THE SOUTH AUSTRALIAN DAIRYMEN'S . . . Journal

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EURARIE RADIANT JINGO
Leading Sire of the Lanac Stud
G. O'H. GILES — LANAC — MOUNT COMPASS

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Sire—

JINGO'S GRACEFUL LAD (Imp.) 13124, H.C.

The highest rated Jersey Sire in Australia. 114 daughter records av. 505 actual.
Superior Sire. Prepotent for High Test.

Crowning Standard of Lynn 8205, H.C.
Four Star Bull. Sold for £1,250.

By Jingo's Rush 48876, H.C.
Supreme Champion over Jersey Island.

Age	Milk	Test	B/fat
10	8,547	5.84	500
11	10,303	5.88	606

Winner of numerous prizes.

Crowning Aim of Lynn 7919, H.C.

Lynn's Graceful Lady, 52972, H.C.
3 times Champion over Jersey Island.

Age	Days	Milk	Test	B/fat
5	305	7,372	6.41	473
6	305	7,932	6.29	500
8	305	12,206	6.32	776
9	305	11,553	5.95	688
10	305	11,530	5.96	687
11	305	12,636	5.88	743
12	305	11,598	6.07	703

Rush Fern's Oxford Jnr., 7020, H.C.

By Jingo's Golden Princess, 33758, H.C.

Dam—

EURARIE VELVET 11th 6816, V.H.C.

Age	Days	Milk	Test	B/fat
1 y. 10	300	8,700	5.21	453
2 y. 11	300	11,055	5.25	580
4	300	11,490	5.14	590
5	300	10,838	5.29	573
6	300	11,940	5.7	675
7	300	13,080	5.4	706
8	300	12,330	5.5	671
9	300	13,695	5.6	761

8 year aver. 626 lb. b/fat. Full sister to E. Velvet 9th, H.C., 8 year aver. 624 lb. b/fat.

Belgonia Observer 2nd 8568
Superior Sire by Aim High.

Aim High (imp.), 7072, V.H.C.
Meritorious Sire.

Belgonia Junette 19th, 90464, V.H.C.
Has an aggregate of 3.740 lb. b/fat.

Eurarie Velvet 4th 35984, H.C.

Age	Days	Milk	Test	B/fat
Jun. 2	300	9,891	5.11	505
Sen. 2	273	11,187	5.0	539
Sen. 3	300	12,114	4.97	603
5	300	13,620	5.15	702
6	300	14,115	5.11	721
7	300	11,274	4.55	513
8	300	13,620	4.54	618
9	300	13,860	4.84	671

Leading Cow, A. Reg. of M.
Top Jersey 2 year old, 8 year average 614 lb. b/fat.
By Belgonia Junette 26 lb. Aim—the great proven sire.

Belgonia Junette 26th Aim, 3846

Eurarie Madeira Velvet 3rd, 35970, H.C.

Age	Days	Milk	Test	B/fat
Jun. 2	273	7,620	4.78	364
Jun. 3	273	8,373	4.72	395
Jun. 4	273	9,043	4.69	434
Mature	273	10,166	4.75	477
Mature	300	11,130	5.07	564
Mature	273	9,300	5.41	503
Mature	300	7,268	5.11	371

THE SOUTH AUSTRALIAN DAIRYMEN'S JOURNAL

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GENERAL PRESIDENT'S ANNUAL REPORT FOR 1964-65

PRODUCTION AND SALES

The dairying industry over much of Australia is, at this moment, suffering the effects of a drought which will effect the Commonwealth's output of dairy produce not only during the present season but also for some time to come, for it will take time, money and good management to restore cattle numbers and productivity to their previous levels, and we extend our sympathy to our fellow dairyfarmers in their plight. It is, therefore, gratifying to be able to report that, despite an unpropitious opening to the season, dairyfarmers in the Adelaide milk supply area produced, for the fifth year in sucession, a record output, the total of 48,501,000 gallons being almost 60% higher than that in 1959/60, the year which marked the beginning of this sustained upward trend, and representing an average production of well over 600 gallons per cow.

The sales of liquid milk have continued to rise in step with the increasing metropolitan population and, for the first time, exceeded 20 million gallons, but this amount wos not sufficient to halt the contniued downward trend of the ratio of consumption to output, which now stands at 41.74 per cent., and we have asked the Milk Board to review the situation in the light of the assurance given in 1963 that the Boord would keep the position under close observation and not hesitate to take action should it consider that it is in the best interests of the industry to do so.

The Association has, fortunately, been able partly to offset the effect of the decline in the ratio of liquid milk sales by a further successful application to the Milk Board for a rise in the liquid milk price, the 2½ pence per gallon increase gazetted on 6th September, 1964, representing the third increase gained by this Association for licensed producers since 1959, to give a total increase in this period of sixpence per gallon out of a total rise of eightpence in the retail price.

I am pleased to be able to report, also, that, as the result of our request, the Milk Board hos accepted the principle of applying o surplus milk loading to the assesed production cost as partial compensation for the necessity to provide, at all times, a morgin above the metropolitan area's daily requirements.

PRODUCTION COSTS

Nevertheless the Association believes that many licensed suppliers are now at a stage of efficiency where further increases in productivity are becoming more difficult to achieve, and the continued decline in the ratio of liquid milk

sales must, in these cases, be causing serious hardship. Consequently the Association made a request to the Milk Board for a revision of the method of assessing the results of the Production Cost Survey, in order to give effects to the Board's concept of a fair return to producers at the lower level of eligibility. It is to be regretted that the Board has replied that at this stage it is not prepared to alter the basis of the Survey in the manner suggested.

In vindication of the frequent criticism of the alleged "inefficiency" of the dairying industry we may, I believe, take pride in the fact that, despite increases in the cost of many of the factors employed, the average production cost per gallon, as measured by the Milk Board's survey, has actually decreased slightly since 1959, and I congratulate the producers whose improving standards of husbandry and productivity have brought this about, but we must, at the same time, realise that there is an economic limit to the improvements than can be achieved, and the special sub-committee appointed to examine the Survey has submitted a case to the Milk Board for a reappraisal of certain factors which, it is believed, may be causing an unrealistically low figure in the final results.

MILK EQUALIZATION

It is rather paradoxical that the increased productivity per farm and per cow that has followed from better methods and management, and which has enabled production costs to be held stable has, at the same time, led directly to the fall in the ratio of liquid milk sales and so adversely affected farm income, and concern has on occasions been expressed as to the part played by the Metropolitan Milk Equalization Scheme as contributing to this unsatisfactory state. In company with the General Secretary I was fortunate in being able to attend in April, the inaugural Wholemilk Conference of the Australian Dairy Farmers' Federation, and to learn at first hand the details of wholemilk supply in the major capital cities. Certainly from the discussions at this Conference I can say that the adoption of a contract scheme would cause dissension and an inescapable increase in overall production costs, and I consider it most significant that, as the result of our contribution to the Conference, great interest was shown by delegates from other States in the Milk Equalization Scheme, and that only last week our companion association in Western Australia, where thought is now being given to vesting in the Milk Board the power to acquire ownership of contract milk, asked for further details in explanation of the operation of our Scheme.

There is, however, the possibility that a plan similar to that submitted in 1959 to the Dairy Industry Committee of Enquiry by a group of agricultural economists for dairy produce generally, could be grafted into the present Equalization Scheme in the hope of slowing down the decline in the liquid milk sales ratio. Your executive Committee, after making earnest and sympathetic examination of the effect of such a plan, believed that there was a strong probability that any benefits from the plan would apply only to sections of the industry, and there was no clear indication of any overall benefit to licensed producers as a whole, and that the introduction of such a plan be not recommended.

CHEESE AND BUTTER

In the feld of manufactured dairy products I am pleased, in view of our over-riding interest in cheese manufacture, to be able to report a moderately satisfactory position in regard to both domestic and export sales.

There is every possibility that the consumption per head for the year has been maintained at the record level achieved last year, and the consequent

Monetary return from the domestic market has been further augmented by the increased wholesale price which has applied during the year.

In the export market the improved prices, which in the case of the United Kingdom, reached, for rinded cheese, from November through January, 260 shillings (Sterling) per cwt., the highest figure for five years, failed to offset the substantial reduction in quantity, and although Australian shipments to the United Kingdom were greater than those of the previous year, actual sales in that country showed a sharp decline. The price for rinded cheese has now fallen to 253 shillings, but it must be noted that the current figure of 260 shillings for rindless cheese is only 10 shillings below the December peak, and indicates that there is still a good demand for cheese of the quality that is supplied in the rindless product.

In markets other than the United Kingdom exports maintained their previous levels, and although the spectacular rise in sales to Japan, which, from 1959, increased threefold each year, has been halted, Australia remained the leading overseas supplier to this country which has now become our second best customer.

THE ECONOMIC POSITION

In view of the fluctuations that the industry has experienced in recent years, the results of the year just passed have been, to some extent, reassuring, but they must, nevertheless, be viewed in the light of the continuing effect of the economic squeeze which has been calculated by the Bureau of Agricultural Economics to amount, in the year under review, to an increase of 5.6 per cent. in the prices of goods and services entering into the cost of dairy production. In the case of butter, the position is far from satisfactory, where the decline in consumption per head of little over 23 pounds has prevented, despite the growth in population, any increase in the total of domestic sales, whilst the price realized on the United Kingdom market has declined to 319 shillings (Sterling) which is 15 shillings below the ruling rate for the previous year.

MARGARINE

The efforts of the industry to increase the sale of butter through promotion are being nullified by the increase in margarine sales, and we now have in this State a situation where the margarine legislation, which has been scrupulously observed by the local manufacturers, is under challenge from interstate manufacturers claiming protection under the Federal Constitution. Whatever the outcome, we must be gratified by the stand by the Minister of Agriculture in upholding the integrity of the margarine legisaltion and in giving his assurance that every possible action will be taken to protect the position of the dairying industry.

RETAIL PRICES

Because of the state of the market for butter, the industry has been forced to give earnest consideration to the wisest use of its powers in adjusting domestic prices for dairy produce, and the ready acceptance of an increased price this time last year, following the basic wage rise, has not been repeated, as the industry believes that it is desirable to await the results of the almost completed A.E. Cost Survey before taking action, although this Association declared itself in favour of an interim adjustment based on the Cost Index movement, with a subsequent adjustment at the conversion to decimal currency. But despite the fact that this Association was outvoted on this matter, it is a matter for gratification that we have, through our membership of the Australian Dairy Farmers' Federation, effective representation on all the policy-making bodies, including the Australian Dairy Industry Council, the Australian Dairy Produce Board, the Commonwealth Equalization Committee Limited and the Australian National Dairying Council, and that, in another field we have representation on the

Australian Society of Dairy Technology, of which our General Secretary is Divisional President.

BULK MILK HANDLING

In the field of technology the most significant matter ot the moment is the introduction of refrigerated bulk milk handling from farm to factory, and although the technique has, as yet, not been adopted by any of the factories supplied by our members, a lively interest is being shown by all sections of the industry, and the Association has gathered a wealth of technical and economic data which is available to anyone seeking guidance or information. The data that has been gathered is such as to indicate that the subject is more complex than was, in some cases, imagined, and it is unfortunate that the merchants have not accepted our invitation to a conference of interested parties which could act as an interchange of ideas and derive a uniform code of practice.

LIAISON WITH THE AUSTRALIAN PRIMARY PRODUCERS UNION

One of the accomplishments of the past year has been the formation of a Liaison Committee with the Dairy Committee of the Australian Primary Producers' Union, and two of the scheduled half-yearly meetings have been held. The purpose of the Committee is to examine the areas in which the two organizations have a common aim, and the two meetings have demonstrated how wide are the fields of mutual interest in comparison with those where policy is in conflict.

OTHER ACTIVITIES

The Association has been active not only in relation to costs, prices and legislation, but as always, has concerned itself with every conceivable facet of the industry insofar as it affects the dairyfarmer, and, in order to be able to deal expeditiously with these other subjects, has formed a number of special sub-committees, the reports of which indicate the wide range of our interests. Although progress in the matters dealt with by these sub-committees may appear at times ot be slow, it must be remembered that the action that we seek is not always in our power to accomplish directly, but must be carried out through other State and Federal organizations, through statutory authorities and government departments, and even through Parliaments themselves, each and all of which must be convinced of the necessity and desirability of our case.

I am, therefore, gratified to be able to assure you that our relationships with those bodies are most cordial, and there are few occasions on which we are given less than the maximum co-operation ond opportunity to present our viewpoint. Consequently I wish to express my grotitude to the officials concerned, particularly the Minister of Agriculture to whom I extend my congratulations and good wishes, to the members ond staff of the Metropolitan Milk Board, ond to the officers af the Department of Agriculture.

To the delegates to the Central Council, the members of the Executive Committee and the Sub-Committees, and to the staff, I express my gratitude and my belief that with mutual trust and genuine co-operation what we achieve will be to the benefit of all.

H. E. LOECHEL,

General President.

Statistics

ADELAIDE METROPOLITAN MILK SUPPLY AREA

PRODUCTION (000 gallons)

	For Month		Total since July 1		Total since Jan. 1	
	1964	1965	1963/64	1964/65	1964	1965
June	3,192	3,354	44,395	48,501	18,840	19,990
July	3,565	3,848	——	——	22,405	23,838

SALES (000 gallons)

	For Month		Total since July 1		Quota %		C.M.B.	
	1964	1965	1963/64	1964/65	1964	1965	1964	1965
June	1,644	1,725	19,646	20,245	51.5	51.4	2/3¾	2/4¼
July	1,712	1,772	——	——	48.0	46.0	2/1	2/3¼

Moving Average Quota for 12 months ended 30/6/65, 41.74%; 31/7/65, 41.62%.

INTERIM PRICES TO LICENSED SUPPLIERS

(All prices are interim only and subject to adjustment by restrospective payment)

	Basic	C.M.B.	Total	3%	3.5%	4%	4.5%	5%
1965	(per lb. butterfat)			(per gallon)				
June	3/10¾	2/4¼	6/3	1/11¼	2/3	2/7	2/11	3/2¼
(cents)	38.96	23.54	62.50	19.35	22.51	25.80	29.02	32.25
July	3/6½	2/3⅜	5/9⅞	1/9½	2/1¼	2/4¾	2/8½	3/-
(cents)	35.42	22.81	58.13	18.00	20.94	24.00	27.00	30.00

LONDON PROVISION EXCHANGE QUOTATIONS

(Sterling Currency)

	June		July	
Butter—Choicest Australian	334/–	321/–	334/–	319/–
Cheese—First Grade Australian	238/–	245/–	238/–	245/–
Rindless Australian	247/–	260/–	247/–	260/–

OPENING BASIC PRICE, 1965-66

Following the practice over the last few years of relating the opening level of equalization values to the Government underwriting rate, which continues at 40d. lb. c.b. the Commonwealth Equalization Committee has determined an opening rate of 239/4 cwt. cheese, the same rate as at this time last year.

However, owing to increases in the cost of transport and the rate of the Australian Dairy Produce Board levy for export marketing, promotion and research, the opening basic price for licensed producers in the Adelaide Metropolitan Supply Area has been reduced by ½d. lb. b.f. to 3/6½, compared with 3/7 in the previous year. However, there is every likelihood of an early increase in the interim rate.

RETROSPECTIVE PAYMENTS

The final payment for 1963-64 of 1.583d. lb. butterfat, will be paid early in October, at the rate of 13/16d. lb. equalized to licensed producers on all production during that period. As the result of this payment the final basic price will be 54.10d. lb. b.f., and the final equalized price 73.25d., both rates being the highest since 1960-61.

A step-up in interim values for 1964-65, including the final bounty for that year, will be paid early in November at an estimated rate of just over 1½d. lb. b.f. equalized.

ALL-TIME RECORDS IN OUTPUT AND SALES

Production in the Adelaide metropolitan milk supply area was at a record level in the financial year just ended for the fifth successive year, being 9 per cent. higher than that for 1963-1964. Sales of whole milk in the metropolitan area, and the total sales of whole milk by equalizing merchants, also continued to rise at a rate in excess of the rate of increase in the population of the metropolitan area, although this may be due to the fact that the fastest growing areas, although included in the "metropolitan area" as defined by the Regulations under the Milk Supply Act, are not included in the statistical definition of metropolitan area.

Comparison of Recent Years—Adelaide Milk Supply Area

Year	Total Production (000 gallons)	Sales of Whole Milk and Cream (000 gallons)	Ratio %
1964/5	48,501	20,245	41.7
1963/4	44,600	19,646	44.3
1962/3	41,244	18,928	46.1
1961/2	38,562	18,393	47.7
1960/1	34,135	18,148	53.2

ARE YOU PAYING TOO MUCH LAND TAX?

Despite widespread publicity (and an article published in an earlier number of this Journal) there appears to be a large number of dairyfarmers who are still paying more land tax than necessary, or even paying tax when none at all is required.

The position is that when land is used for primary production no Land Tax at all is payable where the unimproved value of the land (as assessed by the Land Tax Department) does not exceed £2,500, and the rate of Land Tax is considerably reduced where the unimproved value does not exceed £6,250.

If the assessment issued by the Land Tax Department shows an unimproved value of less than £6,250 you are advised to apply immediately to the Department for an application form for exemption. If you do not have an assessment, but consider that you may be partly or fully exempt, you should apply in any case.

Although application forms should be lodged by 31st August, it is confidently believed that applications received early in September will be considered.

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You'll get healthier development and better herd stock with Kaf-O-Milk at a fraction of the cost of feeding whole milk. Kaf-O-Milk has proved to be a profitable investment for dairy farmers everywhere. Order a trial batch now and watch your poddies . . . and your profits . . . grow!

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DOCTORS USING BUTTERFAT IN CURES

Early in July a man walked into the Association's office and asked whether [we] knew anything about a "butterfat regimen" for gastro-intestinal troubles. He had, three days before, been discharged from hospital after treatment for a haemorrhaging ulcer, and had been instructed by his doctor to adopt the butterfat regimen." He had since been all over Adelaide trying to find, without success, someone who could give him advice on the regimen and tell him where he could obtain the special unsalted butterfat on which the regimen was based, and it was only by chance that he had come across our office whilst delivering goods in Leigh Street.

To us this was a notable occurrence, for it indicated that, after eight years, the work undertaken by a Brisbane research team, and reported in the June issue of the New Zealand "Journal of Science," had been accepted by the medical profession in a practical way.

We were able to give him, from our records, a description of the regimen, as we had been kept informed, during the last few years, of the progress of the research, and we were also able to make arrangements for a supply of butterfat in cans from the Queensland Butter Board, but we were rather disturbed that within the industry no one, apart from ourselves, happened to have any knowledge of the treatment.

BRISBANE RESEARCH TEAM

The basis of the regimen is the replacement, by butterfat, of all other fats or oils in cooking, and the credit for the work goes to Mr. G. W. Coombes, general manager of the Queensland Butter Board; Mr. P. W. Parodi, a research chemist, and Dr. D. A. Kaye, a Brisbane medical practitioner.

Their research carried on from studies undertaken overseas on the nutritional effects of heated oils and fats on laboratory animals.

Depending upon the type of liquid, the extent of the heating, and the amount taken in the diet, pathological disorders observed had ranged from loss of weight to death after a few days.

RESEARCH ON ANIMALS

The early laboratory effects had been obtained by using fats heated beyond the stage ordinarily reached in cooking, but in 1956 Johnson, Sakuragi and Kummeron had fed corn-oil, margarine base stock, and butterfat, heated to 392 deg. F. for 24 hours, to weaning rats.

With corn-oil the rats suffered severe diarrhoea, and decreased food intake, and were characterised by rough fur; under similar conditions margarine base stock gave slight growth depression; **with butterfat no adverse effect was observed.**

HUMAN PATIENTS RESPOND

The Brisbane team worked, not with laboratory animals, but with human patients already suffering from gastro intestinal disturbances of various types, making observations on the effect of altering the type and amount of fat in the diet and defining the maximum temperature to which the fat was heated.

