

DESIGN OF A FARM
IN HAMA DISTRICT

—
MOHD. N. S. SHAWWAF

1949

73

When your footsteps turn toward

HOME...



...and a GOOD roof over your head

Epsn 73

AMERICAN UNIVERSITY OF BEIRUT

Engineering Department

DESIGN OF A FARM

IN

HAMA DISTRICT

Thesis submitted to the Civil Engineering Faculty
in partial fulfillment of the requirements for the
Degree of Bachelor of Science in Civil Engineering.

by

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A. U. B.

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I. INTRODUCTION

CHOICE AND JUSTIFICATION OF THE PROJECT.

The farming population of Syria is, roughly speaking, divided into the following categories:

- 1 - The land-lords, or big land owners managing their land according to modified feudal system.
- 2 - Nomadic sheep and goat raising (Bedouin)
- 3 - Machah farmers: farmers living in one village whose land belong to them as a whole.

The villages in Syria are relatively lightly populated due to the following privailing conditions:

- 1 - Lack of sanitary conditions.
- 2 - Poverty: The big difference in distribution of wealth between the villagers and the land-lords.
- 3 - Lack of education.

Since it is very difficult for an engineer ⁿ in this short paper to discuss in details the social life ~~life~~ of the rural population, I am confining my project to the improvement of living conditions required on the farm by the rich and the poor alike. It is a fact that the bad social conditions on farms have forced intelligent and healthy men and women to migrate to cities in search of better conditions and a decent life.

The following statistics justifies what we have mentioned:

in the years:

	city	villo
1946 the population numbered	84542	85001
1947 " " "	87897	84227
1948 " " "	89874	83154

Source

From this we can see that the apparent decrease in the population of the villages and the increase in that of the city confirms this fact.

On the other hand the well to do and the rich landlord is also preferring to live in the city, despite the fact that his income will be reduced by doing so.

The shifting of farming population from the land to the city is producing many bad economical and social results. My project tends to solve this by improving conditions on the farm.

We are observing that a strong controversy is going on between land-lords and workers due to the absence of the owners from the land during the greater part of the year.

Apart from the social life mentioned above there are many economical factors which I have studied in my project and which would lead to the improvement of the farmer and the land such as building sanitary houses for the owner and farmers, using modern machinery with chemical fertilisation, sheep raising, cattle and poultry breeding, consequently I have selected to deal in my thesis with the most important problems on the farm. I have attempted to present as far as possible solutions which will improve the standard of living of all concerned : the landlord, the farmers, the agricultural workers, the machines, the animals, the birds...etc.

I have applied all possible knowledge in the design of a model farm to make this attractive to farmers and land-lords, and to make it susceptible for the application of modern science in various production, and for good farm management and control.

Sources?

STATISTICAL INFORMATION :

We tabulate below some reliable statistical information for Hama District which we have gathered from different sources on meat, dairy and poultry productions. It will be observed from these tables that there is a shortage in the animal and poultry products in respect to the city population as consumers of the above products.

	1946	1947	1948
Cattle	25,000	-	-
Sheep	358,000	348,000	290,000
Goats	52,000	49,313	45,774
Poultry	179,000	173,000	170,000
	irrigated	area for dry farming	
Cultivated area in Hectars	9,500 h	489,271 h	
" fallow land		40,000 h	
Number of population working on the farm.			
	men	women	
	50500	25000	

Relative uses of machinery

<u>Tractors</u>	<u>plows</u>	<u>seeders</u>	<u>combine harvesters and threshers</u>
26	46	10	15

SITUATION AND SITE :

The farm on which I propose to apply my project is a locality known as (Khandak El-Sharki) on the eastern bank of the Orontes (Al-assi River) about three kilometers to the west of Skelbieh. This is a small village some 30 kilometers north-west of Hama on the road to JISR Esh-Shagour.

The land belongs to Mr.A. Rostom who asked me to study this project for him.

The landscape stretches along the bank of the river sloping northward. The southern part of the land is at 6-14 meters above the water level of the river, while the northern part is not more than one meter and in winter a great part may be covered by water.

Consequently, I have chosen the highest parts for building. Access to different buildings is secured by a single road 8 meters wide.

...for purpose.—F. L. D.
 sture supplied by additional
 s and a slightly lower tem-
 re necessary for the incuba-
 ck eggs in cabinet machines,
 able to spray the eggs with
 rmed water when the eggs
 hatching trays. Do not over-
 eggs in the trays. Tempera-
 t be 99 deg. to 99½ deg. under
 eather conditions, 99 deg. in
 weather.—H. R. C. K.

Pullet Rearing

Give me a rough estimate of
 would cost to rear 50 pullets
 1-old to 3 months old?—T. J.

Difficult to give more than a
 oximate figure for poultry
 sts with the wide variations
 nder present conditions. Up
 onths of age the pullets would
 20lb of food each, for the 50
 is would mean about 9cwt.
 prices you pay for feeding
 can work out the cost of
 ity of food.—H. R. C. K.

Mark on Yolk

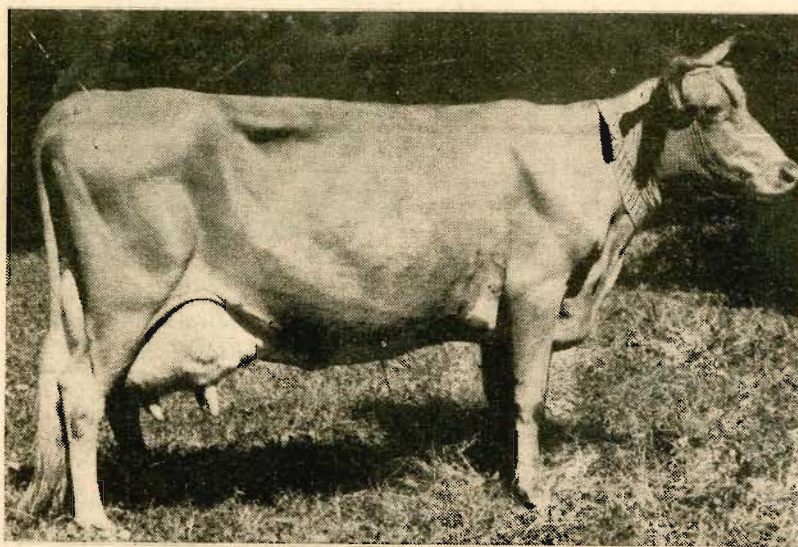
Does a green mark on the yolk
 of an egg?—J. B.

