DAIRYING.

CLEAN MILK PRODUCTION AND DISTRIBUTION.

S. STRATTON.

(Mr. S. Stratton is a small holder under the Surrey County Council, and in 1924 won the first prize in the County Clean Milk Competition. The following article gives an account of his own impressions, estimates and practices.)

To the ordinary farmer the subject of clean milk production is inevitably linked up with the question of the relative return on his investment of capital and effort. He cannot be expected to assume the role of public benefactor for the sake of the national health; or to take steps to improve the quality of his present product without some guarantee that he will not be a loser financially by so doing.

THE NEED AND DEMAND FOR CLEAN MILK.

If in the present circumstances, necessitating no additional equipment, a man can readily sell all the milk he produces, and if, moreover, he sees little probability of the wholesale buyer bearing any part of the extra cost of producing a cleaner article, then it is unlikely that there will be any marked improvement in the cleanliness of the milk delivered to the public.

It is not easy to determine whether cleaner milk is really in demand by the public, whose ignorance about milk and indifference to considerations other than the time it will keep in usable condition and the amount of cream it contains, are made evident by the ready sale which sterilised, pasteurised and condensed milks enjoy.

Clean fresh milk is stated by competent authorities to be one of the essential foods for young children. Yet, instead of insisting that milk should be clean enough for children to consume in a fresh, uncooked condition, housewives are content to "scald" all milk before using it, assuming that "stunned" or dead germs are less harmful than active or living ones. But cooking destroys some vitamins as well as germs, and scalded or heated milk lacks the pleasant, sweet flavour that is such a commendable quality in the clean, raw article; and anyone who is content to go on buying or using other than clean, fresh milk is delaying the day for national improvement in this respect.

Grade "A" milk costs more to produce than does ordinary milk, but not so much more as to make the price prohibitive. The development of its use is hindered, however, by the fact that many purchasers take no interest; and as long as the more cheaply produced article finds a ready sale it will always be forthcoming.

Pre-supposing a real demand on the part of the retail buyer for the cleanest milk that can be produced at the ruling price, the main point is to ensure that clean milk production is profitable; and the purpose of these notes is to show that milk of Grade "A" standard can be produced at a cost that is not prohibitive either to the farmer, retailer or consumer.

HOW GRADE "A" MILK MAY BE PRODUCED.

The writer cannot lay claim to a life-long experience of milk production, his knowledge of the subject having been gained by practical experience, and from sources of instruction and information provided by County Agricultural Committees chiefly during the last six years. He can, however, claim to be a producer of clean milk from the business man's point of view; having commenced to sell milk from his own cow about eighteen months ago with a daily sale of three quarts, and now selling the produce of fourteen cows.

Necessary Equipment.—An opportunity was provided by the first Surrey County Clean Milk Competition held in 1924 to discover whether with the extra equipment necessary, one could expect to produce clean milk. The extra equipment consisted of :—

(a)	A "Grada" milk filter	£3. 0. 0
(b)	Two Davies milking pails	,, 2 0 0
(c)	Milking overalls and caps	,, 2 0 0
(d)	Steriliser	,, 1 10 0

The above are found to be absolutely essential. A few words as to the steriliser. Not wishing to purchase an expensive article, a steriliser was improvised from an existing copper; a large wooden lid with holes bored therein, rested on the copper, and above this was an inverted galvanised iron bin moved up and down with a pulley and rope. This equipment is sufficient to sterilise all ordinary dairy utensils, and was most satisfactory. A Barford and Parkins steriliser has now been installed for greater convenience.

Clean Work.—In the actual washing of utensils the order of procedure is as follows: they are first washed with cold water; then with hot water using "Sterolene;" then rinsed in cold water; and finally sterilised. When the old steriliser was used, as it was throughout the clean milk competitions of 1924 and 1925, the buckets, milk cooler, and filter had to be removed from it to make room for bottles, stools, etc., the buckets only being placed upside down on a rack and the rest of the utensils put into a closed cupboard until required. With the new steriliser all utensils can be left in the steam chamber and there dried automatically; the steriliser is opened momentarily to let out the steam and then closed. With this method no tendency to rust has been noticed.

Weekly limewashing and monthly scraping of the cowsheds and cooling room are a necessity. Such work is not a luxury—a limewasher works very quickly and is an effective germ killer.

The Buildings.—The buildings are of the ordinary kind adapted for cowsheds, with steel yokes and standings, concrete floors, and open channel drainage. The shed in use at first had no lighting or ventilation; a glass louvre light 5 ft. by 3½ ft. placed in the south end wall, and two windows 3 ft. by 2 ft. facing west and east in the roof remedied these defects. The size of the cowshed with 14 standings is 45 ft. long by 15 ft. wide.

The milk cooling, bottling and sterilising plant is at the moment all in one room, 15 ft. by 12 ft. in area; this arrangement, though satisfactory, is not desirable and an existing shed is now being adapted to give two separate rooms for these purposes. The sterilising room will be 12 ft. square, and the cooling and bottling room 12 ft. by 15 ft.

An ordinary 15-in. cooler is here employed for cooiing, water being used from a 1,000-gallon rain water tank in a covered yard. The temperature of the milk in this case was reduced to 52°F. in winter and 56°F. in summer, which appeared satisfactory as no complaints were received about

the keeping qualities of the milk. In the new cooling room there is a 200-gallon tank into which water is pumped immediately before cooling from a 100-ft. well. With this it is now possible to obtain a summer milk temperature of 52°F.