The experimental procedures used were:

- Changing the pattern of fats used by a group of persons who had been long-term chronic sufferers from digestive disorders and agstro-intestinal disturbances;
- Employing tests of which the patients were unaware;
- Studying the effects of butterfat on two cases of chronic diarrhoea.

THE FIRST EXPERIMENT

In Experiment 1, three were selected 38 volunteers who, as diagnosed by their own medical practitioners, were suffering from digestive disorders or other gastro-intestinal disturbances.

One of the team as a medical practitioner, confirmed the diagnosis to ensure the validity of the selection, but at this stage no X-ray examinations were made. The examination of the patients continued at regular intervals during the trials.

In this experiment, the effect on gastro-intestinal complaints of substituting butterfat for other cooking fats previously used by the patients in the preparation of fried foods and other foods cooked in fat was studied. The detailed instructions given to the patients for preparing their food were as follows:

MEATS: Remove all visible fat. For frying use a minimum amount of butterfat for one operation only, varying from, say, 6 g for a thin steak to 30 g for crumbed fish cutlets, pancakes, etc., and adjusting the amounts so that the cooking vessel is free of fat when cooking is complete. For oven-baking use a rack, and brush on butterfat at intervals during cooking, or baste with a mixture of equal parts of butterfat and flour.

VEGETABLES: Steam in saucepan with 3 g of butterfat and a quarter-inch of water. (Cabbage is first shredded and no water added.) For oven roast treat as for meat. For frying, sear on both sides at 350 deg. F. and then reduce to 300 deg. F. For baking, sear and crisp at 400 deg. F. and then reduce to 350 deg. F.

OTHER FOODS: Do not eat cooked foods containing fats other than butterfat. In all domestically prepared cakes, pastry, biscuits and confectionery use only butterfat.

Of the 38 who followed the instructions, 32 were cured or improved to the point of not suffering pain after eating baked or fried meals.

THE SECOND EXPERIMENT

In Experiment 2, tests were carried out on four people over a three-weeks period using butterfat and household used beef-and-mutton dripping in coded cans, both coloured and indistinguishable.

The persons concerned were not aware the tests were being made with the fats used in the preparation of their foods. Neither the arranger of the experiments nor those preparing the food were aware of the nature of the fat used at the point of issue.

CASE 1: Male 18 years. Throughout life this patient had a "liver disorder" necessitating a low fat diet. Symptoms—dizzy headaches and vomiting.

RESULTS—During a period of two weeks when butterfat was used for cooking, the patient was able to eat all foods including fries and bakes, without experiencing any trouble.

DRIPPING USE DISCONTINUED

On the third week when dripping was used in place of butter there followed on the second day headaches and a general feeling of illness. On the third day a severe headache and vomiting developed. The use of this fat was discontinued and when the patient returned to butterfat the symptoms disappeared.

CASE 2: Male 38 years. This patient had suffered from "stomach ulcers" for four to five years. (Diagnosis not confirmed prior to commencement of test.) Symptoms—dyspepsia, indigestion and pain.

RESULTS—During the first and third week when butterfat was used, the patient ate fried fish, chops, steak and onions, also cabbage boiled with teaspoon of fat without any discomfort.

In the second week when dripping was used, it was noted that after two of the meals which consisted of fried steak and two fried topside mince rissoles, with cabbage boiled with a teaspoon of fat, the patient suffered severe indigestion and dyspepsia, so the use of dripping was discontinued.

CASE 3: Male 37 years, Duodenal ulcer for 20 years. (Diagnosis not confirmed prior to commencement of test.) Symptoms—dyspepsia and pain after meals.

RESULTS—During the first and second weeks butterfat was used and the patient felt very well with no pain after meals and no dyspepsia.

On the third week dripping was used. After the first meal consisting of fried rissoles he suffered severe dyspepsia and pain after meal, so the use of this fat was discontniued.

CASE 4: Male 52 years. Nervous dyspepsia for six years. Symptoms—dyspepsia, nervous tension, and vomiting.

RESULT—On the first week when dripping was used he suffered during the first two nights from dyspepsia, vomiting and nervous tension. The use of this fat was therefore discontinued. On the second and third weeks when butterfat was used for cooking no disorders after meals were experienced.

THE THIRD EXPERIMENT

The cases reported below record the effect of Experiment 3 on two patients suffering from gastro-intestinal disturbance:—

CASE 1: A returned soldier, as a prisoner of the Japanese during World War II, had been constrained to work for over a year on the construction of the Burma railway line. On his return to Australia he continued to suffer from chronic dyspepsia, vomiting and diarrhoea, and was unable to work.

About three years ago he was put on the dietary regimen. After three months he returned to work as a labourer since when he has suffered no digestive disorders nor gastro-intestinal disturbances.

CASE 2: A returned soldier 57 years of age had been diagnosed as suffering from ulcerative colitis for 19 years, with chronic haemorrhaging and diarrhoea—up to 12 motions a day being not unusual. After three months on the dietary

regimen, the haemorrhaging had ceased and diarrhoea occurred only after emotional stress.

WORLD-WIDE RECOGNITION

Publication of the report, considered a most important contribution from Queensland in the national and international field of dietetic research, already has brought congratulatory messages from the United States of America and New Zealand.

In a letter to Mr. Coombs, Professor W. H. E. Reid, of the University of Missouri, U.S.A., said the work of the Queensland team could have a great impact on the dairying industry of the world.

He advised that he had forwarded copies of the report to eight U.S. scientific journals for publication.

Dr. F. B. Shorland, Director of the Department of Fats Research, Department of Scientific and Industrial Research, N.Z., told Mr. Coombs he had confidence that, in due course, "you will be looked upon as something of a pioneer in the field of designing experiments to test the effects of foods on humans."

BUTTERFAT VERSUS MARGARINE

It is somewhat ironic that whilst scientists on the one hand are seeking to demonstrate that butter is the culprit in the increasing incidence of coronary diseases, and that margarine (or at least a specially prepared type of quite expensive margarine) provides the counter to the disease, other scientists are proving that, in that other scourge of civilized man, digestive disorders, butterfat cures what other fats, including margarine, have caused.

BUT IT IS ALSO MOST DISTURBING THAT WHILST THE FIRST EXAMPLE HAS RECEIVED NATION-WIDE AND WORLD-WIDE PUBLICITY, THE SECOND EXAMPLE IS PRACTICALLY UNKNOWN AND UNRECOGNIZED, EVEN WITHIN THE DAIRYING INDUSTRY.

If our patient had suffered not from ulcers but from heart trouble, it is impossible to imagine him not being able, anywhere and anytime, to find someone to tell him where he could find out all about poly-unsaturated margarine. Why then should he have to go to so much trouble, and then only by chance, to find out what he wanted to know, AND EVEN THEN NOT BE ABLE TO BUY IN ADELAIDE THE VERY THING HIS DOCTOR HAS PRESCRIBED?

FOOT AND MOUTH WARNING

Tests at an animal disease research institute in England have revealed that some Australian native fauna have, under experimental conditions, a degree of susceptibility to infection with foot and mouth disease virus.

The Commonwealth Minister for Health, Mr. R. W. Swartz said this recently.

Mr. Swartz said arrangements had been made with the director of the research institute (at Pirbright, in England) and the C.S.I.R.O. to continue the tests so that the practical implications of the initial findings could be assessed.

He said the susceptibility or otherwise of indigenous Australian fauna to foot-and-mouth disease could be a factor in planning the country's defences against the disease.

Because there was no foot-and-mouth disease virus in Australia, it was necessary to have the tests carried out overseas. Late in 1964 a consignment of 60 Australian fauna including kangaroos, wallabies, wombats, bandicoots, possums, echidnas and marsupial mice and rats had been sent to the research institute at Pirbright.

A C.S.I.R.O. scientist had gone to Pirbright to carry out the tests. Because of the findings so far it was now necessary to send to the institute a further consignment of about 20 kangaroos.

Mr. Swartz said that while it had been found that some marsupials could be experimentally infected with foot-and-mouth disease virus it was not yet known whether marsupials infected in this way could transmit the disease back to farm livestock.

Mr. Swartz emphasised that the results so far did not necessarily mean that Australian native marsupials could be significant carriers of foot and mouth disease.

CANADA'S NEW DAIRY POLICY DISCOURAGES SURPLUS

A new dairy policy, designed to provide a national average return to producers of $3.50 per 100 lb. milk (2/10 Australian per gallon) for domestically used milk for manufacture, is now in operation in Canada.

The objective of an effective national average price to manufacturing milk and cream producers equivalent to $3.50 per 100 lb. milk, based on 1964-65 production will be achieved through two programmes:

(1) A deficiency payment plan, coupled with direct subsidy and export assistance designed to ensure a national average price of $3.30 (2/8 Australian) for domestically used manufacturing milk and cream.

(2) A supplemental payment to manufacturing milk and cream producers which will, in total, be approximately equal to the difference between the $3.30 support level and the target price of $3.50, based on 1964-65 production.

The supplementary payment will not be made to producers who marketed less than 10,000 lb. of milk (less than the production of two cows) during 1964-65. However, to ensure equitable treatment of smaller eligible producers the supplementary rate will reduce as production rises, the rate ranging from 25 cents per 100 lb. (2½d.) for the first 47,999 lb. of milk (9½ cows) down to 10 cents per 100 lb. (1d.) for all milk in excess of 95,999 lb. (19 cows).

It is estimated that about 200,000 producers will be eligible for the supplementary lump sum payment, and that the average payment per producer across Canada will be slightly over $100 (£A41).

The support programme is being based on domestic use in order to discourage the build-up of new surpluses, and the costs of exporting will be deducted from the deficiency payment fund. Thus as surplus production will tend to reduce the support level it will be in the producers' own interests not to over produce.

CANADIAN POLICY VERSUS AUSTRALIAN

The stated intention of the new policy is "to discourage the build-up of surpluses and **to protect the interests of Canada trading partners in the export market.**"

That this is in contrast to official Australian policy is shown by the recent statements of the Deputy Chairman of the Australian Dairy Produce Board (Mr. J. P. Norton), who said: "Too many people in the industry equate the word "surplus" with adverse conditions, and build-up of excess stocks is considered little short of disastrous. I am firmly of the opinion that we should not be afraid of a surplus. . . . It follows that there must always be a surplus after favourable seasons if the market demand is to be satisfied in times of adversity."

Increase in the Use of Nonfat Dry Milk for Animal Feeding

Denmark imported approximately 19,000 metric tons of nonfat dry milk during the first half of 1964, more than double the quantity imported in the same period the previous year. The Netherlands for the year 1964 imported a little over 100,000 metric tons of nonfat milk solids, mostly for calf feeding. These imports have contributed significantly to reducing the large surplus stocks previously held in various countries of the world.

ARE CHAROLAIS THE DAIRYMAN'S ANSWER FOR VEALER PRODUCTION ?

In the March-April issue of the Journal the A.B. News-Letter referred to Charolais cattle being established on the Isle of Man. We have since had several enquiries concerning the significance of this item, and why it should have formed part of a news-letter about artificial breeding.

Fact of the matter is that in the world-wide increase in beef production dairy herds, the Charolais breed has come to the fore because of the far more rapid liveweight gains from Charolais dairy cattle crosses than from other beef-dairy crosses, and the following article from N.S.W. gives the reason why.

The massive Charolais cattle from France could offer the Australian dairy farmer a rewarding "second" income in the form of vealers.

The popularity of vealer and yearling classes of beef has introduced a new production concept.

As distinct from the traditional steer production, where animals are grown and then fattened, the simultaneous growing and fattening of cattle of young ages is a beef production method on its own.

It is in this field that production of beef from dairy herds—rather than from beef herds—has a growing place.

BOBBY CALVES

The dairy industry also offers a cheap source of potential meat in the form of the "bobby" calf.

About one million such calves are slaughtered each year and at least a third of these, suitably managed, could be used for production of high quality veal, vealers or yearling beef.

The development of this practice in many parts of the world is no accident or fad. There are sound economic and physiological reasons behind it.

Dr. I. D. Wardrop, of the University of Sydney, points out that as beef breeds have been selected for many years for steer beef production it is not surprising that producers have difficulty in consistently producing high quality prime—as distinct from forward store—vealers and yearlings from these breeds. Under normal grazing conditions, calf liveweight gain to weaning is largely determined by milk intake.

Therefore, calves reared on dairy cows usually have a higher rate of gain than those reared on the relatively poorer milking beef cows.

IMPORT SEMEN

The increase in beef production in Britain has come mainly from crossbred beef from dairy herds and, in fact, in Scotland 80 per cent. of the beef production comes from dairy cows.

Close to home, New Zealand has taken a major step in this direction. The Dominion realises that if it is to keep in the protein market to meet the growing world demand, it must continue to develop the quality of its livestock by bringing in new breeds.

NEW ZEALAND

A maximum security quarantine system will make possible the introduction of the new blood strains through the New Zealand livestock industry.

For many years veterinarians have been justifiably wary of bringing in outside breeds to stimulate the national herds because of the danger of importing diseases which could jeopardise the national economy.

But a maximum security quarantine system, for which Government legislative approval has been given, will provide a safe passage for the importation and testing of new breeds from overseas.

First to arrive would perhaps be Charolais. Experiments show that Charolais-Jersey cross herds could boost New Zealand's veal trade without adversely affecting dairy production.

Charolais semen is being introduced into New Zealand for evaluation of Charolais cross with Jersey, Friesian and Ayrshire breeds. In this, the Department of Agriculture is working in close co-operation with the Herd Improvement Council of the New Zealand Dairy Board under the supervision of the Director of Agricultural Research.

BLUE TONGUE

In the case of Charolais, it has been claimed that France is subject to blue tongue and foot-and-mouth disease.

France has never had an outbreak of blue tongue and because of a new policy of slaughtering infected stock, foot-and-mouth is kept under close control.

The British Ministry of Agriculture recently authorised the importation of 200 Charolais heifers. Bulls were introduced into Britain in 1961.

The aim nowadays is to produce more protein and less waste—fat and bone—and it is doubtful if this can be achieved solely by the former method of trial and error which can take many years.

In 1962 a series of national trials with Charolais was begun in Britain to obtain comparative information on birth weights, calving and calf mortality, growth rate, efficiency of feed conversion and evaluation of the final carcass—all under various management systems. This work has involved most of the traditional British beef breeds and crosses in addition to Charolais.

The trials are being held in three categories, two of them by the Ministry of Agriculture and the third on commercial evaluation by the Milk Marketing Board.

The first 26 Charolais bulls were imported by the Ministry of Agriculture in Britain in November, 1961. Sixteen of these were placed at Milk Marketing Board artificial insemination centres and ten at private centres. They were first made available for service in March, 1962.

From this date until the end of August, 1964, 73,623 inseminations had been carried out representing an estimate of 55,000 calves born to date.

Results in Britain are far from complete and even if they were considered wholly successful there, they would not be conclusive for any other country. However, sufficient evidence has emerged from the British trials to justify evaluation under New Zealand conditions.

GROWTH RATE

For example, the Ministry of Agriculture tests revealed that the average liveweight gain for Charolais cross was greater by about 5 per cent. for both steers and heifers than for crosses from British sires.

Killing-out percentages also favoured the Charolais crosses and there was a marked food conversion advantage.

In the Milk Marketing Board tests so far, Charolais-Jersey calves have averaged out about 68 per cent. heavier than pure Jerseys, and the steer calves have shown consideroble beef potential, achieving a two-pound live weight average gain each day.

Because of speciol development in the hindquarters and along the back, the Charolais cross has gained an advantage in the yield of high-price cuts from the carcasses.

Some doubts arose during the early stages of the trials. There were reports of a higher incidence of calving difficulties and a high calf mortality where the sire was a Charolais. But now it appears that both of these are lower than could have been expected in view of the heavier birth weights of the calves.

There was also some criticism that the usefulness of Charolais cross for veal production was reduced because of the calves' slow performance. It is now known that this criticism was based on cases where the quantity and quality of food were insufficient.

In the meantime, the case for the introduction of of Charolais sires to develop veal production is building up. Experiments suggest that New Zealand farmers could expect from the Charolais cross bigger calves, an excellent growth rate and food conversion ratio and better-than-average yields of meat from the higher priced cuts—all without any detrimental affect on butterfat production.

The case against Charolais rests solely on the danger of bringing in exotic diseases. But the fact is that the New Zealand Department of Agriculture's veterinary dragnet would undoubtedly arrest and eliminate any infection long before New Zealand domiciled stock became exposed.

QUARANTINE SYSTEM

The maximum security quarantine system would be new to New Zealand but has been established for some time in Eire and Canada, and in a modified form, in Britain.

The New Zealand Department of Agriculture would, no doubt, adapt and modify the system to suit their country. But this is basically how the system would work:

The Charolais would undergo a prolonged inspection in France by New Zealand veterinarians, who would investigate the disease status of the animals and the farms and districts in which they live.

The veterinarians would then accompany the beasts to New Zealand, where they would be off-loaded directly into a maximum security quarantine station on a site yet to be chosen.

The animals could be quarantined for up to two years, but when they emerge one thing would be certain—the cattle would be disease free.

FEEDING CAN AFFECT CONCEPTION RATES

By T. J. McCLURE, Department of Veterinary Medicine, University of Sydney.

(Condensation of a paper read at the 1965 Conference of the Australian Veterinary Association)

A high stocking rate is one of the important factors leading to high per-acre production which is the key to efficency on dairy farms where pasture or its products comprises the whole or nearly the whole source of food. A high stocking rate does, however, bring its attendant problems; it renders the cattle sensitive to adverse climatic conditions reducing the supply of pasture, and it does demand of the farm manager a high standard of management, particularly in autumn and winter.

Failure to feed cows adequately during the early lactation period (and the physical capacity of cows to eat sufficient pasture is limited during this period) will result in (a) the failure of the cows to reach their peak yield and subsequently a reduction in daily yield during the remainder of lactation, and (b) a lowering of the conception rate (or as it is more correctly known, non-return rate) and resultant delay in subsequent calving. While in herds with all-year-round mating and calving, the effect of this lowered fertility may be limited to the few cows being mated during the period of nutritional stress, the failure of cows to calve at the desired time does seriously affect the maintenance of uniform milk yields and milk quotas. Furthermore, the forced purchase of springing or freshly-calved cows to maintain these quotas is expensive, renders the herd susceptible to introduction of infections, and prevents culling on a production basis.

Experiments have been conducted by the Department of Veterinary Medicine on the McGarvie Smith Animal Husbandry Farm at Badgery's Creek, in the past four years to find out the noture of the apparent nutritional cause of infertility first recognised in spring-mated pasture-fed dairy herds in the Waikato district of New Zealand.

It is now apparent that underfeeding (though at this stage there is still the possibility that some aspect of pasture quality may also be involved) during the calving-mating period resulting in a loss of body weight of between 5 and 10 per cent. (i.e., 50-100 lb./1000 lb.) of the weight during the first week after calving, will couse a drop in first service conception rate to below the minimal acceptance standard of 50 per cent. Losses of body weight of this magnitude are not easily assessed visually. Recovery occurs spontaneously after a period which may vary from one cycle, 3 weeks, to 3 months or even longer. Up to the present, hay and, in N.Z., hay and/or silage supplements have been used in attempts to prevent low fertility. No information is available on the value of concentrates.

In the Badgery's Creek experiment the conception rate of cows fed 10-14 lb. of hay per cow per day from the time of calving until three weeks after mating was 62 per cent. compared with 13 per cent. of the underfed cows. At present there are no tests available to assist in diagnosing this cause of infertility and although endeavours are being made to find such tests along with a study of the physiological changes involved, early success is not expected. This is because of the spontaneous recovery which usually occurs and the fact that the signs, body weight and others will probably have disappeared when the problem is examined.

The fact that the syndrome bears some resemblance to vibriosis and trichomoniasis is a cause of concern for the veterinary surgeon investigating low-conception-rate infertility problems.

These studies do not imply any criticism of the value of pasture as food for dairy cows. Pasture feeding is by far the most economical method of feeding dairy cows where adequate pasture can be grown.

