,
- (2) to raise the local standard of poultry farming,
- (3) to encourage in members the spirit and practice of thrift, mutual help and self help.

MEMBERSHIP.

3. The members shall consist of :—

- (1) individuals or co-operative poultry societies which join in the application for registration,
- (2) individuals or co-operative poultry societies admitted in accordance with these Bye-laws.

4. Every member of the Association must be :—

- (1) an individual of good character ordinarily resident within the radius of _____ miles from the Headquarters of the Association and engaged in the business of eggs, and of not less than 18 years of age (except in the case of a minor heir of a deceased member), or
- (2) a registered co-operative poultry society within the radius of _____ miles from the Headquarters of the Association.

5. Members shall be admitted after election by the Managing Committee, subject to the confirmation of a General Meeting.

6. Every member on his admission shall sign his name or make his thumb-mark in the register of members ; a co-operative poultry society shall nominate in writing a person who shall sign the Register.

7. Membership shall be terminated by :—

- (1) death or permanent insanity of an individual, or ceasing to reside within the radius of _____ miles from the Headquarters of the Association ;
- (2) in the case of a society, cancellation of its registration ;
- (3) ceasing to hold the share or shares prescribed by Bye-law 18 ;
- (4) withdrawal after 3 months's notice in writing to the Secretary ;
- (5) expulsion by a two-thirds majority of a meeting at which not less than half of the members or 20, whichever may be less, are present and vote.

8. Every member shall nominate a person or persons to whom on his death, his shares shall be transferred but no member may nominate more than one person, unless he holds more than one share, and, in any case, unless the amount to be paid to such nominee, whether by way of whole shares or by fixed proportion of the amount available for transfer, as the case may be, is duly specified when the nominees are appointed; and he shall attest the nomination by making his signature or thumb-mark in the register of members.

9. A member shall not transfer any share held by him except to an existing shareholder or to any other person qualified under Bye-law 4 and approved by the Managing Committee for this purpose. Such transfer shall be subject to the confirmation of a General Meeting.

10. A person whose membership is terminated under Bye-law 7 (3) shall be paid the value of his shares within 6 months.

11. The value of the share or shares of a society whose registration is cancelled, shall be paid to the Liquidator within 6 months.

12. An individual or society whose membership is terminated for any other reason is entitled to transfer his shares to the existing members or to him.

13. The value of the share, shall, in no case be more than the sum received by the Association in payment thereof.

14. A member may be expelled for :—

- (1) failure to pay any sum due from him to the Association ;
- (2) bankruptcy or application for bankruptcy ;
- (3) (if an individual) conviction of a criminal offence involving dishonesty or resulting in his imprisonment for 3 months or over ;
- (4) (if a society) being classed by the Registrar or a Gazetted Assistant as D in two consecutive years ;
- (5) action which may be held by the Managing Committee and a general meeting to be dishonest or contrary to the stated objects of the Association or to the interests of co-operation, such as adulterating his produce or refusing to sell his produce through the Association.

15. Any money due on any account from the Association to a member or past member, or person claiming through him, may be sent off in payment of any sum which he owes or for which he stands surety.

LIABILITY.

16. The liability of members for the debts of the Association shall be limited to double the nominal value of their shares.

CAPITAL.

17. The capital shall be composed of :—

- (1) an undetermined number of shares of the value of Rs. 50 each ;
- (2) deposits from members ;
- (3) deposits and loans from non-members ;
- (4) realised profits.

18. Each individual member shall hold at least one share. Each society member shall hold one share for every 50 members or fraction of 50 members, but no society shall hold more than 5 shares. All shares be fully paid.

19. If any member by inheritance or otherwise becomes possessed of more than the maximum holding permitted by this rule, the Managing Committee shall have power to sell the excess number, or to buy them on behalf of the Association and to hold the proceeds at his disposal.

20. Shares may be transferred to existing shareholders or to persons approved by the Managing Committee for this purpose. Such transfers shall be subject to the confirmation of the general meeting.

GENERAL MEETING.