Matter is a fungus which had
 penetrated the shell after the
 hen laid, and this points to the
 on which the eggs are laid
 some damp and mouldy, and
 renewal.—Vet.

Turkey Chicks

Could I construct a wire-floored
 for turkey chicks, as I am told
 not run them with my hens?
 could I feed them?—A. G.

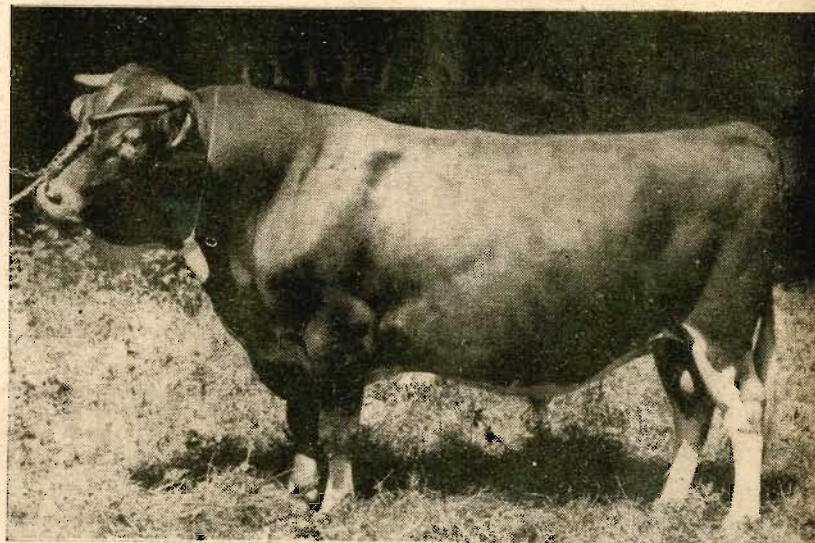
For rearing turkeys on poul-
 ound is to avoid, if possible,
 disease which can be passed
 ar to year through the caecal
 h affects poultry. If such
 t available, intensive rearing
 resorted to, but wire floors
 unnecessary for this system.



AT GUERNSEY SHOW

Over from America were Mr. J. S. Clark, president of the American Guernsey Breeders' Club, and Mr. C. Hill, one of the oldest American breeders.

(Top) The grand eight-year-old cow EVANDALE FLOWER II from Mr. H. J. Camp was runner-up for supreme honours.



Mr. J. W. Froome's ZENA MAJESTIC IV OF THE FONTAINES who had a big day. He led the senior bulls and became supreme champion.

the soil may not be so good.—J. G. S.

Post-mortems

Poultry for post-mortem examination should be sent by train securely packed to Leigh Mill Farm, Cuckfield, Burgess Hill Station (not to this office). The fee of 2s 6d for each bird must accompany a letter, giving all information that will help diagnosis. Reports are furnished only for guidance in treatment and management. The name and address of the sender must accompany each parcel and each letter.

Butter Samples

Butter samples are examined and reported upon for a fee of 2s per sample. Samples, with fees, should be addressed to J. G. W. Stafford, Midland Agricultural College, Sutton Bonington, and should be securely packed in grease-proof paper and cardboard covering with the sender's full name and address.

DISCUSSION AND ANALYSIS OF PLANS

I.- COW STABLE.

Plate N°2 shows the general drawing for a cow stable to house 36 milk cows with calving pen and pens for young stock, and horses. It is located on a well drained yard of 35 by 12 meters; with its long axis in a northwest-southeast direction making it possible to get sunlight on both sides at some time during the day.

It is two story **1**barn. The cows are faced outward. The advantages of this arrangement are:

- 1 - The walls of the **1**barn do not become splashed with manure.
- 2 - The heads of the cows are nearer to the ventilator and windows to breathe fresh air.
- 3 - The removal of the manure is more convenient, and considerable labor is saved in loading from the gutters when overhead carriers are used.
- 4 - It is more convenient when milking machines are used.

SANITARY CONDITIONS:

A stable is a place in which food for human is produced. The health and even the lives of our children depend to a large extent upon the conditions existing there.

Therefore we have to give careful consideration in locating as well as in planning a cow stable to make it possible to keep it in good conditions and to fit the requirements of consumers.

There is no doubt that it pays as a financial proposition to have well arranged, sanitary barns which make the cows more productive. A sanitary barn is not necessarily an expensive one. Many inexpensive structure is, more sanitary than an ill arranged, leadly kept, but expensive barn.

LIGHT :

Light is also one of the most important things which must be taken into consideration. Sunlight does not only destroy the germs but where there is plenty of light, unclean conditions are easily seen and corrected.

The stable is provided with 0.9 x 1.1 windows, whose sashes tip in at top, and which can be removed in hot weather to permit greater circulation of air.

According to the health department regulation there should be at least four square feet of glass to each animal, e.i we need in our stable for the 36 cows:

$36 \times 4 = 144$ square feet or 15 square meters of glass which is supplied by 24, 0.9 x 1.1 windows, considering that the glass occupy $\frac{3}{4}$ of their areas.

VENTILATION :

Good ventilation for a stable is not only necessary from the stand point of the health of the animals, but it is necessary for the most economical production of milk. We are indebted to Prof. King¹ for information on this subject. He said that:

20 cows require a ventilating flue 2x2 feet
Then our 36 " " 2 " flues
and the calves " 1 " "

These are clearly shown on the drawing.

These 65 cms x 65 cms flues according to the King System are open ~~open~~ near the floor and extend above the roof of the stable for the escape of the air. This arrangement as we see helps to remove the cold air. The in-coming air enters the stable near the top of the windows by a series of smaller openings 30 cms x 30 cms arranged on either side of the stable. This arrangement prevents direct draft of air against the cows.

DISCUSSION AND ANALYSIS OF THE CROSS-SECTION.

Plate N^o 2 shows the cross-section of a two stories barn. The first floor is 3 meters high and contains the followings:

- 1 - A feed alley 1.20 meters in width slopping toward the wall.
- 2 - A continuous manger 70 cms in width, with rounded corners to facilitate cleaning.
- 3 - A platform 1.80 meters in width, slopping 3 cms from the rear edge of the manger to the front edge of the gutter. Its surface is slightly fluted to prevent cows from slipping and falling on their knees reaching for feed.
- 4 - A gutter 40 cms in width, 20 cms in depth to hold the dropping manure.
- 6 - A passage or litter alley 2 meters in width slopping towards the gutters on both sides.
- 7 - A 50 x 50 cms ventilating flue for the escaping air.
- 8 - A 30 x 30 cms intakes of air.
- 9 - ventilators or outlets.
- 10- Drinking cups.