THE PRESENT DROUGHT AND ITS EFFECT ON FERTILITY

At present the results of this experimental work on underfeeding of pasture fed cows in the McGarvie Smith herd cannot be directly applied to herds in the drought-stricken areas of N.S.W. In these areas little or no pasture remains for the dairy herd and purchased hay or hay and concentrates comprise the majority of, if not the entire, ration. There is no doubt that adequate quantities of good quality hay and concentrates will enable cows to both milk at high levels and be highly fertile.

There has been little critical research done on the effect on fertility of underfeeding lactating cows. Wiltbank and his colleagues in the U.S.A. have recently reported the results of trials in which mainly hand-fed beef cattle were fed on a low plane after calving. Far fewer underfed cows showed heat periods than did the well-fed cows. These experimental results agree with the common observation that relatively severe degrees of underfeeding can cause failure of cows to show oestrus.

On farms suffering from the present drought, and where sufficient concentrates are not being fed in addition to hay to maintain production, it is likely that anoestrum, or failure to show heat periods, is a common problem, and that this is caused by severe underfeeding.

Wiltbank and his colleagues also showed that the cows on the low plane of nutrition after calving which did show oestrus and were mated were of lower fertility, i.e., more return to service, than the cows on a high plane. Thus these results on underfeeding of mainly hand-fed lactating beef cows agree with the field observations on pasture-fed cows in New Zealand and the results of experiments on pasture-fed lactating dairy cows of the McGarvie Smith Animal Husbandry Form herd.

It would appear, therefore, that low conception rates may be experienced in some of the drought-stricken herds in which the supplementary feeding is inadequate.

No attempt can be made to answer questions on the effect on fertility of possible vitamin, mineral and protein deficiencies which may occur in these drought-affected herds, for such information is not available.

(N.S.W. Milk Board Journal)

Portable Meter Measures Moisture in Hay Quickly

Agricultural engineers of the U.S. Department of Agriculture and the Experiment Station of Texas Agricultural and Mechanical University have developed a portable meter that determines moisture content in hay in three minutes. The new method cuts drastically the two hours previously required by the oven method.

The meter measures the electrical conductivity of hay, producing readings that can be translated directly into moisture percentages. The equipment is inexpensive, easy to construct and easy to operate. It consists of a moisture meter, hydraulic press and hay sample holder. **It will be of special value to farmers for determining livestock feeding quantities, and to hay buyers.**

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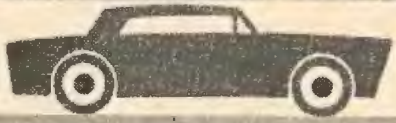

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Milk Fat Holds Key Position in Human Nutrition, declare World Authorities

While there have been many contradictions on the question of animal fats and their relationship to heart disease, the further research proceeds, the greater the contradiction that the scaremongers who decry the use of these fats in human diet are right. This was borne out by an article recently published in "Landwirtschaftlicher Informationsdienst", Switzerland, which was written by Dr. Hellmut Mertins, Munich, West Germany.

The article points out that the well-known Munich nutritionist, Dr. Simon, made it his business to study on a world-wide basis, the findings of scientists working on the problem. Among other things, Dr. Simon maintains that until now not one instance of a connection between atherosclerosis and the concentration of blood cholesterol has been found.

The advantages of certain types of fat in the human diet have been extolled in innumerable publications in the last few years, says Dr. Mertins.

To many it must have come as a surprise that a diet on which parents and grandparents prospered should have suddenly become detrimental to human health. Almost daily, advertising appears in the press drumming into the public the notion that it is possible to keep in good health and reach old age only by consuming vegetable oils and fats.

THE FINAL TRUTH

In the meantime, however, scientists all over the world are trying to discover the final truth about the value of fats (or lack of it).

The well-known Munich nutrition specialist, Dr. Simon, made it his business to study, on a world-wide basis, the findings of scientists working on the problem.

The widely accepted thesis that cholesterol is the main cause of atherosclerosis and, indirectly, of death due to heart infarcts or coronary thrombosis is well-known. The consumption of animal fats, this thesis maintains, causes an increase of the cholesterol content of the blood. Thus, high quality essential foods such as milk, eggs, meat and fish become suspicious in the eyes of the public.

CHOLESTEROL IS VITAL

What is not generally known is that cholesterol is vital and irreplaceable, not only for the removal of waste matter from human and animal cells, but also as the substance from which the acids of the bile and countless essential hormones are taking their origin.

The Austrian researchers Prokop and Halden (Professor Halden is a member of the Council of Experts of the World Health Organisation of the United Nations) pointed out that the human organism outproduces by far any cholesterol absorbed with a normal diet.

Confirming the above findings, Professor Favarger, physiologist, of Geneva, Switzerland, declared at a recent conference of Swiss clinical chemists, "Basing on the present stage of nutritional science, we can affirm without hesitation that alimentary (that is, supplied by food) cholesterol does not have a significant influence on the cholesterol level of the blood."

NOT ONE INSTANCE

Dr. Simon maintains that until now not one instance of a connection between atherosclerosis and the concentration of blood cholesterol has been found. On the contrary, acute atherosclerotic lesions have been found in vegetarians and people living on a vegetable oil diet!

It must therefore be assumed that metabolic disturbance not dietary cholesterol is, in the main, responsible for atherosclerosis and sundry heart ailments.

The current cholesterol theory insists on the advantage of vegetable oils in the human diet because of the high content of unsaturated fats.

VALUABLE FATS

It is time, says Dr. Simon, to revert to the findings of many researchers who call for a reasonable, varied diet, containing the right quantity of really valuable fats. Among them, most important is milk fat, holding a key position in human nutrition because of its high content of irreplaceable vitamins.

"From the point of view of nutritional physiology, medical experience considers butterfat as superior to all other fats," he says.

A highly significant contribution is furnished by Professor Haubold and his collaborators. They were mainly concerned with the connection between the structure of nutritional fats and digestion.

Professor Haubold and his staff found that milk fat, as well as butter, passes through the intestinal wall undivided. Findings of Professor Koop and Dr. Wortmann, of the Federal Dairy Research Institute, Kiel, West Germany, working with electromicroscopic photography, confirmed the importance of structural differences in fats. However, Dr. Simon shows in his work that **artificially created deficiencies of certain fats in humans are impossible** because humans are born with a substantial reserve, used so slowly that it is almost immeasurable.

HEALTH IMPROVED

The well-known nutritionist, Davis, of London, said two years ago, "Man, in contradistinction to animals, can survive without essential fatty acids (found primarily in vegetable oils); on the contrary, his health may even improve."

The question, "How important the essential fatty acids?" says Dr. Simon, has been dealt with in an editorial in a publication of the British Medical Association. The answer: "They are not important!"

Dr. Simon comes to the conclusion that an abnormal supply of essential fatty acids causes not only obesity but also fat hypertrophy of the liver.

The question must therefore be asked: Why should products containing large quantities of essential fatty acids be recommended as suited to the human diet?

(From "Butter Fat and Solids".)

No Week-End Milking?

Swedish dairy farmers are experimenting in eliminating Saturday afternoon milking. Initial work indicates that a drop of approximately 4 per cent in milk production results. Experiments seem to indicate that intervals of up to 15 hours between milking make no significant difference, but with longer intervals production in reduced.

HANDBOOK OF

Refrigerated Bulk Milk Storage and Transport

SUPPLEMENT TO THE SOUTH AUSTRALIAN DAIRYMEN'S JOURNAL Sept.-Oct., 1965

Probably no subject has created more interest in the local dairying scene during 1965 than the introduction of refrigerated bulk milk storage and transport.

The idea of transport by tanker is not new; it has been in common use in the form of either a road tanker or a rail tanker, for transport from receival depot to the processing plant since its introduction in Vermont in 1903, but the ultimate step of eliminating all containers in the transit from the farm to the processing plant appears to have been taken in 1940, in the United States.

In the subsequent 25 years processes of development and refinement have taken place which have eliminated or minimized many of the early problems, and the adoption of the technique within the Adelaide metropolitan milk supply area can be achieved smoothly and efficiently if those concerned are prepared to recognize the fact that it amounts to a revolutionary change, perhaps second only to the mechonical milking machine or the cream separator, and that its introduction must be justified on economic and technological grounds.

Conflicting claims in both these aspects have made it difficult for the dairyformer to form a valid judgement, and the Metropolitan Milk Board's statement made in 1959, after a visit by its Chief Supervisor to Victoria, where the technique was then coming into general use, that "the tanker system of collection was a most controversial subject with some sections enthusiastically supporting the methods, and others just as strong in their opposition" is as true of South Australia today as it was of Victoria then.

It is, therefore, for the purpose of providing for the dairyfarmer the information from which he can form his judgements, that we have set out in this Handbook to answer the questions that are being asked, and to provide supporting material which can be used as a source of reference, and a guide to the most effective and most economical use of the system.

CONTENTS

WHAT THE DAIRYFARMER WANTS TO KNOW ABOUT BULK MILK

WHERE IS THE SYSTEM IN USE?

As mentioned above, the first example of bulk transport of milk, in this case by rail, was in the **USA** in 1903, even at this early date, under refrigeration, and it was only nine years later, in 1912, that road tankers were introduced in California. It is not surprising, therefore, that in subsequent years the USA maintained its lead in this field, and in 1940 the use of tanker transport was extended to farm pick-up in the Los Angeles supply area, in an atmosphere of "intense scepticism. Innumerable reasons could be cited by almost everyone concerned as to why it wouldn't work." Despite this pessimism, by the end of 1941 the number of farm tanks had increased to 10, and within 20 years the total was increasing at the rate of 12 per cent annually, and passed the 180,000 mark in 1962, with tanks installed on 42 per cent of all dairy farms, but accounting for 80 per cent of all milk production.

In the **United Kingdom,** where the first installations were made in 1954, the statistics are less spectacular: by 1963 a total of 2,174 tanks on two per cent of the dairy farms in England, Wales and Northern Ireland accounted for 5 per cent of the total milk production, but in Scotland a total of 1,321 tanks on 20 per cent of the dairy farms accounted for 33 per cent of the milk produced.

No statistics have been received for **New Zealand,** but the 1963 Report of the New Zealand Milk Board refers to the adoption of the system "on a large scale," and in 11 years from 1951 to 1962 one company, the N.Z. Co-operative Dairying Company Limited had expanded bulk transport to the point where it was collecting milk from 4,100 farms with a fleet of 200 tankers carrying one million gallons daily in the flush season.

In **Canada,** despite the relatively low ambient temperature for much of the year, the majority of whole milk suppliers are equipped with bulk tanks.

In **Australia** the greatest progress so far has been in Victoria, where approximately 4,000 refrigerated and 3,000 unrefrigerated farm tanks are now installed.

In New South Wales the total of refrigerated farm tanks, at the beginning of 1965 was just under 400, but all but 50 of these had been installed in the last two years.

Accurate information concerning the **European** scene has been difficult to obtain, but the impression has been gained that there has been no major move to displace can transport; on the contrary, considerable progress is being made toward fully-automated can-receival equipment. The reasons for this appear to be due to three factors—the much smaller size of the average dairy farm in Continental Europe, where; even in those countries, such as Holland, Denmark and France, which produce in total very large volumes of milk and are our major competitors in the dairy export market, herds generally contain fewer than 20 cows, the widespread use of the much lighter aluminium cans, and the general absence of pipe-line milking machines which although not essential are more suited than bucket-type machines or hand-milking for combination with farm bulk tanks.

WHAT ARE THE ADVANTAGES OF THE SYSTEM?

Quality:

Generally it can be said that the introduction of **refrigerated** bulk storage and transport brings a substantial improvement in quality; in the standard of the milk on the farm, as the rapid cooling retards the multiplication of bacteria

GOOD QUALITY MILK SELLS BEST

(And what Dairyman doesn't want to see milk sales go UP-UP-UP.) In the achievement of this high quality the most important factor is the refrigerated bulk milk cooler because it retains the goodness of the product as it comes from the cows. For such an important role a Sunset Cooler has no equal. It is ALL nickel bearing stainless steel, even the refrigerating coil and the small but important legs which "live" near the mostly wet floor and daily carry the loads of a ton and more of milk. There is no wood, no copper in a Sunset Cooler . . . just nickel bearing stainless steel all over. And if you would have the lowest running costs on record and assured lifetime performance, these you will find best demonstrated in the very fine Sunset Refrigerated Bulk Milk Cooler. If you would like a full specification please mail the coupon.

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ond retains the milk at very nearly the same quality as when it was drawn from the udder (provided farm hygiene is of a high order) and in the standard of the milk as received, as there is no further deterioration during transport. This second aspect is of particular importance to the farmer as the samples are taken as the milk is pumped from the farm tank to the tanker, and held at low temperature until tested, so that the methylene-blue test measures the quality of the milk at the farm rather than the quality received at the factory perhaps several hours later.

The higher quality may be expected to couse an increase in the consumption of city milk, mainly because of improved flavor (or rather, the avoidonce of flavor deterioration), and a probable increase in the quality of cheese, but to the farmer the more direct effect of the increase in quality is the virtual elimination of the danger of licence suspension.

The factory also gains, not only from its share in the possible increased revenue from higher milk sales and better cheese grading, but also by avoiding the problems arising from the handling, segregation and disposal of down-graded milk, and the possibility of having to purchase accommodation milk when down-grading or licence suspension has caused a shortage of milk of acceptable quality.

However, it must be fully understood that the improvement that follows the introduction of refrigerated bulk storage is confined to "quality" in terms of the methylene blue reductase test; when hygiene is inadequate (and there is a strong temptation to reduce hygiene standards when refrigeration is introduced) some contamination is inevitable and although the low temperature does inhibit the multiplication of some of the bacteria types, a class known as "psychrophilics" actually possesses the ability to multiply at low temperature.

Labor-Saving:

For the farmer this is probably the system's greatest advantage, as it eliminates the handling and lifting of full cans and the handling, washing and storing of empty cans. For the factory also the elimination of the labor necessary to load and unload trucks, to tip and weigh milk, and to clean and handle cans results from the almost automated receival routine for bulk transport.

Milking Shed Control:

As the farmer is not required to give frequent attention to the milk room he is able to spend all his time with the cows, with no danger of loss through over-filling cans, an almost complete absence of contamination, and a better control of milking routine.

Transport Costs:

There are substantial savings in transport costs when compared directly with can-transport solely because of the greater ratio of milk-weight to container weight, (it can be assumed that the weight of the cans, assuming some are only partly filled, makes up well over one quarter of the total load, which is a far higher ratio than the weight of the tank, as well as occupying, because of the cans' shape, a much greater volume of the load), but these savings can be considerably increased where refrigeration is used, by reducing the frequency of pick-up, from twice per day to once per day, and from once per day to every other day or even longer intervals. The accessibility of the farm tank also allows the spreading of the pick-up time through a much longer period of the day up to the ultimate of practically the full 24 hours, so that the large fleet of trucks necessary to collect the day's intake within four or five hours can be reduced to a much smaller number working "around the clock."

Measuring and Testing:

The advantage in sampling in the case of testing for quality has been stated above, but further advantages of considerable value to the farmer are the elimination of spillage and can-adherence, which has been estimated at 5 to 8 ozs. per can (1d. to 1.6d. per can at Adelaide prices), and the reduction in the possibility of error in weighing the milk at the factory.

Although the efficiency and accuracy of dip-stick measuring is not completely satisfactory (and at present no better or more accurate method has yet been devised) the elimination of errors in can-weighing far outweigh these shortcomings.

The butterfat test is also far more satisfactory, as the excessive cream-rise and possible churning in cans which lead to inaccurate testing are eliminated.

Elimination of Cans:

In other regions the elimination of cans is shown as a gain to the dairy-farmer, in terms of the capital cost, maintenance and depreciation of the cans themselves, and to the factory in terms of the can-receivol plant and can-washing equipment. Although, in the local context, the cans are provided by the factories, there is no doubt that the savings resulting from their elimination would eventually, and to virtually the same extent, pass to the farmer.

ARE THERE ANY DISADVANTAGES IN THE SYSTEM?

Apart from the economic aspect, and the already mentioned quality hazard caused by psychrophilic bacteria, there appear to be no disadvantages for the technique as such which will to any extent offset the major advantages, although minor problems may be encountered, particularly in the initial stages.

Of these the main one will be the occasional controversy between farmers and tanker drivers over the dip-stick readings, which should be simply resolved if both parties are prepared to be reasonable and if the farmer recognizes that the ability to countercheck his weights is itself a worthwhile gain.

A further disadvantage, but one which is of reduced importance where milk is refrigerated, is in the handling of milk downgraded at the farm by the driver for some defect such as taint. Obviously this cannot be taken into the tank as it will contaminate the remainder of the load, and the procedure to be followed in these cases will depend on the policy of the factory, as to whether the milk will be completely rejected, or picked up later by tanker or can truck. Examples have been cited of tankers containing two or more compartments, to permit the segregation of milk of differing quality; certainly tankers are divided into compartments, but this is predominantly for load-balancing, in order to give wheel-adhesion when partly full, and in the instances where the milk is actually segregated according to quality, the segregation appears to be based on compositional (i.e. relative butterfat and solids content) quality, not on grade. The provision of separate compartments for downgraded milk could hardly be justified either on economic or quality grounds, and would, in any case, conflict with a strict interpretation of Clause 13 of the Regulations (28.6.62) under the Metropolitan Milk Supply Act.

Insofar as farm routine is concerned, some disadvantage in the early stages will arise from the necessity to clean the empty tank before the next milking. As the tank may have been emptied any time during the day or night this will require an earlier start to be made for either the morning or the afternoon milking.

ARE THERE ANY LIMITATIONS TO ITS ADOPTION?

Again excepting economic factors, there do not appear to be any practical limitations to the adoption of refrigerated bulk tank storage and transport.

The problem of access in hilly country, which has been quoted as limiting the use of the technique because of the inability of semi-trailers to negotiate sharp curves and steep grades, may be countered by the use of the same type of fixed-chassis, short wheel-base trucks as are now used for can pick-up rather than semi-trailers, so that it can be said that where the can pick-up truck goes, the tanker truck can also go, and it is because of this fact that there are, in Australia, about the same number of rigid-chassis tankers as semitrailer types. The rigid-chassis tanker has also the advantage of being less demanding in its requirements of ground area and quality of construction for on-farm access roads and turning loops.

There will, nevertheless, be some limiting cases in hills districts where the farm tracks from the roadside to the milking shed are too steeply graded or too restricted for even a rigid-chassis truck, and where the cans are at present brought to the roadside by tractor. If the site is such that a negotiable road cannot be constructed there may be no alternative to the building of a new milking shed at the roadside.

Electric Power Supply:

Although the use of refrigerated bulk handling is technically possible in areas where there is no reticulated electrical supply whatsoever, it is assumed that reticulated power will be available on most farms within the metropolitan milk supply area, and where such power is 3-phase, no difficulties should be encountered. In those areas where 3-phase power is not readily available (and there are a number of "pockets" where the Electricity Trust is unable, for financial reasons, to supply 3-phase) the higher cost of a single-phase motor will increase the cost of the installation by as much as £60 in the case of the 7.5 h.p. motor used on tanks of 400 gallons capacity. If it is necessary, as it may be for tanks over 600 gallons capacity, to use motors exceeding 10 h.p. on single phase, special permission must be obtained from the Electricity Trust before the installation can be made.

WHAT ABOUT THE SMALL PRODUCER?

The maximum economies in transport costs are obtained from the exclusive use of the refrigerated bulk system; if bulk transport and can transport are used simultaneously on one route it is almost certain that transport costs will be higher than for can transport alone, and furthermore the factory must also be equipped for the receival of both bulk and cans, and must continue to operate can-washing equipment, thus preventing the maximizing of savings or the minimizing of outlay.

By operating a dual system the factory is, therefore, unable to make savings which can be passed on to the farmer to offset his investment and running costs. Alternatively, a complete change to bulk transport will permit substantial savings from which the farmer can be at least partly recompensed.