21. The supreme authority shall be invested in the general meeting which shall be held at the time of the annual audit or as soon after as may be found practicable, and at other times when summoned by the Registrar or the President, or by the Committee of their own motion or at the written request of not less than 6 members.

The presence of at least 10 individual members or representative of member societies, shall be necessary for the disposal of any business at such meetings.

If in the case of an ordinary general meeting a quorum is not forthcoming, the chairman shall postpone the meeting to a date not less than 7 days and not more than a fortnight later, and the business transacted at the postponed meeting shall be the same and no other than proposed for the original date of meeting. At such postponed meeting, if a quorum is still not forthcoming, resolutions may be carried by a majority of three-fourths of the members or representatives present.

22. In a general meeting, the following business shall be transacted :—

- (1) the election, suspension and removal of members of the managing committee including a President and one or more Vice-Presidents ;
- (2) the election of a Treasurer to keep the money of the Association ;
- (3) the consideration of the annual statement of accounts and balance sheet and of the auditor's report and the inspection notes of the Registrar and the Inspector ;
- (4) the disposal of profits in accordance with the Act, the notified rules and these Bye-laws ;
- (5) the confirmation of the admission and expulsion of members and of the transfer of shares ;
- (6) the fixing, subject to the approval of the Registrar, of the maximum liability to be incurred during the following year in loans or deposits from non-members ;
- (7) the amendment of the Bye-laws subject to the sanction of the Registrar.

23. Amendment of the Bye-laws shall be carried out by a majority of a meeting at which not less than two-thirds of the individual members or representatives of societies are present. All other questions before the general meeting shall be decided by a majority of votes. When the votes are equal, the chairman shall have a casting vote.

24. Member societies shall be entitled to be represented at a General Meeting by Representatives who must be members of the society which they present. They shall be entitled to two representatives for the first share and one for each subsequent share held.

25. All business discussed or decided at a general meeting shall be recorded in a Proceeding Book which shall be signed by the chairman of the meeting.

26. Any co-operative society registered under Act II of 1912, shall be entitled to receive the same price for the eggs produced by it to the Association, as an individual member of the Association.

MANAGING COMMITTEE.

27. The Managing Committee shall consist of at least 5 individual members or representatives of societies of over the age of 21, including a President and one or more Vice-Presidents. The members shall be elected for one year and shall be eligible for re-election.

28. A member of the Committee shall cease to hold office, if he :—

- (1) applies for insolvency or is declared insolvent ;
- (2) becomes of unsound mind ;
- (3) is convicted of any offence involving dishonesty or is imprisoned for 3 months ;

An individual member of the Committee shall also cease to hold office, if he ceases to be a member of this Association. A member of the committee who represents a society shall cease to hold office if :—

- (1) his society ceases to be a member of this Association ;
- (2) his society is classed as D for two consecutive years ;
- (3) he ceases to be a member of his society.

29. Meetings of the committee shall be held when necessary and in any case at least once a month.

The attendance of at least 3 members shall be required for the disposal of any business. The President or the Vice-President, or, in their absence, one of the members shall preside. Each member shall have one vote. The chairman shall have a casting vote.

30. The committee shall exercise all the powers of the Association except those reserved for the general meetings, subject to any regulation or restriction duly laid down by the Association in a General Meeting or in the Bye-laws, and in particular shall have the following powers and duties :—

- (1) to observe in all their transactions the Act, the notified rules and the Bye-laws ;
- (2) to maintain true and accurate account of all money received and expended and all stock bought and sold ;
- (3) to keep a true account of the assets and liabilities of the Association ;
- (4) to keep a register of members, correct and up to date ;
- (5) to prepare and lay before the annual general meeting a profit and loss Account and Balance Sheet ;
- (6) to examine the accounts, sanction contingent expenditure and supervise the maintenance of the prescribed Registers ;