The second floor is 3.4 meters high, is used to store the hay and grain.

DISCUSSION AND ANALYSIS OF THE PLAN :

On the plan of the barn we can see:

1 - A silo: a cylindrical overground pit to preserve all the common crops grown on the farm, where fermentation takes place, converting the sugar in the forage into acid and alcohol.

The first published account of preserving corn by means of a silo dates back to 1869 in the U.S.A.

The advantages that go with its use are:

a - The possibility of utilizing all the crop.
b - The large amount of feed that can be stored in a given space.

c - Distinct saving of labor.

d - Satisfaction of feeding from a central and convenient source when the weather is bad.

f - Silage feeding is the most practical means of supplying feed of succulent character which is a necessary part of the ration for satisfactory milk production.

The size of the silo to be used will be depend upon the number of animals to be fed. It is not advisable to build one over 5 meters in diameter. A table is given below showing the relation between the size of the herd and the capacity of the silo needed:

Relation of size of silo to length of feeding period
and size of herd.

N° of cows in herd	Feed for 180 days			Feed for 240 days.		
	Estimated tonnage of silage con- sumed.	Size of silo Diameter	Height	Estimated tonnage of silage con- sumed.	Size of silo Diameter	Height
	Tons	Feet	Feet	Tons	Feet	Feet
10	36	10	30	48	10	34
12	43	10	34	57	10	40
15	54	12	32	72	12	36
20	72	14	32	96	12	40
25	90	14	36	120	14	40
30	108	16	32	144	16	40
35	126	16	36	168 ^x	14	34
40	144	16	40	192 ^x	14	36
45	162 ^x	14	36	216 ^x	16	34
50	180 ^x	14	38	240 ^x	16	40

x- Where this much silage is used, two silos are recommended of the sizes given.

According to this table to feed 36 cows for 240 days, we use two silos of reinforced concrete, 20 cms thick, 4.40 meters in diameter and, 10.50 meters in height.

2.- Grain bin 2.00 x 3.00 meters in size and 3.00 meters high

3.- Feed room " " " " " "

4.- Calf pen 4.40 x 3.20 " " " "

5.- Cow pen 4.40 x 2.50 " " " "

6.- Young stock pen 5.60 x 4.40 meters in size

7.- Pens for horses and other kinds of animals used on the farm :
2.20 x 2.80 meters in area.

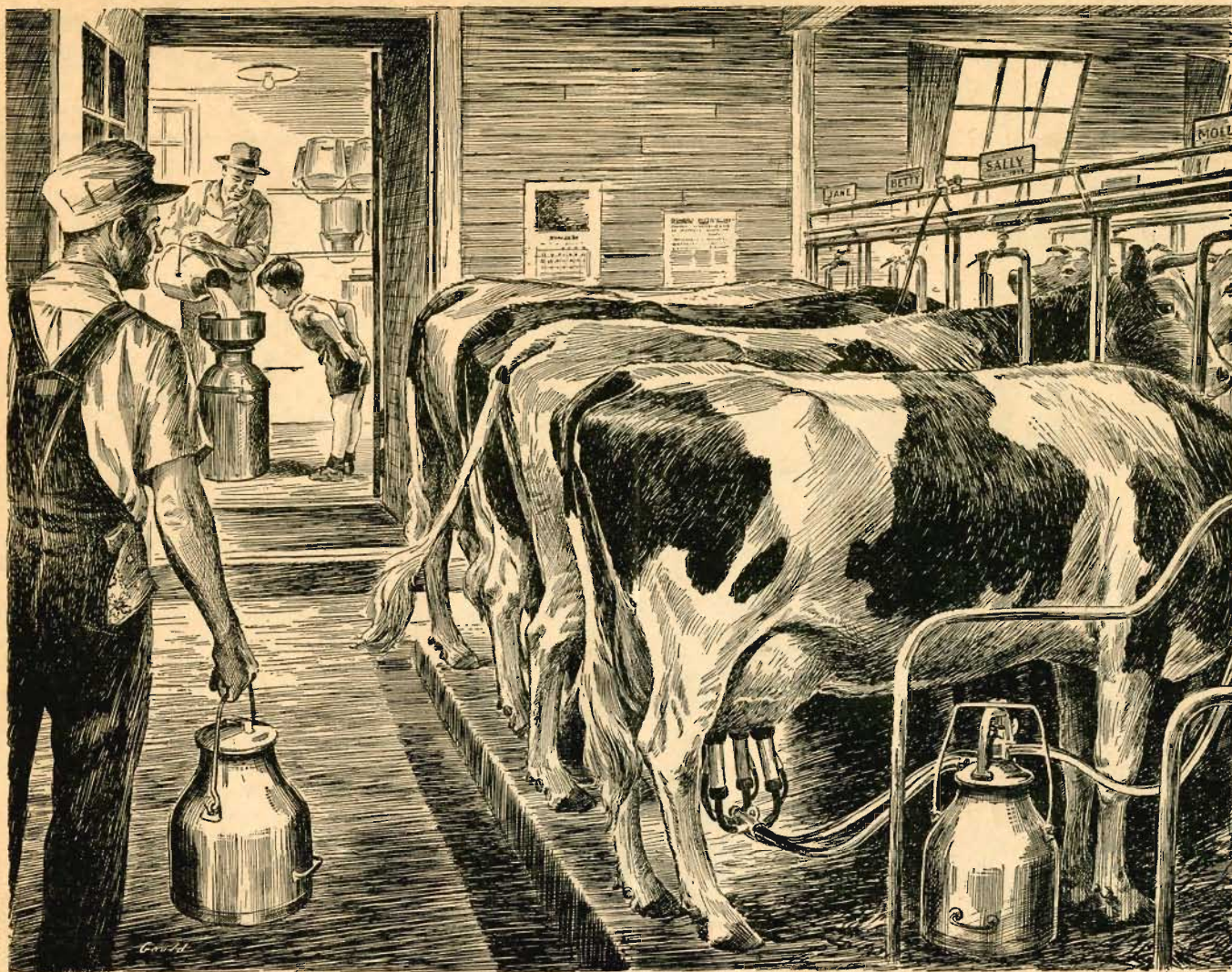
8.- A stair going up to the second story.

WATER SUPPLY AND HANDLING MANURE.

The water is supplied by individual drinking cups which is the most satisfactory method of keeping a continuous and clean supply of water before the cows.

The urine is drained to an underground cistern, which may be pumped at intervals into a tank wagon and distributed over the field from a sprinkler.