The real problem of the smaller producer lies, however, in the fact that although running costs tend to be proportionate to volume, the initial capital cost is not so, the smaller tanks costing for more per gallon capacity than the larger ones (e.g. 100 gallon capacity, £950 = £9.5 per gallon; 400 gallon capacity, £1,519 = £3.8 per gallon), and the savings which can be made by the factory do not appear to be sufficient to provide a return high enough to prevent any diminishing effect on the small farmer's nett income.

In Victoria it has been estimated that savings passed on to the farmer will cover the costs for a 40 cow herd, a figure which can probably be reduced to 35 cows in the Adelaide milk supply area because of the higher productivity per cow, but the size of this problem is indicated by the fact that 1,000, or 44 per cent of all licensed producers, have herds of 35 cows or less. (See Table.)

Because of this there appears to be an acceptance of the necessity to retain the dual transport system, even though this will reduce **and may eliminate** the theoretically possible savings. In other regions factories have attempted to solve the problem by providing some capacity for cans (6 to 8) on each tanker, and in the intraductory phases of some schemes a flat-top truck with a 1,000 gallon tank and capacity for 50 to 60 cans has been used. But these and similar schemes delay or even prevent the change-over in factory equipment necessary to maximize economies. The policy of one company is indicated by the statement, "To use a tanker without cans helps to push farmers to 100 per cent conversion," and another company, after five years of operating dual transport, gave its suppliers four months' notice to convert or **change to cream separation.**

A further problem relating to small producers (and, as shown by the Table the metropolitan milk supply area probably contains more small producers than any other dairying region) is the difficulty of measuring small quantities of milk, as, for technical reasons, dip-sticks are not permitted to be graduated below 10 per cent of the tank capacity, which is 10 gallons in the smallest tank at present available. There are possibly at least 200 farmers in the metropolitan supply area whose daily output falls below 10 gallons in the autumn, and although a New Zealand spokesman, referring to these small quantities, said, "We never refuse it, although we sometimes suggest to the supplier that he make a milk pudding rather than send it in", the small producer should be given a clear statement of factory policy on this matter.

Although instances have been cited from Europe of milk being pumped from cans to tankers, the factors of time and quality appear to eliminate this as a workable practice.

DISTRIBUTION OF HERD SIZES

Adelaide Metropolitan Milk Supply Area (1964-65)

Herd Size (as shown on milk licence)	Number of Herds	Sub-Total
1—5	31	
6—10	83	
11—15	120	
16—20	164	993
21—25	157	
26—30	217	
31—35	221	
36—40	191	
41—50	311	
51—100	671	
Over 100	109	

HOW WILL MONEY BE SAVED, AND WHERE?

As stated earlier, refrigerated bulk milk storage and transport has advantages to both farmer and factory in quality, labor saving, shed control, transport costs, measuring and testing, and in factory equipment, and it may be assumed that

these advantages can be measured in monetary terms, but, except where labor is employed, the monetary savings if any, on the farm, will be slight. Certainly the self-employed farmer will not be likely to put a value on his own labor that he saves by not having to handle and wash cans.

The improved quality, by reducing the risk of licence suspension, may at first sight, seem to give a financial gain to the farmer, but as a suspended licence fractionally increases the return to those whose licences are not suspended, there is no gain to the farm sector as a whole.

In shed control the elimination of can overflow is a gain which is probably both slight and infrequent; and it is possible that the better control of mastitis which follows from the ability to remain in the milking shed may outweigh the former gain, although, again monetary values are impossible to assess.

The elimination of loss in spillage and can drainage is a positive gain which has been earlier assessed at 1d. to 1.6d. per can at Adelaide prices, but as approximately half of this amount is recovered by the factory, and is subsequently reflected in factory bonuses, the total gain from this source must be considerably discounted in assessing the effect on farm costs.

The major advantages in money terms are found in factory operations—[illegible] transport, capital outlay, labor, and quality; but because of variations in the scale of operations, in the regional conditions, and in the accounting methods, there is a lack of consistency in the results, and the estimates of savings to be made consequently lack precision, so that the following are estimates only.

Transport:

Although the cost of the transport tank is high, its life is almost indefinite, and whether it be mounted on a semi-troiler or on a rigid chassis truck it will outlast many truck bodies or prime movers, so that, despite its cost, the higher ratio of milk weight to container weight (total weight of truck and load per 1,000 gallons—cans, 10 tons; tanker, 8 tons) and the ability to use the tanker throughout 24 hours instead of only 4 or 5 hours per day have been calculated as reducing the capital outlay on the fleet by approximately 40%.

Where, then, the tanker fleet is scheduled for round-the-clock running, and the maximum advantage is taken of the possibility of every-other-day collection, the reduction in transport costs resulting from reduced investment and lower operating costs has been estimated at about 2.75d. per lb. butterfat (1.15d. gallon).

The much higher figure of 4d. per lb. butterfat quoted in the case of Cahuna Co-op. in Victoria was achieved with a pickup frequency in the lean period of **every fourth day,** but this was possible only because the factory manufactures casein; for city milk or cheese the quality, despite refrigeration, would be far from satisfactory. Nevertheless this factory's transport costs are of interest also because they reveal the diseconomies of dual transport; during the long period of changing over to tanker transport the costs were, in cans, 6d. lb. butterfat; cans plus 1 tanker, 6.6d.; cans plus 4 tankers, 2.9d.; all tankers 2.0d.

To this saving of 2.75d. on farm-to-factory transport may be added an unknown but considerable saving possible under local conditions by the diversion of city milk from country depots. Whereas with can transport city milk is taken from farms to the factory for chilling and then dispatched generally by tanker, to the bottling plant in the metropolitan area; with tanker transport the chilled milk can be taken direct from the farms to the bottling plant, saving mileage, double handling, chilling, spillage and labor

costs, and it is not impossible that such factors as the variation of consumption with weather conditions may one day lead to radio control for milk tankers.

It must be emphasized, however, that savings whether in direct transport or from diversion, depend on complete changeover and the proper scheduling of the tanker fleet. The Victorian Milk Board has stated that " . . . the Board would not care to go on record as accepting that, at this stage of development (July 1962), bulk collection is overall more economical than the can system . . . The Board has recently had an application from a large factory operating a dual service (can and bulk) for increased cartage rates, and it is quite apparent to the Board that these increased costs are **largely associated with the development of bulk transport** . . . The Board has been provided no evidence at this stage of actual savings in cost **by any section of the industry.**"

Opinion in the U.S.A. also endorses the statement by the Victorian Milk Board. H. L. Mitten Jnr. warned that "full realisation of the advantages of bulk milk transport is possible only when complete conversion to bulk handling is achieved," whilst C. L. Roadhouse and S. L. Henderson have stated that, even with complete conversion, bulk transport is more economical than can transport only when the average pick-up per dairy is 300 gallons per day, or 150 gallons per day for every-other-day pick-up. Where these qualifications are met Roadhouse and Henderson quote transport costs being reduced from 2.33 cents per U.S. gallon (6.7d. lb. butterfat) in cans to 1.11 cents per U.S. gallon (3.2d. lb. butterfat) in bulk.

Cans:

Cans are not, strictly, a capital item, because of their relatively short life, and because, in other regions, they comprise part of the farm cost structure, and in other examinations of the economics of bulk milk handling this item has been treated as a farm saving and the savings have not been quantified.

As, however, in the Adelaide metropolitan milk supply area, the cans are generally provided by the factories, this elimination is a source of savings in factory costs, and on estimate of the possible savings can be made thus:

Average daily intake in the month of highest production	—	190,000 gallons.
Number of licensed producers	—	2,300.
Highest daily average production per producer	—	85 gallons.
Highest daily can requirement per producer (i.e. each producer using a part-filled can)	—	9 cans for 85 gallons.
Total needed for 190,000 gallons	—	20,100 cans.
Add the same number of empty cans returning	—	40,200 cans.

Say: 41,000 cans @ £5/10/0 each=£226,000 for 190,000 gallons maximum daily intake; 50 million gallons total annual intake. £4.5 per 1000 gallons per year. Interest (6%) on this amount would be 0.06d. gall (0.15d. lb. b.f.). Depreciation (10 years) would be 0.11d. gall (0.26d. lb. b.f.).

Factory Building and Equipment:

It will be understood that although the use of bulk transport allows for a lower capital outlay in the factory itself, by eliminating the necessity for tipping and weighing equipment and can washing machines, by requiring a smaller boiler and, because of the reduced number of employees, by requiring less outlay on employee amenities, this is true only where a factory is

built for bulk handling. Where an existing factory converts to bulk handling even though the conversion may be 100 per cent the investment has already been incurred and cannot be recouped except at salvage value, and, in fact, it may be necessary for a converted plant to incur additional capital expenditure, such as a weigh-bridge, and other ancillary equipment not required for can collection.

Operating Costs:

For a factory with a maximum daily intake of 30,000 gallons (which is slightly greater than the intake of the largest depot in the Adelaide milk supply area) and a total annual intake of 6 million gallons, it has been estimated that the major annual savings would be—

Labor:	
Grading, tipping and can washing	£4,000
Possible elimination of labor in cheese manufacturing section on Sundays for 8 months per year	350
Maintenance labor (and materials) on can-handling equipment	750
Possible labor for steam generation on Sundays for 8 months per year	300
	£5,400
Refrigeration:	
Both operational and plant capacity for cooling of milk to be held overnight during 6 months per year	£4,200
Electricity:	
Power costs and plant capacity on the basis of 30 h.p. operating for an average of 5 hours per day at 2.3d. per h.p. per hours	£500
Steam:	
The saving of 3 pounds steam per can at 0.2d. lb. is almost balanced by the need for more heat to pasteurize farm-cooled milk, leaving a net saving of	£250
Total	**£10,350**

These are claimed to be conservative estimates, but in total they represent a saving of 0.75d. lb. butterfat on the total intake throughout the year.

Total Savings:

It is not intended, in the Adelaide milk supply area, to build new depots to receive bulk milk; existing depots will be adapted for its receipt, and consequently there will not be the saving on capital outlay that is claimed for bulk transport when a new factory is being built solely to handle the commodity in this form. Economies will therefore be limited to operating costs and the eliminating of investment in cans, namely—

Reduction in transport costs	2.75 pence per lb. butterfat
Cans—interest (6%) and depreciation	0.41 pence per lb. butterfat
Factory operating costs	0.75 pence per lb. butterfat
Total	**3.91** pence per lb. butterfat

plus an unknown amount resulting from the diversion of farm tankers direct to the bottling depots.

WHAT WILL IT COST THE FARMER?

Because of the incomplete nature of farm costing generally, and because of the incansistency that arises in farm costing from variations in the scale of operations ind techniques it is not possible to give any more than an approximate answer to this question.

The sources of farm costs in installing and operating a refrigerated bulk milk tank are:

Non-recurring: Purchase price of tank, and installation charges; structural alterations to milking premises; cost of road building; finance charges (where applicable);

Recurring: Interest on capital; electric power; depreciation; service and maintenance on tank and unit; periodical recalibration; road maintenance.

Non-recurring Costs:

Capital Cost:

In the range of capacities that is commercially available the prices of refrigerated farm milk tanks vary from about £950 for 100 gallons capacity to about £1,700 for 500 gallons capacity for 3 phase units, with from £70 to £160 extra for single phase units where 3 phase power is not available. (As it is likely, ond for the best purchasing terms and the best servicing contracts, desirable that most farm tanks will be purchased in quantity by the factory concerned, these prices would probably be subject to a discount of about 12½%).

The general opinion seems to favor a tank large enough to hold 3 separate milkings in the flush season of the year, when milk will be picked up daily, which gives a safety margin to provide for emergencies (such as the breakdown of a tanker) exceptionally favorable seasonal conditions, or limited herd expansion, although some support is shown for a capacity equal to 3 flush milking plus 25%, mainly because of the claim that the reduced labor load at milking time allows the farmer to handle more cans, and hence leads invariably to a larger herd.

However, even with this requirement it can be seen that the 100 gallon tank, the smallest size commercially available, will safely hold 3 flush season milkings of a herd of 22 average cows, or of a herd of 17 average cows if 3¼ times is used as the criterion. Thus a 500 gallon tank suitable for a herd of perhaps 80 cows or more costs less than twice as much as a 100 gallon tank suitable for a herd one quarter the size (or even smaller), a disparity which is shown in the following table.

COST OF TANK, RELATIVE TO HERD SIZE

Herd Size (milking cows)	20	40	60	80
Gallons per milking in flush	33	60	120	160
X 3	99	180	360	480
Capacity of tank required (galls.)	100	200	400	500
Minimum Price of Tank* (£)	830	1,010	1,330	1,530
Annual production (lbs. b.f.)	6,000	12,000	20,000	27,500
Cost of tank per lb. b.f. (£)	0.14	0.08	0.07	0.06
Cost of tank per lb. b.f. (pence)	33	20	16	13

*i.e. List price less 12½% for a typical 3 phase unit with water cooled condenser. Single phase, or air cooling would be higher.

Structural Alterations to Milking Premises:

As these depend on the design of the dairy no overall comment or estimate can be given. Major structural alterations may be required merely to get the tank into the dairy, even though the dimension and construction of the dairy are otherwise suitable. Structural alteration may be required to provide satisfactory ventilation to allow the efficient operation of the refrigerating unit; apart from the electrical connection of the unit and the provision of a light for reading the dip stick it may be necessary to have an external power-outlet for the tanker pump; a water connection will be necessary for rinsing the tank after emptying.

Cost of Road Building:

Where the dairy does not front directly on to the roadside it will be necessary for the farmer to provide an access road to the dairy, of adequate construction to permit use by the tanker in all weathers. It is particularly important to note that, where semi-trailers are to be used, it is necessary to provide a road with a grade that is not too steep, as a semi-trailer has poor adhesion on its driving wheels, and the use of the farm tractor may be required at times. At the dairy the access road should terminate in a loop sufficiently large to enable easy turnaround, as because of the time factor, it is not desirable to back the tanker into position, and, in the case of a semi-trailer, backing in a limited area may be impossible.

Both for ease and accessibility and because of the effect of wet dung on wheel adhesion it is desirable to fence the road completely, but where this cannot be done a cattle-grid or drive-over gate will be required at the boundary.

As with structural alterations, costs will vary according to individual requirements (and the availability of road making material). As a guide it has been calculated that, in the recent bulk scheme introduced by the Berrima Co-op. in N.S.W., the combined costs of road-making and structural alterations ranged from £100 to £300 per farm.

Finance Charges:

Where finance is required it is probable that arrangements will be made by the factory concerned, and the charges for this service will depend upon factors that cannot be determined here. The Commonwealth Development Bank will provide finance to a factory, with certain guarantees, at 4½% flat, for a term depending on the deposit, i.e. 25% deposit, 3 years' term; 33⅓% deposit, 4 years' term. At these rates, where finance is required, the costs of the tanks given in the example above would be increased thus:

ANNUAL COST OF FINANCE

Tank capacity (gallons)	100	200	400	500
Discounted Price of Tank (£)	830	1,010	1,330	1,530
Terms charges on balance:				
(a) 3 year term—total (£)	84	102	135	155
(b) 3 year term per year (£)	28	34	45	52
Annual cost of finance per lb. b.f. (pence)	1.0	0.6	0.5	0.4
(a) 4 year term total—(£)	100	121	160	184
(b) 4 year term per year (£)	25	30	40	46
Annual cost of finance per lb. b.f. (pence)	0.9	0.5	0.5	0.4

Recurring Costs:

Interest on Capital:

In discussing the costs of running a refrigerated bulk milk tank a figure which varies from 8/- to £1 per cow per year is frequently quoted. This cost is for electric power only, and is not the only major cost, as it must be realised that a farm business is no different from any other business in that a return on capital invested, whether from an outside source, as in a company or a partnership, or from the farmer's own resources, is a component of the cost of production, and that on investment is not made unless the return is better than the present earning power of the funds to be used, having regard to the risk of loss. Even if the farmer pays cash for the asset it can be assumed that the funds have been withdrawn from a source where a return was being received on the investment, and that the return was related to the duration of the investing period, so that the output from the asset must be charged with at least the value of the forgone return.

In the case of a farm milk tank the investment will be of many years' duration and a return of at least 6% is reasonable.

Electric Power:

The cost of electric power depends (apart from climatic conditions) on the capacity of the refrigerating unit, the type of unit (ice-bank or direct expansion) and whether or not the milk is precooled with water before passing into the refrigerated tank. Adequate capacity, in terms of the relationship between the size of the refrigerating unit and the volume and temperature of the milk, is essential, as otherwise, in extreme conditions, apart from the failure to cool the milk to a satisfactory temperature, the unit will be subject to long running, high power usage, and short life.

The choice between ice-bank or direct expansion depends mainly on the existence of a low night tariff. The ice-bank type has a smaller unit which, during 24 hours, part of which is at night rate, builds up a reserve of ice which is then used to cool the milk when the tank is filled. The direct-expansion unit operates only when milk is in the tank, cooling it initially and maintaining it at the required temperature. Despite the smaller size of the icebank unit the longer running time results in a higher power usage than for direct-expansion but the greater consumption may be achieved at less cost than that for direct expansion where the difference between day and night tariffs is sufficiently great, as, for example, in Victoria, where the night-rate is 1.13d. per kWh. In South Australia, the higher night-rate of 1.85d.—2.04d. per kWh would probably prevent any economies from the use of ice-bank units.

It has yet to be proved that an ice-bank unit is capable of passing the performance standards of Australian Standard N46, and it is possible that an ice-bank unit submitted for test against this Standard would incorporate surface-cooling (i.e. the use of a conventional multi-tube cooler-aerator). The large surface area of a multitube cooler is a potent source of contamination by airborne organisms which would inhibit the possibility of obtaining the maximum improvement in quality of which refrigerated bulk milk handling is capable.

The same objection can be made to the use of precooling with a water-cooled multitube cooler, whether in conjunction with ice-bank or direct expansion units, and, even though it is claimed that electric power costs can be halved by this means, it is recommended that where really cold water is available (and unless the water is really cold, not merely cool to the touch) it should be used only in coldwater jackets on the milk lines.

For o conventional set-up without pre-cooling under Victorian conditions the State Electricity Commission of Victoria has estimated from field tests o consumption of about 10 kWh per 100 gallons over the full year, which at 3d. per kWh (which is the medium range of day tariff for both the S.E.C.V. and the E.T.S.A.) is the equivalent of 0.3d. per gallon, 0.73d. per lb. butterfat or 15/- per cow per year.

Although lower figures than these may be quoted, even down to 8/- per cow, it must be emphasized that many of the units already installed in the eastern States may not be capable of meeting the requirements of Standard N46, which will be compulsory in South Australia, and which has been shown in the models which have been tested so far to require refrigerating units of considerably higher horsepower than those which have supplied in the past.

Depreciation:

For true cost determination it is necessary to use o depreciation figure related to the life of the equipment, rather than to the concessional income-tax rates. The refrigerating unit will have a much shorter life than the tank, and a maximum of 12 years' efficient life may be assumed for a direct expansion unit; the life of an icebank unit will be shorter. The milk tank itself, with its associated equipment will have a much longer "life," perhaps 25 years, but as an asset its resale value will be negligible long before the end of its useful life.

On the basis that the unit represents 30%, and the tank 70%, of the total value, a straightline depreciation rate of 5.3% can then be calculated.

Service and Maintenance:

Obviously this figure is impossible to estimate, as it will depend on the number of service calls, the extent to which new parts are required, and the mileage of the service man, and the number of service calls will depend on the initial quality of the equipment, the suitability of the equipment for the job, the use to which it is put, the care which it is given, and the skill of the service mechanic, but, overall, from cases cited, an amount of £10 per year appears to be reasonable for service and maintenance of the equipment.

Periodical Recalibration:

Recolibration of the dip stick is required by the Weights and Measure Act, at least once in every 2 years, the fee being 36/- per each 200 gallons or part thereof. However, if a dip stick is found to be inaccurate a new dip stick must be made and calibrated, at a cost of from £12 upwards.