- (7) to consider the inspection notes of the Registrar and the Inspector and take necessary action ;
- (8) to elect new members, to issue new and transfer old shares subject to the confirmation of a general meeting ;
- (9) to summon general meeting in accordance with the Bye-law 21 ;
- (10) to contract loans subject to any restrictions imposed by the General Meeting or by the Registrar ;
- (11) to arrange for the purchase and sale of eggs at the most advantageous prices on cash purchase system or on commission or hire purchase basis ;
- (12) to decide the terms on which goods and other requirements shall be bought and sold for the use of members ;
- (13) to decide the terms on, the period for, and the rate of interest at which deposits are to be received and to arrange for the payment or return of deposits ;
- (14) to arrange for the safe custody of all produce, grading machine and other implements ;
- (15) to watch for and guard against the adulteration of the produce sold through the Association and evasion of the duty of members to sell through the Association ;
- (16) to assist the inspection of books by any person authorised to see them ;
- (17) to appoint, suspend or dismiss the salaried or non-salaried officers or employees of the Association and to require all or any one of them to furnish sufficient security ;
- (18) through any member or officer or employee of the society or any other person, specially authorised, to institute, conduct, defend, compromise, refer to arbitration, or abandon legal proceedings by or against the Association, or Committee, or the officers or employees concerning the affairs of the Association ;
- (19) to acquire on behalf of the Association shares in the Central Bank ;
- (20) to hear and decide complaints relating to the business of the Association ;
- (21) to receive, withdraw, or disburse, or by special resolution authorise one or more of its members to receive, withdraw or disburse money or other property of the Association and to arrange for the safe keeping of its funds and documents ;
- (22) to make proposals to the general meeting for the payment of the dividend and the disposal of profits and the investment of the Reserve Fund in accordance with the rules and the Bye-laws ;
- (23) to consider and act upon the instructions of the Agricultural Marketing Department ;
- (24) the Association will be responsible jointly for the proper observance of the conditions laid down by the merchants at the establishment of the Grading Station with the Agricultural Marketing Department of the Government of India ;

- (25) the produce shall be marked with the registered Mark "AGMARK" of the Agricultural Marketing Adviser to the Government of India ;
- (26) In their conduct of the affairs of the Association, the committee shall exercise the prudence and diligence of ordinary men of business and shall be responsible for any loss sustained through acts contrary to Law, notified rules and Bye-laws ;
- (27) to arrange for the safe custody of books and to appoint one of its members or one of the officers of the Association to take charge of all the Registers and papers prescribed in these Bye-laws.
31. The committee may appoint from amongst its own members a small working committee, and may delegate to it or to the officers of the Association such of its own powers as may be prescribed by a general meeting.
32. All business discussed or decided at a meeting of the committee shall be recorded in a proceeding book which shall be signed by the chairman of the meeting and all the members of the committee present.

SECRETARY.

33. The Committee shall appoint a Secretary and if necessary a manager and may require them to give such security as the committee deems sufficient.

34. The powers and duties of the Secretary and of the Manager under his control shall be as follows :—

- (1) to superintend the working of the office, and be responsible for the proper and punctual maintenance of the accounts including a cash book and ledger showing the accounts of every shareholder, depositor, creditor and buyer and a stock register ;
- (2) to maintain correctly and up-to-date the register of members, the share list and the list of persons nominated under bye-laws ;
- (3) to procure from buyers and sellers the due execution of receipts and other acknowledgments ;
- (4) to receive deposits and issue receipts as prescribed by the committee ;
- (5) to buy and sell egg produce and other requirements as directed by the committee ;
- (6) to receive money due to Association and give receipts ;
- (7) to pay money due from the Association ;
- (8) to incur contingent expenditure subject to the sanction of the committee ;
- (9) to sign on behalf of the Association and conduct its correspondence ;
- (10) to summon and attend general meetings and meetings of the committee ;
- (11) to certify copies of entries in books under Section 26 of the Act ;
- (12) to keep in hand sum not exceeding Rs. in absence of the Cashier ;

- (13) generally to conduct the current business of the Association and to perform all duties entrusted to him by the committee.

35. The committee shall appoint one of its members or one of the officers of the Association to take hold and keep in safe custody all the Registers and papers in the use of the Association and prescribed in Bye-laws 34.