The manure is handled by the use of an overhead carrier which drops it in a concrete pit where it is preserved and hauled to the field when desired.



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New York 5, N. Y.



...Your Unseen Friend

2.- DAIRY (MILKHOUSE)

Plate N°2 shows the general drawing for a milkhouse supplying the city market. It is located near the cow stable, with a roofed passage 4,00 meters wide in between. It is not opened directly into the stable to protect the product from odors and contamination and is situated on the side away from the cow yard, for the same reason.

DISCUSSION AND ANALYSIS OF THE PLAN :

The plan of the milkhouse shows the followings: -

1 - Pouring platform 3.10 x 1.80 meters in area, 1.40 meters in height. It is reached by steps and another platform a₁ or b₁ 80 cms in height, all constructed of stones and concrete.

The milk carried from the cow stable will be poured into an elevated, receiving vat which saves traffic into the milkhouse and gives better sanitary conditions.

2 - Milk room 4.00 x 3.70 meters in area, 4.50 meters in height. Here the milk is cooled, filled into cans to be send to the city. It is provided with one door leading to a passage and opening outwards to reduce the opportunity for flies to reach the milk room.

3 - Passage 4.00 x 1.80 meters in area, 3.00 meters in height provided with four doors. One leading to the leading platform, while the others join the different units of the house to one another.

4 - A loading platform 4.50 x 1.30 meters in area, 80 cms in height of the same level as the floor of the milkhouse as well as the floor of the track, for the convenience of loading cans.

5 - A cold storage room 3.00 x 3.00 meters in area 3.50 meters in height

6 - A machinery room 3.00 x 1.80 meters " " " " " " " provided with one door giving to the platform a₁.

7 - A wash room 3.00 x 5,00 meters in area 3.50 meters in height.

It contains the sink, the sterilizer and the boiler. It is provided with two doors, one giving to the platform b_1 , while the other leads to the ~~pass way~~ passage.

DOORS AND WINDOWS:

The number of outside doors provided for a milkhouse should be limited to the actual number required for convenience in operating it.

To protect the milk and prevent utensils from contamination by flies and dirt, all opening should be protected with screened frames to keep out flies and supplied with sutters to be closed in unfavorable weather. Health departments usually recommend that all outside doors of the milkhouse be paneled and hinged to open into the rooms. Aeration and light are secured by windows and ventilators. The sanitary requirements of the milkhouse are usually met if the window space is not less than 10 percent of the floor area and if the height is evenly distributed.

VENTILATION :

Steam and water used in the milkhouse cause dampness which injures the metal equipment, the utensils, and the wooden part of the structure. To prevent the condensation of steam on the ceiling and to dry off the floors we use 50 x 50 cms ventilators installed 20 cms below the ceiling as well as above the floor. All of them are equipped with shutters and screened against flies, insects and birds.

According to Health Department regulations, one square inch of ventilator space for each square foot of floor space has proved satisfactory.

Exterior walls are of limestone 40 cms thick, while the interior walls are 15 cms block concrete. The roof of reinforced concrete. The floor is tiled with a slope of 1/50 to a bell trap in each room to drain the waste water thoroughly.

p with Carstrad Climax, rve to his heifer Lavender II contest, and the reserve pionship with Cirkbank ce.

Orthorns a Feature

horns appear to hold their Wales, despite the strong hallenge of Ayrshires and he classes were well filled f good type, judging was sy, and was watched with interest and comment by side until the mid-after-

nothing among the senior ars old or over—to with- ins of Messrs. Ashton and ndsome milker, Scottsgrove nderalla 7th. A thousand is a fine type of matron le female champion. The nion was second in the

cow Plasbach from the Uni- ege of Wales, oduction lines, rs. Wooster's Waterloo taking A small string reached the the four-year- s. Eaton Dar- a long, good- v. had been pion at Chester at the Royal Messrs. R. L. ns were second icker Wenallt

om the Duke of would have in the first t for a nervous T. J. Williams er here with a daughter of sire. one white six year old. Duchess 16th won the in-

nd two of her progeny, Jones again led with p and two daughters. Mr.

not overdone, one that should make an attractive bull. Not so neat in the shoulder. Moor-cock Forcast, from Mr. H. D. Bailey, was second.

In the remaining classes only one competitor appeared in each, and firsts went to Mrs. M. A. Dunne's Chadshunt Benjamin the same exhibitor's Chadshunt Bruce, and Mr. R. Morgan Jones's five-year-old bull, Sugwas Corinthian, well marked, and smooth-fleshed. British Friesians

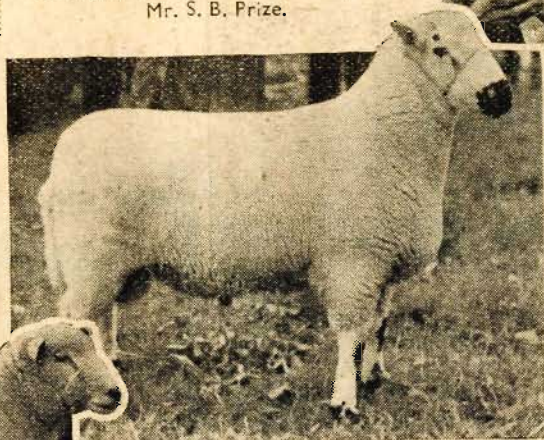


Above: Champion Ryeland cow, from Mr. B. J. Davics.

were disappointing. There was only one animal forward in each of the heifer and cow or heifer class, while the cow class had none forward.

Bulls born on or after January 1, 1946, found a winner in Mr. R. W. Griffiths' Montgomery Romsses, a nice dairy type. Youngest in the class was

Champion Welsh Mountain ram from University College N. Wales (right). Champion Kerry Hill ram (below) from Mr. S. B. Prize.



★
"Farmer and Stock-Breeder" photograph

★

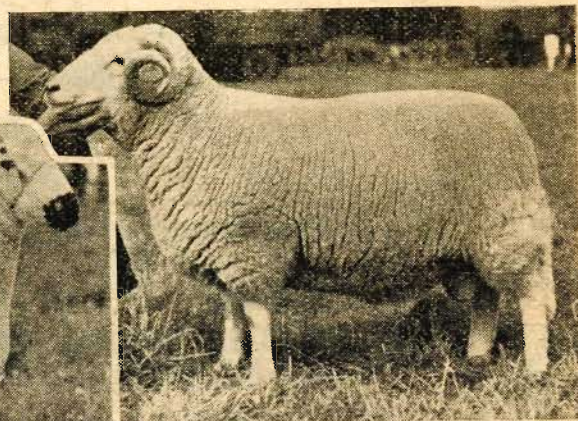
swept heedlessly between animals on parade.