Road Maintenance:

The maintenance necessary to the access road, fences, and grid or gate will depend on the length, quality of surface, grade and weather conditions and an annual amount of £5 would be conservative.

Other Costs:

The above study attempts to estimate the costs of installation and operation and it is not likely that many individual cases will fall below these figures, but in some cases there may be unforeseen costs not accounted for, as for example, where district council rating is on assessed annual value the building of an access road may increase the assessment and consequently increase council rates, and water rates will be similarly affected.

Total Annual Running Costs:

Using the amounts calculated or imputed above and excluding interest on the costs of shed alterations and road building, the annual cost to the farmer for operating a refrigerated bulk milk tank would probably be **at least:**

TOTAL ANNUAL RUNNING COST RELATIVE TO HERD SIZE

Herd Size (milking cows)		20	40	60	80
Annual Production (lbs. b.f.)		6,000	12,000	21,000	27,500
Capacity of tank (gallons)		100	200	400	500
Discounted Price of tank	(£)	830	1,010	1,330	1,530
Interest on Capital	(£)	50	61	80	92
Electric power	(£)	15	30	45	60
Depreciation	(£)	44	54	71	81
Service and Maintenance	(£)	10	10	10	10
Recalibration	(£)	—	1	2	2
Road Maintenance	(£)	5	5	5	5
Total Running Cost	(£)	124	161	213	250
less milk goins		8	16	28	37
NET RUNNING COST	(£)	**116**	**145**	**185**	**213**
(pence per lb. butterfat)		4.6	2.9	2:1	1.9

WHAT WOULD IT COST THE FARMER ON HIRE-PURCHASE?

In the above estimates of total running cost a return has been allowed on the capital invested, but where hire-purchase is used the return on capital must relate only to that portion of the capital provided by the farmer, which will be initially the amount of the deposit, and which will increase as the principal is repaid. Ultimately, the full return on capital will form part of the total running costs, but during the currency of the debt the total cost may be considered as including the interest on the outstanding balance. Because the return on the farmer's equity increases with each repayment of principal his return on capital will increase accordingly, but where the interest on the hire-purchase debt is calculated at a "flat" rate, this amount will not decrease as the debt is liquidated, and in the following example an "average" return on capital has been used, based on the farmer's "average" equity during the duration of a 4-year repayment term, at 4½% flat, with 33⅓% deposit.

TOTAL ANNUAL COST DURING REPAYMENT (4 YEAR TERM)

Herd Size (milking cows)	20	40	60	80
Tank capacity (gallons)	100	200	400	500
Discounted cash price of tank (£)	830	1,010	1,330	1,530
Net running cost less interest (£)	66	84	105	121
Interest (6% on farmer's average equity during term) (£)	33	40	53	61
Average annual running cost (£)	99	124	158	182
Principal repayment (£)	138	168	222	255
Interest on loan (£)	25	30	40	46
TOTAL ANNUAL COST FOR 4 Years (£)	**262**	**322**	**420**	**483**

HOW MUCH CAN THE FARMER BE RECOMPENSED?

Even where labor is employed, and cans are owned by the farmer, it is clear that farm savings cannot balance the operating cost of a refrigerated tank; to be a financially attractive propasition a contribution from the factory savings must be paid, either at a gratuitous rate set by the factory concerned or at a rate set by a marketing authority such as a Milk Board.

The rates of contribution and the bases on which they are paid show wide variation between countries and between factories, as shown by the following table, which is illustrative only of a few examples.

Place	Rate of Recompense (d. gall.)	(d. lb. b.f.)	Comment
N.Z.	Apparently none or small		Although premiums of 0.5d. to 0.83d. gallon are quoted, they are paid for refrigerated milk, whether in can or bulk. The N.Z. Milk Board does not differentiate in producer's price of factory margin between can and bulk pick-up, but pays same premium for refrigeration method in each case. However, N.Z. Co-op ". . . allowed farmer a premium (unstated) to meet additional power costs."
England & Wales			For initial period depending on size of farm tank, namely—
	1.0*	2.4	Under 150 galls. 10 years 151-249 galls. 7 years 250-349 galls. 6 years 350 & over 5 years
	0.5*	1.2	After period above, for all tanks.
Scotland			For initial period depending on size of farm tank namely—
	1.0*	2.4	Under 100 galls. 5 years 101 and over 4 years
	0.25*	0.6	After period above, for all tanks.
N. Ireland	0.75*	1.8	Permanently.
Victoria	2.0*	4.8	Location unknown; quoted by DICE (para. 358).
	0.8	2.0*	Archie's Creek, paid out of cartage saving of 2.75-2.9d. lb. b.f.
	1.0	2.5*	Kraft, paid out of cartage and factory saving of 3.75d. lb. b.f.

*Indicates the stated rate. The conversion to butterfat or to gallons is given for comparison in each case.

HOW WOULD ADELAIDE FARMERS BE PAID?

As stated, in other countries and States recompense is paid by an increased (i.e. premium) price determined either by a marketing authority or by the factory. In some instances in Victoria when the cost of cartage is charged against the farmer a similar result has been obtained by reducing or eliminating the cartage cost for bulk milk whilst retaining it for can milk.

In the Adelaide milk supply area the position is complicated by the conditions imposed by the Metropolitan Milk Supply Act and by the Milk Equalization Agreement, as well as by the fact that cartage costs are borne by the factory, and for these reasons the payment of any form of direct premium for refrigerated bulk milk in a way that would be acceptable to the farmer and yet would not constitute a breach either of the Metropolitan Milk Supply Act or of the Milk Equalization Agreement presents difficulties.

To overcome these difficulties the two companies which have already decided to introduce bulk milk transport have made proposals which are very similar in principle, namely the payment of a return on the capital value of the tank.

From the point of view of equity, particularly with regard to the small producer, this method has much to commend it. In an earlier table it was shown that the net running cost ranged from 4.6d. per pound butterfat for a 20 cow farm to 1.9d. for an 80 cow farm; a flat rate of premium based on the small herd would overliquidate the large producer's cost; if based on the large herd it would leave the small producer considerably out-of-pocket, and there appear to be no acceptable grounds on which a company can pay a sliding scale premium.

On the other hand a return of, say, 8% on the discounted price of the tank would return £68 to the 20 cow herd and £122 to the 80 cow herd, these figures representing **almost exactly** (within 2%) **the same proportion of the net running cost** in each case.

WHAT ABOUT TANK-RENTAL SCHEMES?

Although the advantages of refrigerated bulk milk handling in every phase of operation through to the final sale of a better quality product are fully proven, to many dairyfarmers the spending of upwards of £1,000 even on the most liberal terms, may be absolutely unthinkable.

Because of this the industry faces the dilemma that maximum economies are achieved **only by complete saturation** and anything short of this may actually cost more, so that, if the factory cannot achieve complete change-over to bulk handling it will be unable to offer sufficiently attractive terms to induce **any** supplier to convert, and for this reason the decision may be "all or nothing."

It may be argued that, although the farmer shows no financial gain from labor saved and drudgery avoided (and fewer doctors' fees for slipped discs and hernias), he may be prepared to pay the relatively small cost for power and maintenance to gain what has been described by a dairying authority as "a changed way of living on dairy farms."

It may also be argued that in many other investments the farmer does not recognize a direct relationship between outlay and return, so that, once having paid for the equipment, he does not expect his income to increase by an amount equal to a reasonable return on the additional investment. These two arguments may illustrate the farmers' **willingness** to introduce bulk handling, but they do not influence his **ability** to introduce it, which is conditioned by his asset backing either in cash to buy the equipment or in collateral for term-financing.

To gain the full advantages from bulk handling right from the start there is a growing practice of overcoming this handicap by substituting company ownership of the equipment for individual ownership, as for example, in the case of Berrima Co-op., the latest factory to convert to bulk handling

in the N.S.W. Milk Board area. The company borrowed £100,000 from the Commonwealth Development Bank, to be repayed over 5 to 7 years, and each dairyman is required to enter into an agreement with the Society. The bulk tank remains the property of the Society at all times.

Certainly the Berrima Scheme is small, involving only 100 farms, but at the other end of the scale the New Zealand Co-operative Dairy Co., with 9,000 suppliers, and its own fleet of 200 tankers, also supplies and owns all farm tank equipment.

In the U.S.A., despite a wide variety of finance schemes, it is reported that there is now **a trend toward long-term leasing arrangements that appear to have some very definite benefits for the producer.**

WHAT IS THE FUTURE OF CAN REFRIGERATION?

It has been stated that the rapid increase in the installation of can refrigerators which has occurred in recent year has now slowed down for the reason that farmers fear that, within a few years of laying out many hundreds of pounds on a can refrigerator, they may be faced with the necessity to change to bulk storage, and lose heavily on the sale of their old equipment.

If this is so, it is to be deplored, as, although can refrigeration does not have the outstanding advantages of refrigerated bulk handling, it can make a considerable contribution to milk quality.

It is, however, almost impossible to give advice to farmers concerning the wisdom of buying can refrigeration; so much depends on the companies' experiences in the areas now under survey, on both technical and economic grounds, and it is only from this experience that decisions can be made concerning the expansion of the technique into other areas.

It has been suggested, and in New Zealand the practice is common, that an ice-bank unit, with or without a can-cabinet can later be adapted for use with a farm milk tank. Technically this is so, but there is no assurance at present that such a combination would be capable of complying with the requirements of AS N46, nor is it certain that such equipment would cost less than a complete refrigerated tank.

In the absence of any other guidance the only advice that can be given to a farmer is to suggest that the proposal to install a can refrigerator be examined on the basis of a shorter operating life but with the expectation of a quite reasonable trade-in allowance in view of the rapidly increasing acceptance of the need for milk refrigeration not only in the Adelaide Milk Supply Area but also in the adjacent regions where, because of the wide dispersion of the farms, bulk milk transport may never be economically acceptable.

PERIODIC RECALIBRATION OF TANKS

The Weights and Measures Act requires all farm milk tanks used for trade to be verified and stamped by an inspector at least once in every two years. Verification and stamping will be carried out under the following conditions:

Whenever possible the tanks will be tested in the position in which they are used. For this to be done a minimum of 3' 2" clearance between the top of the tank and the ceiling or roof is necessary.

If there is not 3' 2" clearance the tank will have to be moved to a position where there is. The owner of the tank will be expected to provide the labour to do this, and afterwards reinstall it, in a level condition, to its place of use.

Testing will be done between morning pick-up and evening milking. Every effort will be made to avoid inconvenience to you but your co-operation and assistance to make this possible is necessary.

If the calibration is found to be incorrect the Inspectors will recalibrate it, and the Department will have a new, correct dip-stick made.

BULK MILK DEMANDS RIGID SUPERVISION

An address given by Mr. J. Tarrant, Kraft Foods Ltd., to the Australian Society of Dairy Technology, at Toowoomba, Queensland, on 2nd June, 1965.

The information contained herein has been designed to alert newcomers to the field of bulk milk collection to the problems they may encounter in developing a bulk milk system.

Reference to non-refrigerated systems has been omitted, as I do not believe such systems can be used with benefit by the industry of this country. I submit the following statements confirm this opinion—

Mr. A. H. Woolven, General Manager of the New Zealand Co-operative Dairy Company, in an address to the 14th International Dairy Congress, 1962, had this to say:

> "It can be safely said that milk tanker collection has found a permanent place in the dairying industry in New Zealand, and that, together with farm chilling, it is a major step in the maintenance and improvement of quality of production."

Mr. T. M. Jensen, Superintendent of Dairying, Department of Agriculture, Victoria, reporting on the collection of milk from farms by road tankers in New Zealand, concluded his findings as follows:

> "To proceed now with the use of unrefrigerated farm vats would apparently achieve very little, except perhaps to save some factories from renewing or expanding their milk receiving facilities. On the other hand, if a suitable type of refrigerated vat should become available at a reasonable cost, it might be possible to institute tanker collection systems in Victoria which would offer some real economies to the participants, and without the risks to milk quality that may be involved in the use of unrefrigerated vats in our climate.
>
> "The prospects of achieving an every-other-day collection service with these savings in cartage are much better in Victoria than they are in New Zealand, where the daily milk production per farm is higher, and where collection costs are already so low that the potential saving from less frequent collection is much less than it is here."

This contribution to your conference has been designed in four parts:

- Industry;
- The Dairy Farmer;
- The Factory; and some
- Sundry Items.

I. INDUSTRY:

In my opinion, a project of the magnitude of bulk milk was deserving of a thorough investigation on an industry level, rather than its policy being determined by individual factories.

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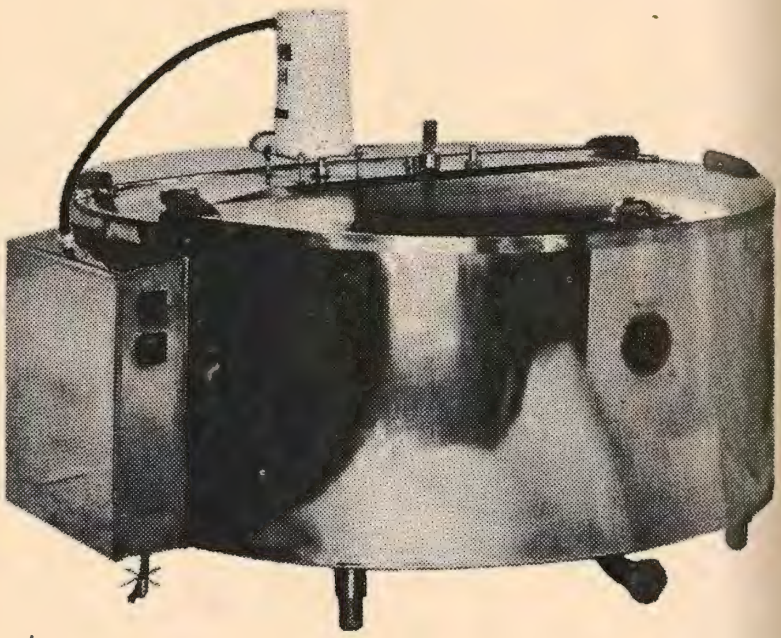

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Mr. Harold Baker, leading South Australian Dairyfarmer of Ponde states,

"Having been interested in bulk pick-up for some considerable time, I eventually, after examining and gathering information, decided to purchase a 'Way' Refrigerated Farm Milk Tank. Since that time some 18 months has elapsed, and I am happy to report the following facts:—

1. Since installation, we have never once required service to the unit. It has never failed to operate as per the original stipulations given at the time of purchase.
2. Running cost has been determined by independent metering of the unit over a 12 month period and the running cost of .227 pence per gallon determined.
3. The time saving and quality control achieved have more than ever convinced me that purchase of a "Way" Refrigerated Tank is a must for every South Australian Dairyfarmer.

Harold Baker,
Ponde, S.A.

Producer organizations should have investigated all aspects and declared their policy on the following points:

1. Refrigerated and non-refrigerated systems.
2. Ice Bank or Direct Expansion, including vacuum tonks.
3. The acceptance of standards for tanks.
4. A uniform basis for payment and financing of tanks.

As far as I am aware, the Australion Doiryfarmers' Federation or its counterparts in the various States hove no declared policy, which has left their members up in the air.

II. THE DAIRY FARMER

I think it can be said the requirements of a successful bulk collection system have been known by the majority of dairy farmers before making a change, but once having ordered a tank, in a large number of cases, they have conveniently forgotten their obligations to ensure a successful operation.

Before buying a tank, they should:

(a) Ascertain from a qualified electrician if power supply is adequate, and what costs, if any, would be involved in renewing aerials, and the cost of connecting power to the tank; noting particularly that low voltage, due to inadequate conductor capacity, will create severe problems;
(b) Ascertain from the local dairy officer if any repairs are necessary to the shed, including adequate ventilation;
(c) Assess the work necessary to provide tanker access to milk room (tanker transfer hose should be no longer than 15 feet);
(d) Assess the work necessary to construct and protect the roadway, including the elimination of gateways;
(e) Assess the cost of providing adequate illumination for inspecting milk and reading the dip stick;
(f) Assess the cost of providing an adequate water supply adjacent to the milk tank.

When he is prepared to put the above work in hand, he should proceed to investigate the various makes of tanks available.

These investigations should include:

(a) The tank should be designed for once-a-day collection;
(b) It should be guaranteed to comply with the Australian Standard N46;
(c) It should be covered by an adequate maker's guarantee for a minimum period of 18 months;
(d) It should not require pre-cooling of the milk to conform to the standards;
(e) Manufacturers should have an adequate service arrangement available;
(f) The capacity of the tank should be adequate to contain three milkings at peak production, assuming there will be no major increase in the foreseeable future.

Having ordered his tank, he should see that:

(a) It is installed to both his and the maker's satisfaction;
(b) It is operated in accordance with the maker's recommendations;
(c) It is maintained to the recommendations of the maker;
(d) It is cleaned in accordance with the recommendations of the maker, the dairy officer and the factory Field Officer.

III. THE FACTORY:

The factory's problems can be divided into three groups:

1. Self-Inflicted—

As might be expected, diverting the receipt of milk from the factory to the farm, and holding milk in a **foolproof** container on the farm, has introduced new areas for argument and complaint.

In the absence of a code of practice acceptable to all bulk milk operators, there is a tendency for factories to give way to the farmer rather than lose his supply. This has forced conditions on the industry that should never be. Loss of supply could be threatened because of such things as:

(a) The tank being out of level;
(b) The tank not being properly rinsed by the driver;
(c) Milk quality affected by poor cleaning of tank;
(d) Variance in milk weights;
(e) Milk temperature too high brought about by manipulation of thermostats;
(f) Poor access to shed;
(g) Unsuitable roadways and gates to open;
(h) Sub-standard tanks and service on same;
(i) Excessive charges for electricity consumed by the tank;
(j) Times of collection.

2. Operational—

This is no doubt the most important aspect of bulk milk collection, as without efficient control, losses can be very great. It calls for a well-trained team, including:

(a) A controlling officer;
(b) A team of drivers holding certificates qualifying them as bulk milk grader drivers;
(c) Field Officer. (In smaller plants, this officer may have the added duties of controlling officer.)

(a) **Controlling Officer:**

His duties include—

(i) Rostering drivers to maintain schedule times for collection routes;

(ii) Schedule routes to ordinary hours to prevent excessive overtime;

(iii) To maintain a day-to-day "Round schedule", whether it be on on adjustable board or paper, it will be set up to show—

Round
Times of departure and arrival
The driver
The names or numbers of suppliers who will be collected;

(iv) From this schedule, the office will prepare drivers' Trip Logs, which will show—

The Round
Time of departure and arrival
The driver
The number or name of suppliers
Pounds of milk collected
Temperature of milk
Remarks
Total of milk collected by—Farm totals
—Factory total
Variance.
Driver's Signature as Grader.

Laboratory will, in turn, set up a set of sterile numbered sample bottles in iced sample bottle case. On return to the factory, the driver will hand in suppliers' samples and drivers' Trip Log.

The controlling officer will then see that the tanker load is weighed with the weight inserted on the Log. The driver's attention is then drawn to any discrepancies.

The gallonage collected will form the basis of the Round scheduled for the following day. The controller will know if he can allocate additional suppliers to the Round or take some off. He will roster a tanker cleaner to take over the cleaning of tankers at regular periods, but at least once a day, and rely on the laboratory for cleaning techniques and proof of cleaning.

(v) He will organize the utilization of tankers to make best use of them. In any case, in the flush season, they should be able to pick up four to five loads per day.