36. The registers and papers of the Association shall be open to the inspection of any one interested in the funds, except that no one shall be allowed to see the deposit account of any persons without that person's consent in writing.

Copies of the Bye-laws and of the Balance Sheet shall be supplied free on demand to any member.

37. All charges or other instruments executed on behalf of the Association, except receipts, shall bear the signature of the Secretary or the Manager and also at least one member of the committee, as representing the Association.

TREASURER.

38. A treasurer may be appointed by the committee to take charge of all money entrusted to him by the Association and to account duly for the same and to make such payment as the committee or the Secretary or Manager may order in accordance with their powers. The Treasurer may keep in hand an amount not exceeding Rs. 400 and shall pay all sums exceeding this amount into a Bank approved by the committee. He shall give security of not less than rupees . He shall sign the Cash Book in token of its correctness and produce the Cash Balance whenever called upon to do so by the Committee or Auditor.

BINDING RULES.

39. The Association shall accept from every member all eggs produced supplied by him provided that the sale of such produce is customarily undertaken by the Association and it is delivered in good condition and is suitable to be sold by the Association and is delivered at such time as may be warranted by the market conditions. In case of any default by the Association in acceptance of such produce, it shall pay to every member in respect of whom default has been made a sum equal to the difference between the price of the produce calculated according to the highest rate reached on that particular date of that particular quantity or commodity and the price at which the produce was actually sold by the members.

40. Every member shall deliver to the Association for sale all his saleable eggs produce which the Association is willing to accept. In case of default by any member in respect of the quantity of the produce to be delivered under this Bye-law, the Managing Committee shall be empowered to impose on the defaulting member a fine equal to the produce not sold to the Association.

41. The Association and its members respectively shall be temporarily absolved from the obligations imposed by Bye-laws 39 and 40 in the event of the work of the Association being brought to partial or complete standstill by accident or by any other cause over which the Association and its members can exercise no control.

GENERAL PROVISION.

42. The funds of the society may be devoted to the promotion of the stated objects of the Association and to the purposes set forth in Bye-laws.

43. The Association may build such offices, sheds and godowns as may be necessary to carry out its stated objects and may acquire land for this purpose.

44. All transactions shall be strictly on cash terms or on hire purchase system.

45. Every member shall be bound by the rules or instructions of the Managing Committee as to the grading of eggs produce in respect of its quality and bulk.

46. No loans will be given to any person.

47. The Association shall pay such prices on the purchase of eggs as may be fixed from time to time in a general meeting.

48. The Association may join in co-operative purchase or sale with other co-operative societies within the radius of _____ miles from the Headquarter of the Association.

49. Of the annual profits not less than 25 per cent., shall be placed to reserve, of the remainder a bonus of not more than 3 months' pay may be given to all employees of the Association, a dividend not exceeding 10 per cent. may be paid on shares and out of the balance a rebate may be disbursed to members in proportion to their transactions through the Association.

50. No dividend or rebate shall be paid to any member society which fails to sell through the Association a minimum amount of produce to be fixed once a year in general meeting.

51. Before or after the payment of a dividend $7\frac{1}{2}$ per cent. of the profits may be applied to any purpose referred to in Section 34 of the Act and approved by the Registrar, namely, relief of the poor, education, medical relief and the advancement of any other objects of general public utility except one relating exclusively to religious teachings or worship or to a common good fund to be devoted to any of these purposes.

52. The society shall pay such audit fee as may from time to time be fixed by the Registrar.

53. The reserve fund is indivisible and no member is entitled to claim specified share in it. It shall be invested in Government securities or otherwise as directed by the Registrar, under Section 32 of the Act. It may be employed to cover unforeseen losses and to provide security for Association's contract.

DISPUTES.

54. Any dispute concerning these Bye-laws or the business of the Association between members or past members of the Association or persons claiming through them or between a member or a past member or person so claiming and the committee or any officer shall be referred to the Registrar as provided in the rules notified by the Local Government.