Mr. R. Ewart Owen started a good day by parading his 1946 Prestatyn Duke (a winner at Hereford) to lead the senior boars. A promising youngster this. Second came a four-year-old which pressed the leader hard, Messrs. S. S. Eglington and Son's Letton Long Thirty. After that the class tailed off.

Quite a good lot of 1947 boars saw Messrs. Eglington win, followed by Messrs. S. J. Evans and Sons' Rhoswen Prince and Mr. H. Williams' Gwentland Turk.

Among Senior Sows

Another Hereford winner topped the senior sow class for Mr. Owen, Prestatyn Pride 5rd, a wealthy good-quality sort that had littered 11 only a few day before and which looked remarkably fit after a 160-mile journey with nine pigs. Mr. H. Williams was second



Duke; reserve Letton Long Thirty. Champion female was Mr. Owen's Pride 5rd; reserve Dunsley Flora. The sow was supreme champion and the boar was reserve.

Large Whites were the only other breed on parade and they made a moderate display. Only two senior boars were out, Aintree East Lad 10th winning for Messrs. James Ruddin, Ltd. The Cardiff Royal Infirmary Convalescent Home were second with Barry Mollington.

Again there were only two 1947 boars, Messrs. Ruddin again scoring with Aintree East Lad 18th, who had already done some winning. East Lad 10th won the boar medal with East Lad 18th as reserve.

The female and over-all champion was the leading sow, Llysfasi Primrose 7th from Llysfasi Farm Institute. She was well turned out, has a good underline and shows plenty of quality. Behind her stood the older Aintree Carillon 45th from Messrs. Ruddin, Ltd., and she was reserve female and over-all champion; This sow is showing her age now but is long and of the right type.

The best gilt was Ty-To-Maen Bonetta

3 - SHEEP PEN

Plate N°3 shows the general drawing for a sheep pen. It is located on a dry and well drained ground where there are no obstruction to sunlight and good air. It is located within the area that is to be used as pasture and forage and it has its own silo and storage rooms.

Although sheep and lambs should be provided with enough shelter to protect them from storms, they should be allowed to run in lots or in fields in fair weather. These lots are located adjacent to the pen in order to prevent sheep from taking needless exercise.

According to same specifications, an area of about 10 square feet or one square meter exclusive of space for racks should be allotted to each sheep.

The pen shown on plate N°3 is :

25 x 12 = 300 square meters

area of racks 5 x 1 x 10 = 50 " "

net " " the pen 300-50 = 250 " "

which is sufficient to house 250 sheep. Therefore we must use four like pens to house 1000 sheep on our farm.

DISCUSSION AND ANALYSIS OF THE PLAN :

The plan of the pen shows the followings:

- 1 - A wooden feed rack 10 meters in length, one meter in width, 1.20 meters in height. Its side view is shown on plate N°3
- 2 - A silo 4.00 meters in diameter, 10.50 meters in height.
- 3 - A feed room 4.00 x 3.00 meters in area
- 4 - A grain B in " " " "
- 5 - A small lamb creep made of hinged panels which permit the lambs to eat from the same trough as their mothers.
- 6 - Fences made of movable panels, used to feed the sheep during the fair weather.

The pen is built of limestone 40 cms thick, provided with 10 windows, and, 10 simple doors, the upper half of each one is of glass and used as a window.

The floor is of earth and the roof is of reinforced concrete. All other essential sanitary points and explanations concerned with the sheep pen are the same as explained in the cow stable.



Timely Tips

From
**POULTRY TRIBUNE
EXPERIMENTAL FARM**

By **BENTLEY WILSON**, Superintendent



Standards for Egg Production

	For November	For 12 Months
All-Pullet Flock	13	180
All-Hen Flock	4	135
Pullets and Hens Mixed.....	12	170

THIS is the first year that we have housed a 100 percent all-pullet flock on Poultry Tribune Experimental Farm.

It makes a big difference in the overall appearance of the laying pens on the farm. There are no more pens of molting ragged old hens rapidly going out of production; instead, all pens are full of pullets that are fully feathered, smooth, healthy, and well pigmented.

Our early hatched pullets are laying heavily, and the later hatched ones are just getting into stride, so each day the daily total egg production for the farm goes up. With eggs at their seasonal high in price, the whole production pic-

ture on the farm makes everyone happy.

For several years about this time in the fall we have always had an outbreak of colds in one of our big laying houses. In this house, previous to this year, we have always placed the best old hens from all the other pens on the farm. These old hens, being heavy producers and subjected to a change in surroundings so late in the laying year, usually molted and went out of production after moving. In addition to being out of production, we have always felt that the old hens were responsible for the carry-over of colds from year to year. Our experience this year has further strengthened our belief that we were right, as we are now housing pullets only, and none of them have shown any indications of colds this fall.

Our experience with this carryover of disease from old stock did teach us one thing—the value of sulfathiazole for the treatment of colds. When colds broke out, we secured several pounds of sulfathiazole and fed $\frac{1}{2}$ of one percent mixed in the regular laying mash for three days. It seemed to stop the colds

Ten Things to Do in November

(We suggest that you keep this list handy and that you check the work you need to do this month against it.—Editor)

- 1. This is the last chance to make repairs on the laying house before cold weather strikes.
- 2. Be sure to provide artificial lights for the early housed pullets. Up to a fourteen hour day can be supplied.
- 3. Follow the feeding plan recommended by the manufacturer of the mash you are using.
- 4. Remove any out-of-condition pullets, or birds that apparently are not going to make good producers, as quickly as they are noticed.
- 5. If your laying house sets up off the ground and there is not a good foundation around it, bank it with straw or anything else that may be available to prevent cold winds from blowing underneath the floor.
- 6. Do you have plenty of feeding space for all the hens in the laying house? The amount of feeding space per bird will depend on the feeding system used. If the mash system with hand-fed grain is used, provide at least 20 lineal feet of feeding space for each hundred hens.
- 7. Were your pullets as healthy and heavy as you wished this fall? If not, now is the time to begin to make plans for providing plenty of green range for the rearing of young stock in the future.
- 8. Laying hens are creatures of habit; set up a feeding and management program and follow it from day to day.
- 9. Burn or bury deeply all dead birds from the laying flock, and better yet, dig a disposal pit.
- 10. Now is a good time of the year to locate a good market outlet for your eggs. Marketing on a graded basis over a year's time will net the largest returns.