(b) **The Drivers:**

Drivers should be trained to carry out the following duties—

(i) Check his vehicle for oil, water and petrol, including the tank to his pump engine, and the equipment in the pump compart-

ment, including sample bottles and Log Sheet; and transfer hose strainer;

(ii) On arrival at the farm, he will—

(a) Connect transfer hose, but first removing dust cover from the tank outlet and the hose;

(b) Turn tank agitator off, should it be operating;

(c) Grade milk by senses test;

(d) Return to tanker, invert sample jug, start engine pump and return to tank with the Log;

(e) Lift dip stick clear of milk line, wipe back froth, wipe dip stick with paper towel, lower dip stick gently until it comes to rest in its socket;

Raise dip stick gently until the milk line on the stick is at approximately eye level. Immediately read the stick as accurately as possible, and replace the stick and record the weight on the Log;

(f) Start agitator if it was stopped when arriving at the dairy;

(g) Open outlet valve of the tank;

(h) Observe the level on the tank;

(i) Return log to tanker and check drip sample;

(j) Turn off agitator;

(k) Disconnect hose, replace dust cover and return to tanker. Close tanker valve and turn off engine;

(l) Decant sample into supplier's sample bottle the excess into surplus can and invert sample jug;

(m) Return to dairy and rinse tank.

This is a time-consuming operation, and it should be remembered that a one minute loss at 200 suppliers for 365 days approximates a loss in the order of £1,000.

Returning to the factory, the tanker is handed over to the cleaner, samples returned to the laboratory and Log to office.

Driver then takes his lunch-break or finishes for the day.

(c) **Field Officer:**

The Field Officer is a very necessary link in the chain. He should be under strict instructions on policy matters, as it is very easy for him to assume responsibilities which ore rightly the farmers' worries, e.g., arranging for tonk service, by discussing with the power authorities the power supply position, and to be drawn into an argument on running costs, etc.

His prime responsibilities are—

(i) To advise suppliers on the benefits of bulk milk and what would be required of them;

(ii) Conduct regular routine visits to suppliers and advise the manager on sub-standard conditions or practices;

(iii) Assume responsibility for the setting of thermostats to maintain temperatures in accordance with the manager's instructions;

(iv) To demonstrate cleaning and sterilizing techniques, and to explain the effect on poor cleaning methods and inadequate cooling temperatures on milk quality;

(v) To check level of tanks regularly, and not to rely on the bubble levels on the tanks;

(vi) Check tank thermometers as these are also unreliable, and advise the owner of the correction factor;

(vii) Peruse drivers' Logs regularly. Act on any recurring milk weight discrepancy by checking the accuracy of tanks on the particular Round.

This requires milk measures certified by the Weights and Measures Department, together with a licence which will permit the Field Officer to remedy the fault.

Act on any recurring excessive milk temperatures by adjusting the thermostats;

(viii) Peruse the reults of Methylene blue and plate count tests and advise farmer on where his methods are falling down;

(ix) Conduct tests for extraneous matter at regular intervals and show the wad to the supplier.

This statement of operational duties may appear excessive, but I can assure you they are not — in fact, they should be regarded as the minimum.

Many cases can be cited to show that few operators observe these rules. For instance, do we know the sight of a driver is capable of accurately reading a dip stick in a poorly lit milk room, or can they detect traces of blue dye?

It is apparent some cannot, when you compare the results of two drivers operating on the same Round on alternate days. I have seen where one driver records an average loss of 12 lbs. of milk per farm, whereas another will record a loss of 4 pounds per pick-up. Again, I have seen many Logs recording collection temperatures of 47—50°. You may get away with this on a once-a-day collection, but all Field Officers should know that to restrict the growth of phychrophiles over a 48 hour period, milk must be cooled to and held at 40° or lower.

How many Field Officers have checked the efficiency of the farmers' cleaning methods by taking swabs of the cleaned surfaces of the tanks?

How many factories are obtaining the maximum use of their tankers?

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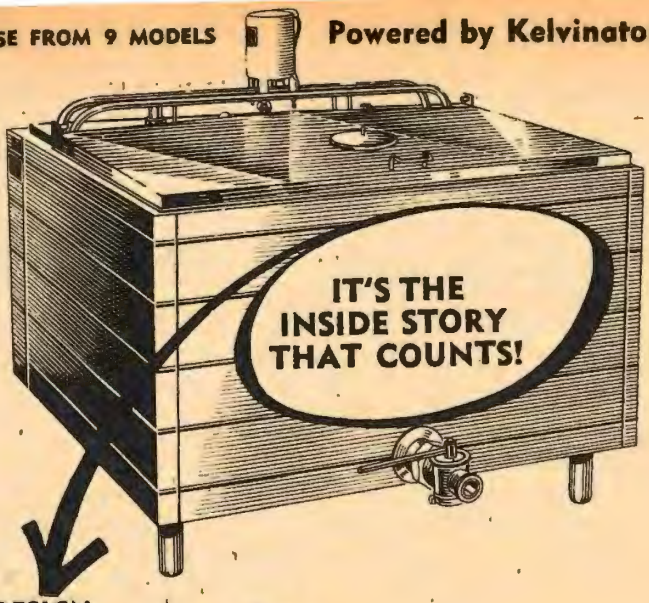

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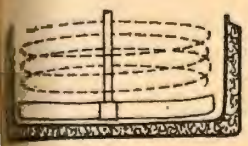

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3. Policy and Cost Control:

Policy—

The conversion to bulk is a policy matter, and requires a great deal of research before a decision can be made. It will be made along the following lines—

(a) Is it necessary to retain supply?

(b) Will it gain supply?

(c) Will it improve the quality of products?

(d) What expense is necessary to operate, maintain or enlarge can handling section?

(e) What expenses are necessary to equip for bulk milk?

(f) What economies can be expected after allowing for a premium to suppliers?

(g) Will it be a refrigerated or non-refrigerated system? We will assume the former, as (c), (e) and (f) would rule the latter out.

Comments—

(a) and (b) need no comment.

(c) Basically, edible products must and do show an improvement, providing, of course, milk quality is strictly controlled, both from the point of view of sanitation and temperature.

(d) If facilities are adequate and building is not required for other purposes, then this element can only be judged on the cost of operation, which we will refer to under Cost Control.

(e) and (g)—again under Cost Control.

Cost Control —

(i) **Milk Receiving Capital—**

The cost of setting up a new milk receival section for handling 30,000 gallons of milk per day in cans would approximate £20,000.

Whilst the annual depreciation on this cost would not vary greatly in terms of pence per lb. butterfat on a 30,000 gallon per day supply, it could amount to approximately 1d. per lb. BF in the early years of establishment.

The cost of labour, refrigeration, electricity and net steam approximates 1d. per lb. BF.

(ii) **Transport—**

Transport savings will mainly come about by . . .

(a) Reduction in frequency of pick-up;

(b) Increase in load capacity of tankers against can trucks, e.g., a change-over from 1,000 gallon can trucks collecting once-a-day for eight months and twice a day for four months, to

2,000 gallon tankers collecting skip-a-day for eight months and once-a-day for four months, would cut the miles travelled by half under average conditions. 12½% of this would be due to reduction of the frequency of pick-up and 37½% to load capacity.

Frequency of pick-up can contribute a saving of up to 25% where the density of production is less or the distance longer, and, of course, where every-third-day collection can be practised.

If the cost of carting milk in cans was, say, 5d. per lb. BF., the 50% saving in miles travelled would save approximately 2½d. per lb. BF. If 1,500 gallon can trucks had been in use, the saving would be 1½d. If milk was picked up at the roadside prior to change-over, the saving would be on an average of ½d. per lb. BF. less.

(c) Operation . . .

These economies are based on the assumption that the cost per mile would remain constant, but in fact, there is a further small saving in the order of 2d. per mile, or approximately 5%, equal to ¼d. per lb. BF. after taking into account:

Increases—salary and fuel,
Decreases—depreciation,
licences and
registration fees.

It will be seen the most important factor in transport savings is the increase in load capacity. Therefore, it is absolutely necessary that the farm and shire roads are brought up to a condition that will carry the increase in axle loadings.

(iii) Checking Milk Receipts—

The most controversial subject on bulk milk collection in Victoria has been the loss of milk purchased, brought about by the inaccuracies inherent in a calibrated system. I have heard it said that losses range between 5 lbs. to 15 lbs. of milk per pick-up, but I would suggest that a large number of factories do not know the true position, as they have no accurate means of knowing the content of each tanker load received.

There are two contributing factors to these losses:

1. Slip-shod methods employed in measuring milk;
2. The inherent inaccuracies in calibration.

Methods employed in checking the accuracy of drivers are:

1. (a) Weighing milk through existing milk scales . . .
Whilst accurate, it is laborious and not practical to check every tanker, and it requires an extra pumping operation.

(b) Calibrated storage tank . . .

This cannot be regarded as better than a rough check. It requires an extra pumping, and would occupy several tanks if every tanker load is to be checked.

(c) Flow meters . . .

Whilst preferable to (a) and (b), these have their limitations, and apart from being subject to variation by temperature pressure and air imprisonment, the makers do not guarantee accuracy better than ±.5%. On 2,000 gallons, this represents 100 lbs.

In addition, meters with a capacity of around 12,000 gallons per hour (necessary to economise on turn-round of tankers) are very expensive, being in the order of £2,000, fully equipped and installed. They will handle a tanker load at a time, and require very careful usage.

(d) Weigh bridges . . .

The newest type of weigh bridge with a full-length platform is perhaps the best means of checking tankers, as they have a guaranteed accuracy of 14 lbs. and do not involve an additional pumping operation, as do holding tanks set on scales.

2. Calibrations:

The Weights and Measures Act in Victoria provides for a tolerance of 5 lbs. for tanks not over 2,000 lbs. and 10 lbs. for tanks over 2,000 lbs. This means that the full tolerance can be taken up at the lowest level of calibration. Australian Standard N.46 states this as being 10% of the capacity of the tank, therefore, during the season of low production, losses could be as high as 2.5% for a 200 gallon tank.

I believe the tolerance should be reduced by 50% (as in the case of W.A.) then 50% should be allowed on the bottom half and 50% on the top half.

There is a strong case to expect the tolerance should favour the the buyer of milk only, as all the inaccuracies involved in measurement, such as milk creeping up the dip stick, milk waves, froth, aeration, etc., does inflate the reading, and so reacts against the purchaser.

Again, the level of the tank is all important considering 1/16th of an inch could represent 10.32 lbs. of milk.

Note.—It is the practice to calibrate tanks in pounds rather than inches or gallons, as these require the use of conversion tables. However, this is not strictly accurate as the specific gravity of milk does vary from place to place.

As effective agitation requires the agitator to be positioned near to the centre of the tank, the dip stick will be found to one side or end of the tank, therefore, the slightest fall to the dip stick can result in over measurement of milk with heavy losses

to the factory. To maintain the tank in a level condition one cannot rely on the bubble level installed on the vat.

Vats should be constructed with built-in levelling points so that a straight edge level can be used.

Unfortunately the tendency in Victoria is to reduce the height of the tank, which is increasing the inaccuracies in milk measurement.

(iv) **Checking Butterfat—**

A drip sample should be taken of all milk as it is being pumped into the factory.

The butterfat calculated from these samples should be compared with the amount of butterfat paid to suppliers on a test period basis. Any unexplainable discrepancies should be followed up by similar tests being made on each tanker load received on a day to be decided. Any tanker load that cannot be reconciled should be followed up by a visit to each farm serviced by the particular tanker with a series of milk samples being taken from the milk in the tank, a composite of which should be reconciled with a drip sample of the same milk.

When sampling the milk in the tank, a sample taken from the outlet should be included. If this sample does not agree, steps should be taken to see that the agitator is rectified.

Efficient agitation is not so vital where milk is sampled by the drip method, but it is very necessary if samples are extracted from the vat, a practice I do not subscribe to.

IV. SUNDRY ITEMS:

1. Tankers—

The important features of a tanker are:

(a) In the absence of an Australian Standard they should be constructed to the British Standard;

(b) In view of the importance of load capacity, tankers should be designed to give maximum axle loadings permitted under the Transport Regulations when loaded to 90% of capacity;

(c) It should be the aim to keep the centre of gravity as low as possible, therefore an oval horizontal tank with two compartments is recommended;

(d) To ensure quick effective cleaning, it should be fitted with an inbuilt spray cleaning system.

(e) To facilitate the quick return of cleaning solutions and to provide for rapid milk draining, the tanker should be constructed with an inbuilt face of at least 6".

(f) To protect the tanker against possible damage from cleaning temperatures and high discharge pumping rates (12,000 to 15,000 G.P.H.), provision must be made for adequate air intake.

A sure way to safeguard this position is to have an internal valve in the outlet from the rear compartment which is operated through the manway in such a way that the manway cover cannot be closed whilst the valve is open. However, it is necessary to cover the manway with an air strainer whilst milk is being pumped from tanker.

(g) To facilitate the cleaning of inside surfaces, S.S. should be of the "rolled finish" and not a polished finish.

(h) Adequate "non-slip" steps and hand rails are very necessary.

Articulated vehicles should be fitted with fully oscillating turntable, shock absorbers or air-bag suspension.

2. Farm Tanks—

There is no need to deal with the performance of farm tanks as the Australian Standard N.46 is the authority in this regard; however, it would be as well to look at some of the designs and methods used by manufacturers.

Refrigerated—

Having decided in favour of a refrigerated vat, one has to decide whether it be refrigerated by a chilled water system or by direct expansion, the main points of difference being:

Chilled Water.—With a chilled water system, a pre-determined quantity of water stored in a tank is chilled to ice by use of a refrigeration compressor. The chilled or ice water is then pumped through a milk cooler or directed on to the walls of the milk vat or both and then returned to the ice-making tank. The return of this water will raise the temperature in the ice tank, which in turn starts the compressor running until the water is chilled down again. This process continues while there is milk in the vat and is sometimes referred to as an accumulator type. The horsepower requirements of the motor to drive such a unit is naturally low: 1½ h.p. being adequate to cool 300 gallons of milk to 40° on a once-a-day collection basis during the hottest period of the year. Being of the accumulator type this system operates both night and day; therefore portion of the power consumed will be charged for at the night rate tariff.

Direct Expansion.—With a direct expansion system, there is no stored cooling medium; therefore the compressor unit has to be adequate in capacity to cool the milk within a determined time limit. To cool 300 gallons to 40° within 2 hours after the completion of milking on a once-a-day pick up basis, this type of unit may require a motor of up to 4 h.p.

The use of motors in this range of h.p. may place too great a burden on the services of the power supply authorities, if an appreciable number were installed in some districts.

If it is to be a Chilled Water unit, then a further decision will be required, for in this category you will find two distinct types of units.

Packaged Unit—usually known as the cold wall variety. The advantage of this unit is that it does not require any ancillary equipment other than a strainer which also acts as a direction piece to direct the milk from the releaser into the vat. For this reason cleaning time is kept to a minimum.

Some farmers like to pre-cool their milk with the farm water and so save on power costs, but if this means the retention of the surface aerator with the addition of an elevator pump, it does not appear a proposition for the relatively small annual savings in the power bill, compared with the extra cleaning time and the possible contamination by surface aeration.

Milk is held under constant temperature.

Separate Components Unit—There are three types of units under this category:

(i) Employing an insulated vat without temperature control with an ice-making tank and retaining the surface aerator for cooling. This type is not desirable, as it relies entirely on its insulation properties to maintain the temperature of the milk. During the hotter months of the year this is not good enough, where a once-a-day collection is practised and would certainly not be good enough on farms holding City milk contracts.

(ii) Similar to (i) but with an auxiliary cooling coil built into the vat.

(iii) In the case of both (i) and (ii) most types are dependent on pre-cooling with farm water to cool milk to 40°. This means that 2 (or 1 extra large) aerators have to be employed which increases cleaning time and exposure to aerial contamination and of course where the farm water is above 65°, it would be impossible to cool milk to 40°. However, there are one or two units in this category which will cool to 40° without relying on pre-cooling, but it is doubtful whether ony of these units are a proposition against the packaged unit unless they have an appreciable advantage in capital cost.

Vacuum tanks in my opinion (whether Ice Bonk or Direct Expansion) are the tanks of the future as they embody three essential features.

(a) By virtue of the design of the tank, they should be economical to manufacture.

(b) As milk is not exposed to atmospheric conditions (from cow to tank), quality is safeguarded from contamination by extraneous matter.

(c) Tank and machines can be coupled into an in-place cleaning system.

3. Milk Quality:

Those factories who recommend farm refrigerated bulk in preference to water cooled bulk do so in the belief that it does improve milk quality.

This belief has been confirmed over and over again, but unfortunately too many dairy farmers do not recognize the advantages to be gained by their industry in producing only choicest grade milk.

A number of factories are equally responsible for this position for they have done little to educate their suppliers. In fact, some factories have encouraged poor quality by their action in taking suppliers from other companies because their milk hos been down graded.

Again, those factories separating milk for casein or skim powder are usually not so quality conscious for a choicest grade milk is not so essential for good quality powders.

This, in my opinion, is a short-sighted policy, for the day may come when they might be glad to turn to those products demanding a choicest grade milk.

Apart from this, I don't think there is any doubt that the quality of their butter would improve if their milk was of a higher standard.

The following are some of the points necessary to control milk quality:—

On the Farm—

(a) Follow a sanitation programme recommended by the Department of Agriculture or the factory.

(b) Milk should be strained and filtered on entering vat.

(c) Outlet valves must be dismantled for cleaning each time the vat is emptied.

(d) Milk must be kept agitated.

(e) Milk room should be free of flies and well ventilated and shaded by planting trees if necessary.

(f) Vat lids should be kept closed and the dust cover kept on the vat outlet whilst the vat contains milk.

(g) Milk should be cooled to and held at 40°F.

At the Factory—

(a) Preferably tankers should be cleaned with an inbuilt spray cleaning system connected to tanks containing cleaning and sterilizing solutions.
If cleaned manually, operator should wear special boots to prevent scratching S.S. surface.
Solution passing through sprays should be strained to prevent jets from blocking.

(b) Transfer hose should be connected into inplace cleaning system, but should be inspected once a week with the aid of a mirror, fittings should be removed at frequent intervals.

(c) Pump should also be connected into cleaning system but first remove impellor. It should be completely stripped once a week.

(d) Equipment not connectable to the cleaning system should be dismantled and cleaned each day.

(e) Areas difficult to reach with the sprays, such as manways, should be brush cleaned.

(f) Once the tanker has been sterilized, manway covers should be closed. If "hypo" is used, tankers should be left to drain as it will attack S.S.

(g) Swab tests should be taken at frequent intervals to prove the cleaning method.

Extracts From
AUSTRALIAN STANDARD N46—1963
REFRIGRATED FARM MILK TANK UNIT

PREFACE

This standard was prepared by the Association's Committee on Bulk Milk Handling in response to a combined request from the several State Departments of Agriculture.

In the preparation of the standard the committee took into account the following overseas standards:

Draft British Standard CY(DAC)9607, Refrigerated Farm Milk Tanks (September, 1958).

3-A Sanitary Standards for Farm Milk Cooling and Holding Tanks, formulated in the U.S.A. by the International Association of Milk and Food Sanitarians in collaboration with the U.S. Public Health Service.

In drawing up minimum performance requirements, the committee adopted the view that tank-units should be capable of cooling and storing milk in accordance with good practice as required by the several Departments of Agriculture when the full capacity of the tank is used every day in ambient temperatures that may reasonably be expected in the dairying districts of Australia.

As the period of highest milk production, throughout the dairying areas of Australia, coincides with the hottest months of the year, the committee studied relevant climatic data and took this into account along with experience gained in bulk milk collection since its inauguration in this country. The facts indicate that summer conditions in Australian dairying districts are more arduous than in the dairying districts of the U.S.A. or the U.K., where minimum performance requirements are based on satisfactory operation in ambient temperatures up to 90°F.

The performance requirements of this standard are more stringent than those of the countries mentioned above in that they demand satisfactory performance in ambient temperatures up to 95°F; furthermore, in order to ensure continuous operation through short peaks of extra high temperature, it is required that tank-units be capable of operating in an ambient temperature of 104°F for at least two hours without interruption by the functioning of protective equipment.

It should be understood that, where experience indicates that a tank-unit may reasonably be expected to be subjected to more arduous conditions, it may be necessary to instal a tank-unit of superior performance in order to meet the requirements of the relevant authority. Such conditions should be the subject of consultation between the purchaser and the vendor, and the relevant authority.