(1) The execution work shall be given to the person or Execution Union selected by the Department and the Association shall not be empowered to withdraw any award unless the dues of the Execution Union or Execution Agent have been paid.

(2) The Association shall not be entitled to send its resolution, etc., to the court direct.

LIQUIDATION.

55. The Association shall be liquidated only by the order of the Registrar under Section 39 or Section 40 of the Act.

56. After discharging the liabilities of the Association and repaying the share capital, the reserve fund may be applied to such objects of local and public utility as may be selected by the committee and approved by the Registrar. If within 3 months of the dissolution of the Association, the committee fails to select an object that is approved by the Registrar, the later shall credit the balance of the Reserve Fund to the Co-operative Society to which the Association was affiliated or shall deposit the amount in some co-operative or other bank until a new co-operative Association with a similar area of operation is registered in which case, it shall be credited to the Reserve Fund of the New Association.

Distribution of Exports of Eggs from chief exporting countries, 1935-36.

330331

(a) Figures not available.

APPENDIX XL.

Monthly average price of eggs in London, 1932-37 (per 120).

Months.	English National Mark Specials.						English National Mark Standards.					
	1932.	1933.	1934.	1935.	1936.	1937.	1932.	1933.	1934.	1935.	1936.	1937.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
January ..	18 0	16 11	17 0	15 4	15 2	15 2	17 0	15 5	14 1	14 1	15 9	13 11
February ..	14 8	16 4	14 2	13 8	16 4	15 6	13 4	15 7	13 7	12 8	15 5	14 11
March ..	11 5	11 0	10 4	10 6	11 7	12 10	10 7	10 3	9 5	9 8	10 7	12 1
April ..	11 1	10 3	10 4	9 10	10 4	10 10	10 3	9 4	9 7	9 1	9 8	10 2
May ..	10 9	10 7	9 11	10 11	11 9	11 2	9 3	9 7	9 2	9 11	10 9	10 6
June ..	12 7	13 1	12 7	12 9	13 1	13 11	11 4	11 8	10 11	11 8	12 1	12 9
July ..	14 3	14 2	13 9	14 0	16 2	16 9	13 6	12 10	12 2	13 4	15 3	15 9
August ..	15 8	17 6	17 5	17 6	17 7	18 4	14 8	16 1	16 5	16 11	16 8	17 1
September ..	18 11	18 11	16 9	18 5	18 6	21 0	17 6	17 6	14 8	17 3	17 6	19 3
October ..	21 11	20 1	20 3	20 5	23 2	22 5	20 8	19 1	18 11	19 2	21 6	20 6
November ..	24 1	23 3	24 0	24 2	23 0	..	22 9	22 0	22 8	22 6	20 11	..
December ..	21 10	21 10	21 0	22 2	21 11	..	18 2	19 6	19 2	20 8	19 9	..
Year ..	16 4	16 2	15 8	15 10	16 9	..	14 11	14 11	14 5	14 9	15 6	..

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APPENDIX XL—contd.

Monthly average price of eggs in London, 1932-37 (per 120)—contd.

Month.	Danish 15½ lb.						Dutch Best Mixed 57/58†					
	1932.	1933.	1934.	1935.	1936.	1937.	1932.	1933.	1934.	1935.	1936.	1937.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
January ..	13 5	13 5	12 6	10 9	13 3	9 5	13 5	13 11	13 5	9 9	12 11	9 3
February ..	10 8	14 2	9 11	10 2	11 7	10 9	10 9	14 4	9 8	9 11	10 11	10 4
March ..	9 4	8 6	7 5	8 3	9 0	10 7	9 3	8 9	7 8	8 0	8 5	10 1
April ..	7 11	7 3	7 11	7 5	8 2	8 5	7 10	7 8	6 11	6 11	7 11	8 3
May ..	8 1	8 4	7 8	7 9	8 8	8 2	8 1	8 5	7 6	7 4	8 2	7 9
June ..	8 9	8 5	8 2	8 4	8 6	8 5	9 0	8 6	8 2	8 0	8 3	8 0
July ..	9 8	8 4	8 4	9 0	9 8	10 9	9 7	8 9	8 4	8 9	9 1	10 5
August ..	10 8	11 9	11 5	11 6	10 8	11 6	10 10	12 3	11 2	11 4	10 1	11 0
September ..	13 4	11 11	11 7	11 9	12 8	13 10	13 5	12 8	11 0	11 2	11 8	13 8
October ..	15 5	13 7	14 2	14 5	14 9	14 8	14 10	15 11	14 0	14 0	13 8	14 5
November ..	20 5	17 1	18 4	16 5	15 6	..	..	..	17 3	14 9	14 3	..
December ..	17 0	17 1	15 4	15 8	13 0	..	..	17 11	14 0	14 8	11 9	..
Year ..	12 1	11 8	11 1	10 11	11 3	..	10 8*	11 9†	10 11	10 5	10 7	..