Another drawback common to many farms is that the manure yard is adjacent to the milk cooling room, and the fact that the milk has to be carried through a chaff-cutting room which separates the cowsheds from the dairy presents a further difficulty. It is obvious, therefore, that such equipment and buildings are not those belonging to a rich farmer with "money to burn" as is frequently suggested by possible entrants for county clean milk competitions. In spite of these generally recognised drawbacks the writer has been able to send in samples of milk for analysis in the 1924 and 1925 competitions, all of which would be classified as Certified Milk having regard to bacterial count and absence of coliform organisms.

Cleanliness.—There are, however, certain rules of procedure in the cowsheds which overshadow in importance most questions of buildings and equipment, apart from the fact that in all work it must be recognised that any handling of milk tends to increase its germ content.

Cows must be groomed daily; udders clipped and tails shortened when required and washed frequently. Before milking, the flanks and udders should be freely washed with plenty of water with one cloth and dried with another; this latter is an important detail. These cloths must be thoroughly washed and sterilised every day. Opinions appear to differ as to the effect of continued washing on the health of the udder. In my small herd since this treatment the cows have been free from udder trouble, and provided that the udders are well dried and that the water used is not too cold, there seems to be little fear of ill effects, but rather the contrary.

Litter should be absent from the cow standings while milking is in progress: where this is impossible it should be thrown forward clear of the milker. Mangers must be free from foods, especially hay and straw or those, such as turnips or silage, that may convey taints to the milk. The floor of the cowshed must be washed at least once a day; and it is a further advantage to have some disinfectant in the water. Cowmen must wear overalls and renew caps twice a week, and their hands must be kept scrupulously clean. This latter point is of primary importance; a clean towel daily and proper hand-washing accommodation are therefore required. If the milker's hands are not perfectly clean all other efforts to produce a clean sample are hindered. The fore-milk must be discarded. Milk is drawn into dome pails and carried immediately into the cooling room, not being allowed to stand about in the cowshed.

COST AND DISTRIBUTION.

The allowance usually made of an extra cost of 1*d.* per gallon on an average output of 36 gallons a day (see table below) covers all charges for extra labour; a larger output would decrease this allowance. Unlimited capital and resources, with no necessity to make the business pay, are not the prime factors in clean milk production. The writer commenced producing clean milk with the object of making more money than was being obtained by selling the milk in bulk. It was realised that it was impossible to compete with existing milk retailers when working on their lines, and it was resolved to test the idea that a ready sale is always found for a better article at the same price. The results have justified expectations and anyone who is prepared to bear the extra cost will no doubt have the same experience.

"Clean Milk: Bottled at the Farm" is the slogan. Any milk producer can enter for his County's Clean Milk Competition. The entrance fee will be his only expenditure in order to discover whether he can produce the commodity continuously. The grooming and extra attention to the cows

must improve their health: clean business-like, regular methods of procedure will be good for the morale and interest of the cowmen employed: surely the type of employee to whom improved and modern methods do not appeal is unsatisfactory in every way. Obviously it is not possible for every milk producer to become his own retailer: distance from a town, existing population, means of transport and like considerations make this impossible. On the other hand, if everyone for whom it is practical proposition were to do so, on lines similar to those the writer has worked out for himself, the problem of clean milk production and delivery should be well on the road to solution.

For distributing the bottled milk, 2 Dunelt sidecar-van combinations specially designed for the purpose are used. The vans carry up to 20 gallons of bottled milk in wire crates with ease and reliability: the cost of running is about 1½*d.* a mile, excluding the driver. Milk is delivered once daily and empty bottles are collected at the same time. By using the wire crates the number of breakages is small, in spite of rough roads encountered in many parts of the round.

The question of having the herd tuberculin-tested and selling tuberculin-tested milk has often been considered, but has so far been ruled out as a practical commercial proposition, on account of the limited local market and high retail price for that milk.

For an average output of 40 gallons a day, the extra overhead charges for equipment, distribution and incidental expenses are well borne by the extra 1*d.* a gallon over the price obtained when milk is sold in bulk.

If milk is produced clean, and then sold in bulk to be bottled at a large centre, the extra cost must be shared by the wholesale buyer. Bottling is the only way milk can be delivered and kept clean. Dirty milk will not keep in bottles unless previously treated in some way. Why should anyone be content with "treated" milk when the clean, fresh article is within the bounds of possibility? It is for the farmer to produce the article and convince the buyer of its merits.

The following table of costs is included to show how the 1*d.* per gallon increase in cost of production is made up:—

Extra Labour.		*Per Week.*		
Daily washing and grooming of cows: 2 hours	...	14		hrs.
Special washing of cowsheds daily: ½ hour	...	3½		,,
Limewashing cowsheds: weekly	...	1½		,,
Scraping and cleaning cowsheds and cooling room: 4 hours per month	...	1		,,
Sterilising of equipment daily: 1 hour	...	7		,,
		27		hrs.
27 hours at 8*d.* per hour	...	£0	18	0
Cost of coal and wood is 6*d.* per day. Total cost per week	...	0	3	6
		£1	1	6

This works out at an extra cost of 1*d.* per gallon on a daily output of 36 gallons (=3*s.* per day, or 21*s.* per week). Much of the work included in the table of costs is obviously already required in any cowshed, so that a generous allowance is shown for the extra work.—Journal of the Ministry of Agriculture, Vol. XXXII, No. 8.