SCOPE.—This specification sets out **minimum requirements** for the design, construction and performance of tank-units for the refrigeration of milk and its storage in bulk at atmospheric pressure on farms. It applies to tank-units **designed for every-day pick-up of milk.**

PERFORMANCE 1.3.1 General. The tank-unit shall be suitable for its intended use on a dairy farm from which **every-day pick-up of milk** is practised in ambient temperatures up to 95°F and for short periods up to 104°F.

In practice, the tank-unit shall be capable of meeting the duties prescribed in Clauses 1.3.2 and 1.3.3 below without freezing any part of the milk.

1.3.2 In Ambient Temperatures up to 95°F.

(i) **Afternoon Milking.** The mean temperature of a volume of milk equal to **40 per cent** of the capacity of the tank, when added to the vessel at a uniform rate over a period of 1 hour, shall be continuously reduced from 95°F to 50°F in 2½ hours, and from **95°F to 40°F in 3½ hours,** the vessel initially having been empty for 2 hours following washing, in the monner described in Appendix A, with a volume of water at 75°F equivalent to 7½ gallons per 100 gallons of the capacity of the tank.

(ii) **Morning Milking.** The mean temperature of a volume of milk equal to **60 per cent** of the capacity of the tank shall be continuously reduced from 95°F to 50° in 2½ hours, and from **95°F to 40°F in 3½ hours,** the vessel **initially** containing **40 per cent** of its capacity at a mean temperature of 40°F and then receiving the 60 per cent at a uniform rate over 1½ hours.

NOTE: The periods of time specified in (i) and (ii) above are reckoned from the time when milk flows into the vessel.

(iii) **Holding.** After the mean temperature of the milk has been reduced to 40°F or less, the heat gain by the contents of the vessel, which may be any quantity from 20 per cent to the capacity of the tank, shall be limited by the operation of the cooling equipment or by virtue of the insulating properties of the tank or by both so that the mean temperature of the milk will not exceed 40°F nor will the surface temperature of the milk exceed 45°F at any time.

1.3.3 In an Ambient Temperature of 104°F. The tank-unit shall operate for a period of **at least 2 hours** in an ambient temperature of 104°F, **without interruption by protective devices** and **without over-heating of the motors,** under the tank conditions of milk contents and temperatures which demand the maximum input of electrical energy.

TANK SIZES. Tanks may be of any size, but the following sizes are preferred:

(i) **Where the capacity is denominated in gallons**—100,, 150, 200, 250, 300, 400, 500 gallons. Above 500 gallons, capacities that are multiples of 100 gallons are preferred.

(ii) **Where the capacity is denominated in pounds of milk**—1000, 1500, 2000, 2500, 3000, 4000, 5000 lb. Above 5000 lb., capacities that are multiples of 1000 lb. are preferred.

FITTINGS. The tank shall be provided with means for agitation of the milk, a capacity measuring device, a milk thermometer, and a milk thermostat, as specified in the following clauses of this Section.

PERFORMANCE. The cooling equipment, including any pre-cooling equipment supplied in it, shall be so designed and proportioned that it will cool the milk from 95°F to 40°F or less in accordance with the requirements of Clause 1.3.

INFORMATION TO BE SUPPLIED BY THE MANUFACTURER. The manufacturer shall make available adequate instructions for the safe and proper operation and cleaning of the tank-unit. This information shall include the following:

(i) The maximum temperature at which milk should be admitted to the vessel.

(ii) Where this temperature is less than 95°F, requiring the pre-cooling of the milk in a pre-cooler comprising part of the tank-unit, the maximum inlet temperature of the pre-cooling medium and its required rate of flow.

(iii) The design saturated suction and condensing temperatures of any condensing unit.

(iv) Appropriate cleaning materials and methods.

MARKING. The tank-unit shall be legibly and indelibly marked with the following information:

On the Tank—

(i) Manufacturer's registered name or mark.

(ii) Designation of model and serial number.

(iii) Capacity.

(iv) The words, "DESIGNED FOR EVERY-DAY PICK-UP."

(v) Minimum refrigerating capacities (for definition see Clause 1.2) required of condensing unit and pre-cooler (if any, in accordance with Clause 7.1 (ii)) in order to meet performance requirements of Clause 1.3. These markings shall include minimum condensing unit capacity required in Btu/hr at o saturated suction temperature designated by the manufacturer.

(vi) Any markings required by Weights and Measures authorities.

(vii) Any label or mark issued by an approved testing authority[20] as to compliance of the model with the performance requirements of Clause 1.3. Such label or mark shall identify the cooling equipment with which the tank has been tested in order to determine compliance with Clause 1.3.

(viii) Any label or mark issued by a statutory authority[21] as to compliance of the model with the other requirements of this specification.

(ix) The number of this Australian standard, i.e. AS N46.

NOTE: The designation AS N46 marked on the tank is an assurance by the manufacturer that the tank-unit complies fully with the requirements of this Australian standard.

On Each Item of Cooling Equipment—

(i) Manufacturer's registered name or mark.

(ii) Designation of model and serial number.

(iii) Refrigerating capacity. For condensing units, this shall include the Btu/hr at a saturated suction temperature designated by the manufacturer with an ambient temperature of 95°F.

CERTIFICATE OF TEST. Upon request, the vendor shall supply a copy of an approved testing authority's[20] certificate of test of performance carried out in accordance with this specification on a stock model of the tank-unit. The certificate shall identify both the tank and the cooling equipment that comprised the stock model which was tested and to which the cerificate applies.

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[20] That is, the testing authority approved for this purpose by the Department of Agriculture in the State in which the tank-unit is to be used.

[21] For example, Department of Agriculture in State in which tank-unit is to be used.

CONDITIONS OF APPROVAL

METROPOLITAN MILK SUPPLY REGULATIONS, 1962

4th October, 1965

BULK TANKER PICK-UP

Regulation 3 of the "Metropolitan Milk Supply (Bulk Collection Regulations 1962" dealing with the type, dimensions, construction and material used in any farm milk tank states:

> "Every person holding a milk producer's license who requires milk to be collected from his premises in bulk shall supply or have available on the premises specified in such license a tonk or other receptacle (hereinafter called "a farm milk tank") of such dimensions and constructed of such material and in such manner as the Board shall approve for the purpose of storing milk in a manner which will enable the same to be collected in bulk by means of tankers."

The Board's basis of approval of refrigerated farm bulk milk tank units will be:

(1) One unit of each brand of tank to be tested by an authority set up in Australia for the purpose, and a certificate that the unit complies in full with A.S.N. 46—1963 and any amendments thereto is to be obtained.

(2) Other units of the same make but of varying sizes will then be acceptable to the Board provided the unit is stamped with the symbol A.S.N. 46—1963 and a warranty is given to the purchaser by the maker that the unit complies fully with the Australian Standard.

R. B. CANT, Secretary.

REGULATIONS RELATING TO FARM MILK TANKS AND TANKERS

METROPOLITAN MILK SUPPLY (BULK COLLECTION) REGULATIONS

(28 June, 1962)

3. Every person holding a milk producer's licence who requires milk to be llected from his premises in bulk shall supply or have available on the premises ecified in such licence a tank or other receptacle (hereinafter called "a farm ilk tank") of such dimensions and constructed of suchm aterial and in such anner as the Board shall approve for the purpose of storing milk in a manner hich will enable the same to be collected in bulk by means of tankers.

5. No producer shall use any farm milk tank—

(1) unless the same complies with and is stamped in accordance with the regulations relating to farm milk tanks made under the Weights and Measures Act, 1934-1958, on the 8th day of June, 1961, and an inspector appointed under such Act has certified that such tank has been verified and tested under these regulations;

(2) Unless there has been supplied for use with each farm milk tank a dip stick graduated and stamped in accordance with the abovementioned regulations made under the Weights and Measures Act, 1934-1958.

6. No person shall take delivery of or receive any milk into any milk tanker wned or driven or used by him unless that tanker is fitted to the satisfaction the Board with equipment approved by the Board and capable of taking and ceiving milk from a farm milk tank.

7. (1) Every person employed as a tanker driver or tanker driver's assistant in connection with the delivery or handling of milk shall while so employed—

(a) be clean in habits;

(b) wear clean washable outer garments; and

(c) keep his hands and person clean.

(2) A person shall not after urinating or defaecating handle any equipment or plant used for delivering milk from a farm milk tank to a tanker or for taking any sample of milk without first washing his hands.

8. No person shall spit, smoke or use tobacco in any form within a distance 30 ft. from the nearest point of any tanker while milk is being delivered into taken out of the same.

9. (1) If after inspection a supervisor is satisfied that—

(a) any tanker used by the owner of any treatment premises or depot for carrying milk is not clean; or

(b) any equipment used on any tanker or for taking delivery of milk from a farm milk tank into a tanker is not clean; or

(c) any person employed as a tanker driver or tanker driver's assistant is affected with disease so that any milk treated, handled or stored in any tanker is likely to be contaminated,

he may by writing under his hand addressed to the owner of the tanker without further name or description make a provisional order—

(i) that the tanker or equipment be forthwith cleaned and be kept clean;

(ii) that no milk be received into a tanker for such time as he thinks necessary or except subject to such reasonable conditions as he may specify.

(2) A provisional order made pursuant to the preceding sub-regulation shall unless confirmed by the Board in the meantime cease to have effect after the expiration of 72 hours from the making thereof.

(3) The Board may vary the order on confirming it and may from time to time after confirming an order vary or revoke the order.

10. No person shall use or drive or permit to be used or driven any tanker unless the same and all equipment shall have been sterilized immediately after the completion of each day's operations and kept in that condition until the commencement of the following day's operations.

11. Except in so far as these regulations provide to the contrary, milk received from a licensed producer into a tanker shall be deemed to have been received at the milk treatment plant or milk depot at which it is intended to be delivered and shall forthwith be weighed, graded, tested and recorded in accordance with the provisions of the Metropolitan Milk Supply Act, 1946-1957, and the regulations made thereunder.

12. (1) No driver of a tanker receiving milk into a tanker from the premises of any producer shall receive such milk unless prior to such receipt—

(a) the quantity of milk to be delivered or received shall have been measured by means of the abovementioned dip stick while the milk is completely at rest in the farm milk tank;

(b) the said milk has been graded by a qualified grader.

(2) Immediately after the quantity of milk has been measured and graded the driver or qualified grader shall record by means of ink or indelible pencil or by such other means as the Board shall approve in a book (hereinafter referred to as "the bulk collection record book") supplied by the proprietor of the milk treatment plant or depot the name and identification number of that producer allotted to him by the milk treatment plant or milk depot for which such milk is intended and the date on which the milk was received into the tanker and the weight and grade of such milk. The proprietor of the milk treatment plant or depot shall cause the information recorded in the bulk collection record book by the same or similar means and on the same day to be recorded or entered in the milk record sheets kept in accordance with regulation 42 of the Metropolitan Milk Supply Regulations, 1951, provided always that in the case of Saturdays, Sundays and public holidays the records required to be entered on the said milk record sheets shall be entered on the next succeeding working day. The said records shall be signed daily by the person making the same.

13. No person shall mix or receive or cause to be mixed or received in a tanker any milk obtained from or supplied by any producer who does not hold a milk producer's licence or whose licence has been cancelled or suspended or milk which in the opinion of the qualified grader does not conform to the standard prescribed by the said Act or the regulations made thereunder with milk which is intended to be used as city milk.

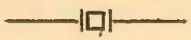
14. (1) The driver of every tanker used in collecting milk by bulk shall before receiving any milk thoroughly mix the milk in the farm milk tank and in the course of receiving the milk into the tanker take or cause to be taken a sample thereof of not less than six ounces by a method known as "the drip method" or some other method approved by the Board provided always that in lieu of or in addition to the sample taken by the method aforesaid the Board may direct such driver to take samples of milk held for delivery as aforesaid direct from the farm milk tank after the contents thereof had been thoroughly mixed and before any part thereof had been received into the tanker.

(2) Every sample taken pursuant to sub-regulation (1) of this regulation shall be placed in a watertight container which shall be marked with the same name or identification number as that of the licensed producer from whose tank the sample was taken. Such container shall immediately be placed in ice or some other approved refrigerant in an insulated or refrigerated chamber or box kept at a temperature of 40°F. and such sample shall be delivered as soon as practical to the qualified tester at the milk treatment plant or milk depot to which the milk is to be delivered. Such tester shall take from the sample sufficient milk to enable him to carry out the composite butter fat test and shall forthwith carry out the same and may carry out the test known as the methylene blue test with the portion of such sample not required for the first mentioned test provided the tester carrying out the methylene blue test is satisfied that the container used for taking the sample and its seal were first sterilized.

(3) The balance of the sample above referred to shall be retained for a period of six hours and every factory tester, manager or person in charge of any milk treatment plant or milk depot shall on demand hand to any supervisor or person employed by the Board or authorized by the Board to receive the same the whole or any portion of the sample then in his possession or in or about the premises of the said milk treatment plant or milk depot and the Board may apply to the same such tests as it thinks fit.

15. The provisions of the Metropolitan Milk Supply Regulations, 1951, relating to the grading, weighing, recording and testing of milk and the care and preparation of samples shall apply (in so far as they are applicable) to these regulations.

(By courtesy of the Government Printer).



INDEX TO ADVERTISERS

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E SOUTH AUSTRALIAN
AIRYMEN'S . . .

Journal

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Published Bi-monthly

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—Photograph by courtesy "The Chronicle"

MARBLE BAR VENTURE'S CROWN (A.I.)
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Champion—Royal Adelaide Show, 1964
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THE SOUTH AUSTRALIAN DAIRYMEN'S JOURNAL

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Aston House, 13 Leigh Street, Adelaide. 51 3034
President: H. E. LOECHEL
General Secretary: DAVID J. HIGBED
Advertising Rates on application

30 YEARS BEHIND US

The Association has now entered into its 31st year, having been formed on 19th July, 1935.

On that memorable occasion a provisional committee was appointed, comprised of Messrs. Herbert Walsh (President), Llayd Hampton, Tom Smee, Jock Gormlie, J. Y. Hudd, H. Duell, L. J. Cailles, A. S. Brabham, G. E. Boord and B. B. Wilhelm, with Mr. J. R. Hewland as Secretary, and on immediate start was made on building up the new organization, which appeared to have plenty of work on its hands right from the beginning. Within a month, the Executive was engaged in solving a dispute between 26 producers and a factory at Salisbury. The dispute was solved to the satisfaction of the producers, and from that point onwards the Association has continued to work for the welfare of producers, perhaps not always as speedily, or with as much success as in that first instance, but certainly with the undivided purpose of achieving the best possible result for its members and for producers in general. We are confident that the next 30 years will be no less progressive than the first 30.

—AND 60 YEARS AGO—

(Well, almost 60 years, anyway; 58 years. to be exact.)

On 9th November, 1907, our progenitor, the Adelaide and Suburban Dairymen's Association was formed. Mr. James Anderson was Chairman, and Mr. R. G. Lillywhite was Secretary. From the time of its formation the pressure was on, and meetings were held every Thursday night, at the Exchange Hotel, Hindley Street, as there was great concern about the price of milk. Some members believed that the price should be increased to 3d. per pint, but there was opposition to a rise of this magnitude, because of the number of dairies that were being conducted by Adelaide City Council employees in the Parklands, and by butchers in conjunction with their butchering business.

For this reason it was felt that registration and supervision of dairies was the first step, and when after 3 years of intensive campaigning, this was successfully achieved, the retail price of milk was raised to 3d. per pint.

If only they had known it then, those pioneer dairymen had an easy victory, for **the price of milk does not appear to have risen during the next 36 years,** being still 3d until the first determination by the newly formed Metropolitan Milk Board in October, 1947.

—MARBLE BAR VENTURE'S CROWN—

This young A.I. bred Ayrshire bull, typical of this uncommon but attractive breed, has been Junior Champion and Champion at two successive Royal Adelaide Shows.

"OVER-PRODUCTION OR UNDER-CONSUMPTION"

An address given by the Hon. G. A. Bywaters, M.P., Minister of Agriculture, in opening the Annual Meeting of the Central Council of the South Australian Dairymen's Association on 28th August, 1965.

Firstly, I would like to thank you, Mr. President, for your words of welcome and the kind remarks that you have expressed. I, too, hope that this cordial arrangement will continue between the Ministry and your Association and for my part I am sure that this will be so.

I am, as you have stated, aware of many of your problems, and I have some working knowledge of the dairying industry because, although not being a dairy-farmer, I have a number of dairy farmers in my electorate, some of whom I see here, which makes me feel a little bit at home. I am happy to be associated with primary producers because I believe that while we must have secondary industries we must never lose sight of the fact that it is primary industry that really counts in this State. We as a nation, have an obligation to fulfil in providing foodstuffs for people who are not as well placed as we are to produce them, and of course this concerns your industry just as much as other primary industries. I say this because there does appear to be a fear that your industry is facing a stage of over-production.

Certainly production has gone up very steeply in recent years and is still going up. This is brought about through improved farming, improved pastures and improved methods generally and this should be a matter not for condemnation but for congratulation. I think we should endeavour to strive for even greater things in this field. Let's not talk about over-production when it is brought about by increasing our efficiency.

Now it has been suggested that something should be done about curtailing future licences. At first, this sounds as though it might be the answer to your problem, but let me say that there are less licences today than there were 12 months ago; in 1963-64 we had 2,339 licences, today we have 2,285 licences and this is the lowest figure on record so that isn't your answer.

I believe that we've got to look somewhere else for the answer, because there is a danger that if you insist on decreasing the number of licences the authorities may consider the best way to do this is to remove some of the existing ones, and this is a situation that wouldn't please me very much, because one of the problems in your industry is that you have got some uneconomic dairy farms. No one likes saying these things but still it is true and we've got to face it. I look to your Association to provide me with the answers because although I know that there are people today who would perhaps be better off out of the dairying industry, are we going to tell these men that they should get out. These people have bought into properties — people who come from the ranks of wage earners to go out on the land, which is an admirable thing, but they have gone into areas which are not economic.

Today we can see a decrease in licences, yet we have an increase in production, by way of efficiency, and I think that we are not looking at the problem positively — that is the promotion of milk sales and the promotion generally of dairy products. We find that as far as our per capita consumption is concerned, we are using less dairy produce and drinking less milk than we have in the past.

Now, this isn't good; what we want to be doing is to be building it up instead of allowing it to drop, and I think that the decline is due to the fact that we are not taking the opportunity of publicising the noture of your product.

I went out to Watervale the other night and I noticed just out of Gawler an excellent sign advertising the tetra pak of Golden North. This is a striking sign and can be seen for some distance before one arrives at it. I don't know whether tetra pak and homogenised milk is the answer but I do say that it certainly gave a boost to sales in the North.

I am not here to tell factories what they should do, nor to tell you what you should do, but to me it seems logical that we should go all out to increase the sales of your product and I think that whole milk is the best of the lot; certainly the most profitable as far as you're concerned.

I know, too, that there are a lot of other things that are worrying you at the moment and one that has been worrying me also is the increase in margarine sales. I had a good deal of representation from three different companies, our own local company and the two major interstate companies to increase quotas when I first became a Minister. This was not new; pressure had been placed on the former Minister and one firm now operating from interstate had already supplied the former Minister with a lot of information and a lot of propaganda; it was only reiterated when I came in so it wasn't new, and I have refused all of these requests for an increase in quota.

As you are aware, any increase in quota can only be made after discussion with the Agricultural Council, which represents every State in the Commonwealth. In this case I said I wasn't going to differ from this —I knew that it would be discussed at the Agricultural Council and it was — but despite this, Marrickville decided to come in under Section 92 of the Constitution. We had this investigated by the Crown Law authorities to see what action could be taken, and we discussed it as a matter of policy in Agricultural Council, and it was the opinion at that time that it would be ruled out as sub judice.