*Best mixed 15½ lb. from 1932 to 1935.

†Ten months average.

‡Eleven months average.

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GLOSSARY OF VERNACULAR TERMS.

A

- Ande-ka-halwa* A variety of Indian pudding consisting mostly of eggs.
- Ashwin* A month of Hindu calendar, corresponding to September—October.
- Asils* A breed of fowls originally used for fighting, from *asal* = real, pure.

B

- Bahangi* A pole the ends of which are connected by ropes to a flat contrivance for carrying loads, the pole being balanced on the shoulder.
- Basant* A Hindu festival heralding the spring.

C

- Chittagong* A breed of fowls from Chittagong (Bengal).
- Chouli* Two annas.

D

- Desi* Literally, of country; an indigenous unimproved fowl.

E

- Ekka* An old type of single horse trap.

G

- Ganda* Rotten; literally dirty.
- Ghagas* A heavy breed of fowls, with feathers on their shanks.

H

- Hali* Four.
- Hat* A weekly or periodical market.

I

- Id* A Muslim festival.
- Itwar* Sunday.

J

- Jaliwala* .. Eggs having blood rings or meat spots: (literally *jali* = network).
Jora .. A pair.

K

- Kachcha* .. Not *pakka*; (of houses) made of mud.
Kafla .. A caravan.
Kamgar .. Literally, a worker; an assistant on a poultry farm.
Karaknath .. A breed of fowls, noted for its black skin.

L

- Lolab* .. A breed of fowls, said to have come originally from Lolab valley in Kashmir.

M

- Mela* .. Fair.
Moong .. A kind of pulse.
Munj .. A kind of dried grass out of which ropes are made.
Mutthies .. Handfuls.

N

- Naram* .. Weak; literally soft.
Neem .. A kind of tree. (*Melia Azadirachta*).

P

- Pakka* .. Firm, regular, final; (of building) made of masonry.
Pan .. Betel leaves.
Panch .. Five.
Panchayat .. A body selected to act as umpires, from "panch" meaning five.
Parcha .. Receipt; literally slip.
Penth or painth .. See *Hat*.
Pilchi .. Mulberry twigs.

S

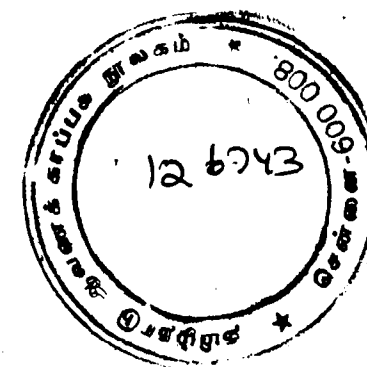
- Sargara* .. A kind of grass, used as packing material in the North.
Shandies .. See *Hat*.
Shisham .. A tree—*Dalbergia Sissu*.
Shukkerwar or Shukkerwari .. Friday or falling on a Friday.

T

- Taza* .. Fresh.
Tehsildar .. Subordinate revenue officer in direct charge of *tehsil* (sub-division).
Tenies .. A small type of fowls: literally diminutive. Some times the word is used for *desi* hens.

V

- Viss* .. A kind of weight used in Burma, equivalent to 3 lb. 6 oz.



R

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