A well managed flock of early pullets means lots of large eggs in November, the high priced egg month. If you don't have such a harvest this fall, it isn't too early to begin planning for in 1947. (PT Farm Photo)



almost immediately. We had to give an individual capsule treatment to a few hens that did not respond to the flock treatment, but on the whole, we were able to check the infection.

If sulfathiazole is used, it should be fed according to the directions of the manufacturer furnishing it or according to the instructions of a veterinarian.

Stopping fall colds is not just a matter
(Continued on page 33)



IDEALIZED "CHICKEN-OF-TOMORROW" prepared by National Chicken-of-Tomorrow Committee and painted by Artist A. O. Schilling.

Poultry Tribune, Mount Morris, Ill., Nov. 1946

3 - POULTRY HOUSE

Plate N°3 shows the general plan and, cross-section for a poultry house.

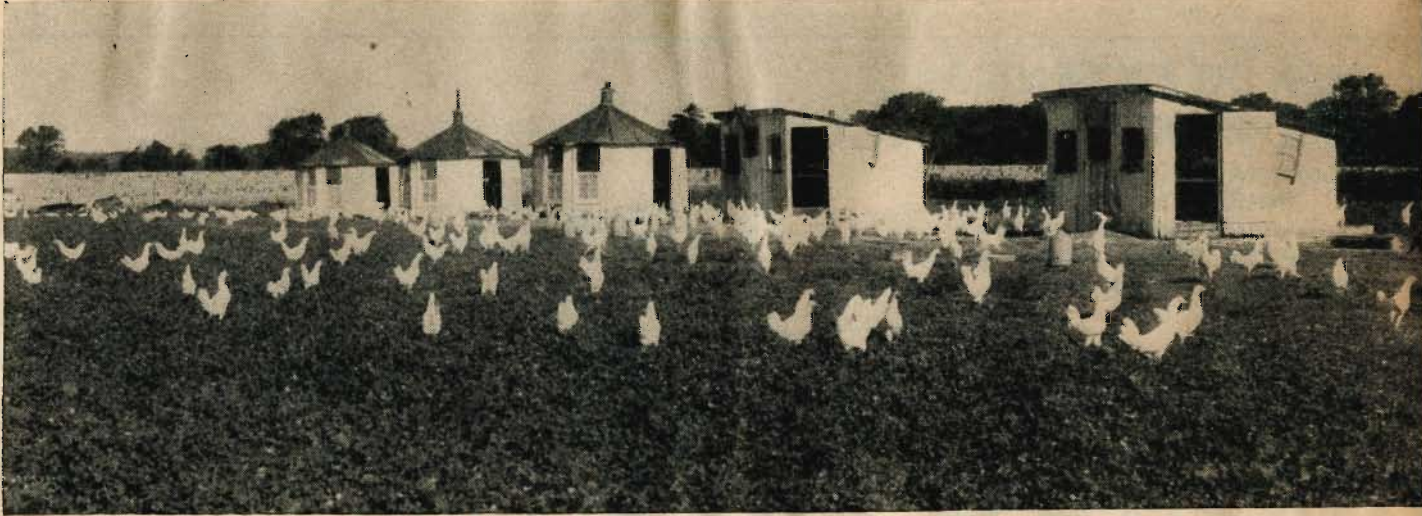
It is a long one story house (Fig. 1) constructed of limestone 40 cms thick, with its front facing the south making it possible to get sun light on both sides.

It is located on a well drained, light sandy soil, slightly slopping to the south.



(Fig. 1) A long poultry house

There are many types of poultry house as in (Fig.2)



(Fig. 2) A colony type.

The first type is preferred by most farmers. A decided advantage of the long type is its adaptability for many other uses if the farm enterprise changed and, the poultry business is discontinued.

According to "Charles H. Reed", in long houses an area of about 3.50-4.00 square feet of floor space should be allotted to each bird.

The house by itself occupies an area of :

$$10 \times 20 = 200 \text{ square meters}$$

$$200 \times 10.8 = 2160 \text{ square feet}$$

which is able to house about 600 hens. Building two houses on our farm we can be able to house 1200 hens.

WINDOWS :

The purpose of poultry house ventilation is to replace moisture and foul air with fresh air in winter, and to keep the house as cool as possible in summer.

The ventilation of poultry houses may be accomplished by the windows themselves taking precautions to avoid drafts on the birds.

The recommendations of the different agricultural colleges on the amount of window glass are, vary from 3 percent to 16 percent of the floor area.

Our poultry house is equipped with one

1.20 x 0.90 window for every 25 birds

e.i. $\frac{3}{4} \times 1.20 \times 0.90 = 0.80$ square meters of glass for every
 $25 \times 3.50 = 88$

square feet of floor.

or $\frac{3}{4} \times 1.20 \times 0.90 = 0.80$ square meters of glass for every 8
square meters of floor

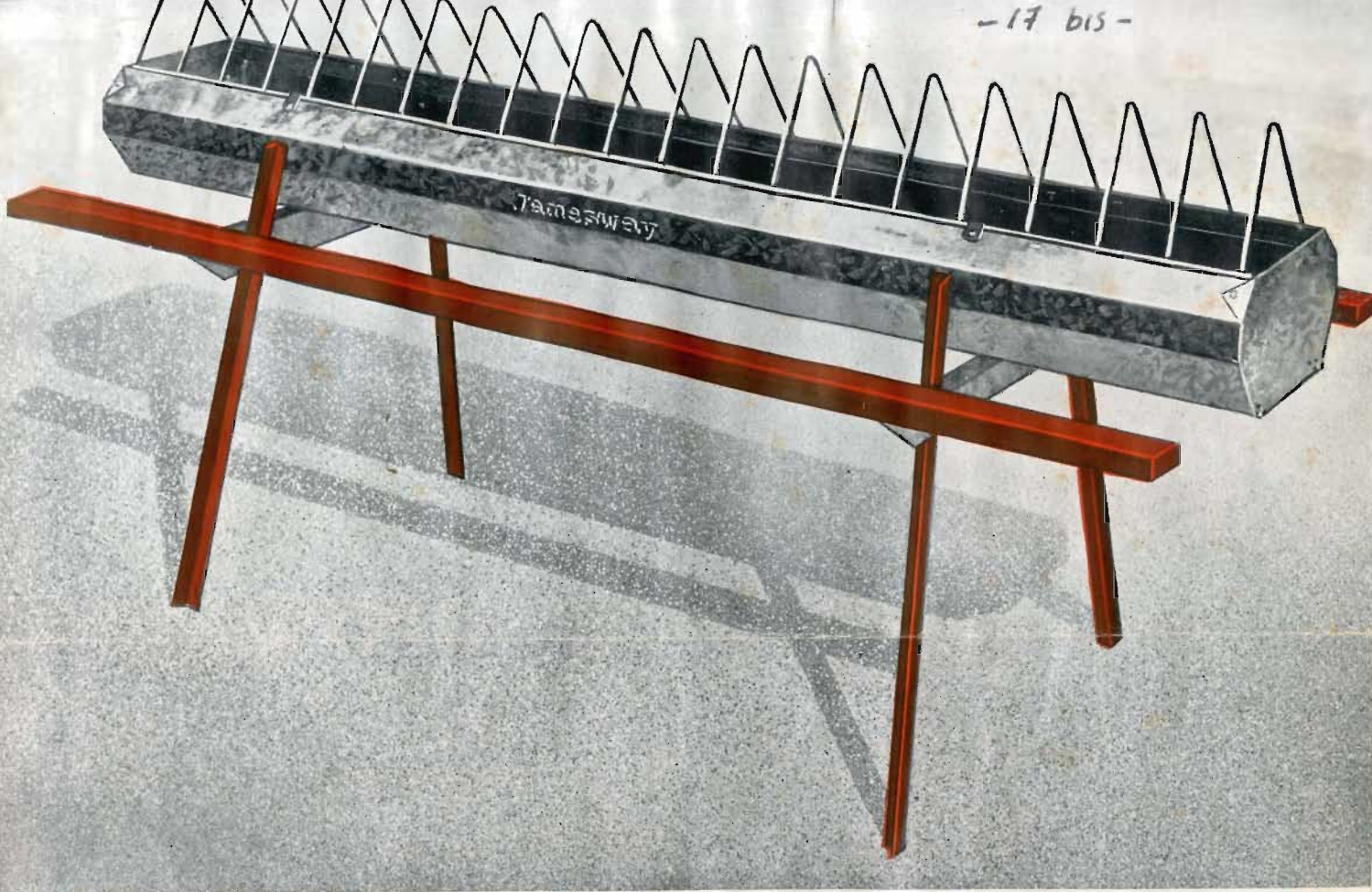
The percentage is $\frac{0.8}{8} \times 100 = 10$.

DISCUSSION AND ANALYSIS OF THE PLAN :

Plate N°3 shows the general plan of the poultry house on which we can see the followings:

- 1.- A feeder (Fig.3) 2 meters in length 25 cms in width 50 cms in height constructed of heavy galvanized iron sheets.

-17 bis-



OPEN TROUGH 525 FEEDER

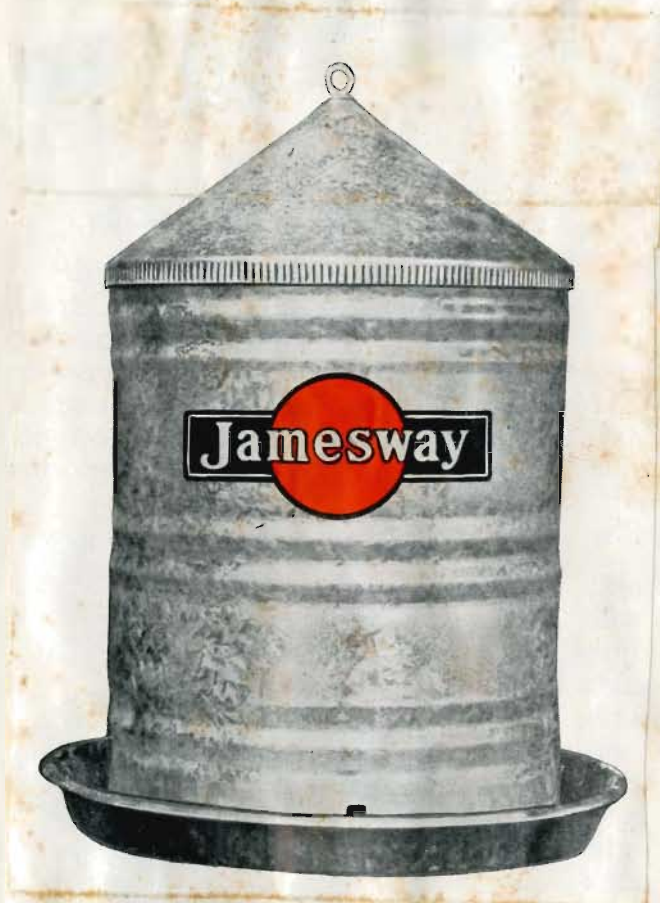


Fig. 3

292 FEEDER

A very popular, practical feeder for baby chicks

2.- A 40 liters waterer (Fig.4) supplies water for 100 to 200 birds for a whole day without refilling. It is 35 cms. in diameter, 45 cms in height.



(Fig. 4) Waterer

3.- Roast on which the hens sleep.

4 - A feed storage.

5.- A 3.00 x 4.00 meters incubater room.

6.- A 4.50 x 4.00 meters brooder room.

7.- Standard nests (Fig.5), 5 feet in length, 13 inches deep, 28 inches in height.



(Fig.5) A nest.

5 - FARMER'S RESIDENCES

The farmers working on the farm are divided into two groups

A - The marrieds.

B - The bachelors.

Each group has its own residence.

A.- COTTAGE FOR MARRIED FARMERS

Five houses are built to house the families working on the farm, with an additional house for the foreman.

Each plot has an area of one donem. The building itself occupies an area of 103 square meters including the porch. The plan and the main façade are shown on plate N°6.

The plan contains the following component units.

- 1.- A living room 5.00 x 4.00 meters in area. It is provided with three doors one giving to the porch, while the other two lead to the dining room and to the passage.
- 2.- A bed room 4.00 x 3.80 meters in area
- 3.- A bed room 3.60 x 3.20 " "
- 4.- A toilet room 2.40 x 1.60 " "
- 5.- A kitchen 3.60 x 3.00 " "
- 6.- A dining room 3.00 x 2.45 " "
- 7.- A porch 2.80 x 1.20 " "
- 8.- A passage 2.70 x 1.70 " "

The whole house is raised 60 cms above the natural level and 4 steps are built for such a purpose.

The house is 3.74 meters in height

" doors are 2.20 " " "

" windows " 0.90 " above the floor level.

B - LODGINGS FOR BACHELOR WORKERS

The plate N°5 shows the plans and the façade for this type of residence. It is a two stories unit.

The first floor is composed of two wings.

a - Left hand side allotted to house the permanent farm workers.

b - Right " " " " " " temporary labourers as, technical men, experts and drivers.

each wing contains the followings:

- 1.- Bed rooms 3.60 x 3.00 meters in area, 3.50 meter in height, provided with their own closets.
- 2.- A toilet room containing two leathes, two w.c. and three wash hand basins.
- 3.- A sitting room 6.00 x 5.80 meters in area, 4.08 meters in height, provided with 3 doors, one going on to the arcade, while the others leads to the dining room and to the corridor.
- 4.- A dining room 6.00 x 4.40 meters in area: 4.08 meters in height.
- 5.- A kitchen 5.00 x 4.40 " " " serving the two adjacent dining rooms.
- 6.- A stair-case-room which leads to the second floor with 25 steps.
- 7.- An arcade 12.80 meters in length, 2 meters in width equipped with 5 columns.

The second floor occupy an area of about 10 square meters excluding the stair-case-room. It is a small house occupied by the cook's family. Its plan shows the followings:

- 1.- A sitting room 5.00 x 4.40 meters in area provided with doors leading to the different units of the house.
- 2.- A bed room 4.18 x 3.00 meters in area
- 3.- " " " 4.18 x 2.85 " " "
- 4.- " kitchen 4.60 x 2.85 " " "
- 5.- toilet room 1.85 x 1.70 " " "

Aeration and light through the whole building are secured by windows, 1.20 meters in height.

6 - OWNER'S RESIDENCE.

It is a two stories villa built on a hill slopping toward the southeast, where we could build a small underground floor containing:

1. A 6.20 x 3.40 garage.
2. A 4.00 x 2.20 store.
3. A 4.00 x 3.00 office to meet the farm workers.
4. A 2.80 x 2.80 waiting room.

These units communicate with the first floor through an underground stair. All these components are shown on plate N°4.

The first floor of the villa is raised about one meter above the natural ground level. All around the main façade extends a wide U-shaped verandas with 6 steps, at the entrance, 20 cms in width, 17 cms in height.

Plate N°4 shows the plan which contains:

- 1.- A hall 6.80 x 5.20 meters in area containing a stair which leads to the second floor.
- 2.- A salon 6.00 x 5.20 meters in area
- 3.- A library 3.80 x 3.20 meters " "
- 4.- A cord room 5.40 x 4.40 " " "
- 5.- A dining room 5.40 x 4.40 " " "
- 6.- A kitchen 4.00 x 3.80 " " "
- 7.- A guest room 4.20 x 4.00 " " "
- 8.- A toilet room for the guests 2.40 x 2.20 meters in area, and a front space communicating with the guest room on one side and with the hall on the other.

- 9.- A maid room 4.00 x 2.80 meters in area
- 10.- An oriental bath 3.00 x 2.50 " " "
- 11.- An oriental W.C. 1.40 x 1.4 " " "
12. Verandas.

The second story occupy an area much smaller than the first, it contains the followings:

- 1.- A hall 6.80 x 5.20 meters in area.
- 2.- A main bed room 6.00 x 5.20 meters in area provided with its own bath and closet.
- 3.- A nursery 4.00 x 4.00 meters in area
- 4.- A bed room 4.00 x 3.40 " " "
- 5.- A bed room 6.00 x 4.00 " " "
- 6.- A toilet room 2.40 x 2.20 " " "
- 7.- A stair case leads to the roof.

~~7. GRANARIES~~

7.- GRANARIES AND STORES.

Granaries are built to store wheat, ~~1~~barley and, corn, as for the other products such as beans, peas, cottons, and lentil are stored in boxes.

Plate Na 6 shows the general plane of the above stores, which is made up of five silos, grain towers -, 3.40 meters in diameter, 10.50 meters in height. The inner walls of the silos should be smooth, in order to prevent clogging, to facilitate insect control, disinfection and, general cleanliness.

8.- TOOL SHED AND WORK SHOP.

Plate N°6 shows the general plan and, section of a tool and machinery shed.

On the plan we can see the followings:

- 1.- A 1.00 x 6.00 meters work shop for repairing and, general overhaul.
- 2.- A 6.30 x 4.00 meters tool shops.
- 3.- Parkings for tractors, harverters, ploughs, and trucks.

The side walls are built of limestone 30 cms in thickness. There are no front walls constructed to allow free parking. The floor is slopping outward to prevent accumulation of water.

III.- SEWER SYSTEM AND WATER SUPPLY.

One of the most important problems is that of sewer system. Since the buildings of the farm are extending along the bank of the river we can dispose the foul water and refuses in the river using a sewer system.

Three independent lines of sewer are used as shown on Plate N°1.

- 1.- Which disposes the foul water of the dairy
- 2.- " " " " " " " owner's residence
- 3.- " " " " " " " worker's residences.

all these sewers are constructed of rubble masonry with cement mortar.

Water for irrigation is supplied from the river by gravity to some areas and by pumping to the others.

Domestic water is supplied from drilled wells. The water is pumped from the wells to an elevated tank built on the ^{highest} ~~highest~~ point at 50 meters from the main road, to supply all the units of the farm.

The distribution of water to the different units will be by buried steel pipes.

IV.- CONCLUSION

In designing this problem, I have confined myself strictly to its buildings and their sanitary conditions such as: farmer's residences, stables, stores... etc., because the other phases of this project need some highly trained specialist in agriculture, irrigation and soil mechanics.

V.- DRAWINGS

Drawings represented in a special pasteboard, include:

PLATE N° I - Lay-out

PLATE N° 2 - Cow stable and dairy

PLATE N° 3 - Sheep pen and, poultry house

PLATE N° 4 - Owner's residence

PLATE N° 5 - Lodgings for bachelor workers

PLATE N° 6 - TOOL SHED AND WORK SHOP. Series of granaries.

Cottage for married Formers.

VI.- SELECTED REFERENCES

Data and requirement were obtained from:

- a - Prof. N. Manasseh A.U.B.
- b - Mr. Mahmoud S. Shawwaf B. Sc; ing agricultural Engineering.
Texas University.
- c - The following books.

<u>Author</u>	<u>Title of books</u>
H. Eckles	Milk and milk products
H. Eckles	Dairy cattle and milk production
C.L. Roadhouse	The market milk industry
W.C. Coffey	Productive sheep husbandary
W.A. Lippincatt	Poultry production
H.R. Lewis	Productive poultry husbandary
B.A. Keen	The agricultural development of the Middle East.
H.B. Allen	Rural education and welfare in the Middle East.

- d - The following magazines:

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Former and stock Breeder 1947-1948

Nature Flock.