On that advice we didn't go any further with it. We may be forced to wait and see what will result from the High Court action.

One of the things, of course, that has led to this problem of margarine is this propaganda about milk products being bad for the heart. This is something that needs a real concentrated effort to overcome because the doctors are strongly divided on this particular issue and I have had quite a number of medical reports.

I think that the best thing for people to do today is not to worry about whether they are going to build up cholesterol because of milk products or animal fats but to get off their lazy bottoms and do a little bit of exercise because this sort of thing builds up cholesterol more than anything else.

I appreciate the very close relationship between your association and the former Minister and I can assure you that there will be no change of policy in this regard and you will find that my door will be open to you at all times. There is only one worry that I have at the moment: there isn't just enough time to go around but I can assure you that when you have a problem I'll only be too happy to talk with you and discuss with you these problems.

I know that you'll always have problems as long as you're an industry — the same as anybody else. We will meet them and we will overcome them as they come along, because you have such a live-wire organization and are always aware of what the problems are. Providing you, as an organization, stick together and work together (have your differences of opinion—certainly—but be united in your approach to your problems), then I am sure that you won't have any real worries in the future.

Statistics

ADELAIDE METROPOLITAN MILK SUPPLY AREA

PRODUCTION (000 gallons)

	For Month		Total since July 1		Total since Jan. 1	
	1964	1965	1964/65	1965/66	1964	1965
August	4,233	4,434	7,798	8,282	26,638	28,272
September	4,846	5,170	12,644	13,452	31,484	33,442

SALES (000 gallons)

	For Month		Total since July 1		Quota %		C.M.B.	
	1964	1965	1964/65	1965/66	1964	1965	1964	1965
August	1,673	1,733	3,385	3,505	39.5	39.1	1/9¾	1/11¼
September	1,608	1,671	4,993	5,176	33.2	32.3	1/7⅞	1/8¼

Moving Average Quota for 12 months ended 31/8/65, 41.57%; 30/9/65, 41.43%

INTERIM PRICES TO LICENSED SUPPLIERS

(All prices are interim only and subject to adjustment by restrospective payment)

1965	Basic	C.M.B.	Total	3%	3.5%	4%	4.5%	5%
	(per lb. butterfat)			(per gallon)				
August	3/6½	1/11¾	5/6¼	1/8½	1/11¾	2/3¼	2/6¾	2/10¼
(Cents)	35.42	19.79	55.21	17.09	19.94	22.79	25.64	28.49
September	3/6½	1/8½	5/2⅝	1/7¾	1/10½	2/1¾	2/5	2/8¼
(Cents)	35.42	16.77	52.19	16.16	18.85	21.54	24.24	26.93

LONDON PROVISION EXCHANGE QUOTATIONS

(Sterling Currency)

	August		September	
	1964	1965	1964	1965
Butter—Choicest Australian	334/–	319/–	334/–	314/–
Cheese—First Grade Australian	248/–	235/–	248/–	235/–
Rindless Australian	257/–	260/–	257/–	260/–

Experienced English Dairyman, married, seeks position. Apply this office, 5[illegible]

THAT TRADE AGREEMENT!

Perhaps the amounts involved are not great; perhaps secondary industry does provide more scope for national growth; perhaps we do receive £1¼ million in subsidy; but why pick on us?

No subject in recent years has caused greater concern to the dairying industry (and particularly to the cheese-producing section) than the Australia-New Zealand Free Trade Agreement.

The purpose of the Agreement is clear enough. It will provide a greater market for Australian manufacturers and a means whereby New Zealand can pay for the imparts she takes from us. It may well be that there was no alternative form the Agreement could take, and that somebody was going to be hurt anyway, but to us it does appear that the burden has not been spread very evenly.

As to Mr. McEwen's jibe about the subsidy, our reply is "So what!" By any measure the Australian farmer is factor-efficient, and the only reason that he is not just as cost-efficient also is that the price of everything he uses on the farm is jacked-up way above that of his competitors in other dairying countries by the scandalous level of Australian tariff protection.

Everything? Yes, everything! Wise guys will say, "There's no tariff on tractors." No! but there is on tractor tyres, batteries, electrical equipment, bearings, nuts and bolts and the spare parts that, sooner or later, you are going to need for your tractor.

And, anyway, the effect of tariff is not limited only to the protected items.

Because the prices of so many articles in daily household use are inflated by tariff protection, wage levels must be higher to offset this. So we pay more for farm labour, and for every item that is produced at Australian wage rates.

So now our pampered manufacturers have had another market opened to them. Let's hope that the increased production volume that will result will be seen by the Tariff Board as a reason to reduce the level of protection. That way we could get back some of what we are losing.

Together with our fellow organizations throughout Australia we have taken action to bring to the notice of the Federal Government our concern at this Agreement, and we sent the following letter to South Australian Members and Senators in the Federal Parliament.

2nd September, 1965.

Subject: Australia-New Zealand Free Trade Agreement

Dear Sir,

I am instructed by the South Australian Dairymen's Association to express our concern at the effect of the Australia-New Zealand Free Trade Agreement on a section of the Australian dairying industry, and at the confusion that has been caused by the incompleteness of the information in the statements made by the Minister for Trade.

As you are aware, the Free Trade Agreement provides for the admission, duty free, in the first year, of 400 tons of cheddar cheese rising in five years to a maximum of 1,000 tons.

As the Minister has stated, in relation to Australia's total cheese output, the quantities are not large, and we agree that the total quantities must be viewed in relation to the previous level of exports (which, however, we claim with the exception of 1963-64, to have averaged more nearly 120 tons per year than the 200 to 250 tons stated by the Minister).

We accept also the Minister's statement that the possible cost to the industry of selling on export markets that amount of our output displaced from the total market by imported cheese may be only £12,000 per year, rising to £48,000 per year, providing our calculations exclude the current imports of 200 tons per year and providing that we assume that we can sell the displaced output at the average price we receive at present for our exports. But what is more likely is that the displaced output will need to be sold on marginal markets at a price less than the average export price, and the loss to the Australian dairy farmer (as all manufacturing, shipping and selling costs will be recouped in full) will be considerably greater than the Minister's estimates.

Consequently we believe that, because of the already very unsatisfactory relations between dairy farming costs and returns, any reduction in overall returns is to be deplored and resisted, even though the amount may be, as shown by the Minister's calculation, as low as ¼d. lb. butterfat.

We deplore, too, the fact that small though the amount may be per pound of butterfat, this sacrifice demanded of one section of the dairying industry is to benefit secondary industries. We are prepared to accede to the Minister's claims that "the manufacture of goods in Australia provides the greatest base for employment in this country" but we counter this by stating that the protection which secondary industry enjoys is the very factor that has placed the dairying industry in its present position, because of the fact that it is forced to pay for its factors of production far more than is paid by its competitors, **including New Zealand,** on overseas dairy export markets.

Our concern is increased also by the fact that the slight protection afforded the industry by the tariff on imported cheese, to offset in part the disabilities resulting from the high factor prices caused by the protection of secondary industries, has, in the case of cheese from New Zealand, been eliminated overnight, yet our case for an increase in tariff on imported cheese to bring the rate set in 1928 at least into line with present monetary values, has continued unanswered for over three years.

The Minister's statement in extenuation of the effect of the Agreement, that arrangements had been made to give Australian cheese producers an equivalent opportunity to compete in the New Zealand market, gives us no satisfaction. We can see little gain, even if we are given access to this market, in taking in each others' washing in this fashion.

The Association therefore asks you to express, on our behalf, concern at the terms of the Agreement relating to cheese, and to seek from the Minister his assurance that, if these terms cannot be modified to the advantage of the Australian cheese industry, he will immediately expedite action to increase the rate of tariff on imported cheese regardless of the protracted procedure which has been claimed to be necessary, and has been presented as the reason for the three years' delay.

Yours sincerely,

(Sgd.) DAVID J. HIGBED,

General Secretary.

DEATH OF A CHAMPION

Ellengowan Maybelle, Australia's greatest producer ever of milk, recently died of gas gangrenous mastitis. Her life-time yield was more than 25,000 gallons of milk and over 8,000 lb. butterfat.

Bred by Buckley Bros. and Waite, of Wollongong, N.S.W., Maybelle was a registered Friesian weighing over a ton at 18 years of age.

She was purchased by Mr. W. Stone, of Wildes Meadow, N.S.W., as a seven-yeor-old for 350 guineas. Mr. Stone estimates she returned him over £4,000 worth of milk over 10 years.

Australia's greatest butterfat producer is still Yarraview Golden Daffodil, a Guernsey which died at the age of 15 years 3 months in 1959, in her 13th lactation.

She gave 152,593 lb. milk testing 5.9% and 8,934 lb. butterfat. She recorded only 70 lb. in 90 days in unfinished lactation. Her average for the other 12 was 739 lb. fat per lactation.

LEAFLET ON VOLTAGE LEAKS

A new leaflet recently issued by the South Australian Department of Agriculture describes how voltage leaks occur in the milking shed, and how to eliminate them.

Mr. M. A. Liebelt, a dairy adviser with the department, is author of the leaflet, No. 3795.

Entitled "Milking is Affected by Voltage Leaks," it is available free on application to the department, Box 901 E, G.P.O., Adelaide.

PRODUCER UNITY AT FEDERAL LEVEL

Primary producers who have been watching with interest the proposals for a merger at Federal level of the National Farmers' Union and the Australian Primary Producers' Union in a new organization to be called the Australian Farmers' Federation were surprised recently to learn that so much progress had been made in such a short time when it was announced in the press and over the radio that "the two bodies will now combine into an Australian Farmers' Federation representing 200,000 farmers, 160,000 in the N.F.U. and 45,000 in the A.P.P.U." The report continued:

"Unity of primary producer organizations will end the duplication of national policy-making in matters affecting all farmers. It will, however, leave intact sectional organizations dealing with commodity problems.

"It was hoped that the A.F.F. would be in operation early next year."

Although progress had been made at the Annual Conference of N.F.U., the report was premature, and presumably arose from either wishful thinking or misinterpretation. In fact, what had actually transpired was:

(1) N.F.U. had proposed an alteration in its financing structure to redistribute the sharing of operating expense in a more equitable way. Although the A.P.P.U. had demanded a restructuring of N.F.U. finance as a condition of entry, the N.F.U.'s action had been for internal reasons, and had been caused by the necessity to re-budget after the withdrawal of the Australian Woolgrowers' and Graziers' Council;

(2) The alterations are **only proposals** for examination by constituent organizations, and will be further discussed at the next meeting of N.F.U.;

(3) Discussions concerning unity are still proceeding and an acceptable constitution is still being hammered out, but **finality has not been reached.**

FINALS AND FORECASTS

1963-64

Returns for the 1963-64 season have been completed by the retrospective payment made in October, and the final basic price and the final equalized price are compared with previous years in the following table:

	Final Basic Price (pence per pound butterfat)	Final Equalization Price
1963-64	54.102	73.250
1962-63	50.262	72.063
1961-62	50.277	72.875
1960-61	55.709	77.500
1959-60	54.599	76.938

1964-65

An interim retrospective payment for 1964/65 incorporating an equalized step-up in cheese value of 9/8 cwt. cheese and final Commonwealth bounty of 1/6.9545 cwt. butterfat has been declared by the Commonwealth Dairy Produce Equalization Committee Limited.

For licensed producers in the Adelaide Milk Supply area this represents an increase in the interim basic price for the year just completed of 2.64107d. lb. butterfat, and will be paid on all production at the rate of 1.7/16d. lb butterfat equalized. The payment will be made early in November and will raise the interim basic price for the past year to 49.37d. lb. fat.

The General Manager of the Commonwealth Dairy Produce Equalization Committee Limited (Mr. J. Clark) has reported that a recent survey has confirmed that first values for butter and cheese were likely to be at least equal to those for 1963-64, although with large local stocks of cheese and U.K. stocks of butter and cheese still to be accounted for it was apparent that the actual final position would not be known for some time, probably well into 1966.

As a result of the step-ups which had been made earlier (and which have now been received by licensed producers), there was no room for any rise in values at this stage, but it has been decided to carry out a further review in December, when it is expected that the position will allow some further step-up for both butter and cheese.

1965-66

Mr. Clark has reported that, whilst it is a little early in the season to draw any worthwhile conclusions, trends at the present time indicate that there would be some **easing in final returns,** (particularly in the case of butter), **compared with those of the past two years,** and that the position of the equalisation funds was such that consideration of a possible increase in values had been deferred until early in 1966.

TEST ON ELECTRIC FENCE UNITS

The July issue of "Choice", journal of the Australian Consumers' Association, contains an excellent article giving tests on 16 electric fence units of the single-wire type.

To join the A.C.A., which is a wholly independent, non-profit-making organisation, formed for testing consumer goods for quality and value, forward the annual subscription of £1 to the Australian Consumers' Association, 20 Queen St., Chippendale, N.S.W.

To receive the article about electric fences, add another 4/- to your cheque and request that a July, 1965, issue be forwarded to you.

Further enquiries regarding A.C.A. will be welcomed by the General Secretary, at 51 3034.

SELECTED PROPERTIES

MOUNT PLEASANT AREA
(Grazing Property)

674 acres freehold land, undulating heavy gum country, with rocky outcrop, carrying 730 sheep, plus 70 dairy type cattle, should carry say 900 ewes, good wool country, well watered by permanent creek, plus 4 dams, 1 x 3,000,000 gall. equipped with electric motor, subdiv. into 13 paddocks. 10-roomed stone home which has been well maintained, all mod. cons. and in a picturesque setting. Stone shearing shed, stone barn, implement shed, 2 unit stone dairy fully equipped, C.M.L., various other sheds. This property is well situated close to all facilities with improvements that are in good order.

Price: £30,000. Terms: May be arranged. Inspection recommended.

KEYNETON AREA

433 acres freehold land, undulating heavy gum country with some rocky outcrop, subdivided into 22 paddocks, all paddocks watered by bore and well equipped, 5 dams, carrying at present 600 ewes and 40 cattle, 8-roomed stone and brick homestead in good condition, all mod. cons., good wool shed, hay shed, dairy fully equipped, double garage, workshop, etc. Well situated close to markets and other facilities. Price: £33,500.

ORCHARD — FOREST RANGE

30 acres freehold undulating to hilly land, 16 acres cleared including 12 acres of apples, 4 acres of gardening land, balance timbered. Boundary fencing cyclone and barb, watered by a dam equipped with centrifugal pump, ¾ in. sprayline through orchard, 40 x 20 packing shed, giving in working plant incl. 2 tractors, Holden utility, etc. Good 6-room stone veneer home with mod. cons.

Price: £9,000 w.i.w.o.

MOUNT PLEASANT
Grazing and Dairying

240 acres freehold, undulating loamy soils, with stony outcrops approx. 200 acres arable, all cleared, subdivided into 9 paddocks, sheep-proof fencing, watered by 2 wells equipped, 12,000 gall. squatters tank. Rainfall 26 in. At present carrying 530 sheep plus 20 cattle. Shearing shed equipped, shearers' quarters, hay shed, wood and iron dairy, C.M.L. and pick up. Cement brick garage, very well kept 5-room stone house with all mod. cons, incl. 2 septic toilets.

This property has been in the family since 1901. Price on application; very good terms.

MYPONGA
Grazing Property

290 acres freehold, 240 acres cleared, undulating country, pasture clovers and rye grass. Subdiv. 9 paddocks, good fencing, watered by dams and permanent springs. 5-room t.f. home. Phone and power connected. School bus passes door. This property at present carrying 500 sheep, plus 65 beef cattle is offered for sale on good terms. Price: £20,000.

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IMPROVING MILK QUALITY

By Dr. W. G. Whittlestone

[This article is the substance of a lecture tour made last month by Dr. Whittlestone, through the dairying districts of N.S.W. and Victoria. Dr. Whittlestone is Senior Principal Scientific Officer at the Ruakura Agricultural Research Centre in New Zealand.]

CLEANING THE MILKING MACHINE

BEFORE giving details of the steps which the farmer should take to keep his machine as clean as possible, in the light of modern knowledge it is useful to review the history of the development of what has now become known as the Triple Cleaning System.

Many years ago in a study at Ruakura an alkaline detergent formulation was developed which at that time was more effective as a cleaner than any other formulation tested. However, despite attempts to improve the alkaline mixture without increasing its corrosion characteristics, it became clear that it is necessary to use an acid at some stage in the cleaning cycle. Thus at Ruakura there developed the second system of cleaning involving the use of an acid detergent once a week. This was a distinct step forward over the single solution cleaning technique and for many years remained a standard. Some preliminary trials were started to test the effectiveness of pre-milking rinsing with the main aim of seeing whether the bacterial count of milk could be substantially improved by using a sanitizer before milking. Chlorine and iodine rinses were tried and in particular the iodophor proved to be very effective from the bacteriological point of view; however, about this time the work at Ruakura was discontinued.

In Australia, studies were started—particularly in co-operation with Mr. Ian Scott of the Department of Agriculture—to test the value of iodophor pre-rinsing as part of a cleaning system. Using an iodophor containing phosphoric acid to rinse the plant before milking and an alkali as a hot solution after milking, a comparison was made with the original Ruakura system, using an alkaline detergent six days a week and an acid detergent on the seventh. The results showed clearly that pre-rinsing with an acid iodophor is better from the point of view of milk-stone suppression than the original once-a-week system.

The field trials also demonstrated the difficulay of carrying out rapid testing of cleaning systems. It was apparent that one required something of the order of 30 farms and the trial had to run for periods of one or two months to get clear-cut results. Again in co-operation with the Department of Agriculture, and specifically with Mr. Alan Twomey at Hawkesbury Agricultural College, an instrument was developed for the acceleration testing of dairy detergents.

This made it possible to obtain in two days the results one would get in the field with something like 15 pairs of farms testing for a month. With this device, Mr. Twomey was able to demonstrate that the addition of a very small amount of certain non-ionic wetting agents to the cold water used to rinse the machine immediately after milking, produced a spectacular fall in the rate at which milk stone is built up. Generally it may be said that this low cost additive reduces milk-stone formation by a factor of ten—a truly important step forward.

As soon as the results of this test were known, work in New Zealand was commenced to test the efficiency of a non-ionic rinse for farm vats and over a period of a few months it became very clear indeed that a simple automatic farm vat rinsing system, using the non-ionic additive, was extremely efficient in reducing stone build up.

The Hawkesbury Accelerated Detergent Testing System was also used to check the type of detergent used in the Ruakura Alakaline Detergent formulation. As a result of these studies, Mr. Twomey has been able to show that certain low-foam, non-ionic detergents perform surprisingly well in the alkaline mixture. The reduction of foaming has greatly improved the efficiency of circulation cleaning, because foam results in a loss of active ingredient from the detergent solution and its accumulation where it is not wanted, in the vacuum tank.

It can be seen from the foregoing that progress has been made in steps by attacking the different phases of the cleaning problem, as it were, one at a time. First there was the alkaline detergent which gave a distinct improvement in general cleaning. By the use of an acid detergent the residues left by the alkaline solution were dissolved. By replacing the acid with an iodophor containing a low level of phosphoric acid, a marked improvement in corrosion characteristics, an increase in milk-stone removal and a great increase in the antiseptic properties of the cleaning system were attained. Still, however, the problem of milk-stone was with us, though to a much reduced degree. The use of the non-ionic additive has generally improved the whole cleaning system by dispersing the milk protein and helping to prevent its deposition on metal surfaces. Finally, the evolution of a low-foaming alkaline detergent has made it possible to get the full benefit from circulation cleaning.

The following is a practical system of machine cleaning which, in the light of present knowledge, is better than any other which has been tested.

Before milking, the iodophor solution is circulated or flushed through the machine at a concentration of 25 parts per million of iodine. This should be done before the cows are brought in so that the machine can drain before milking commences.

Immediately after milking, and without breaking the vacuum, a .03% of non-ionic additive is rinsed through the machine employing the normal procedure for the standard cold water rinse.

Following this, and again without breaking the vacuum, an alkaline detergent solution, based on the latest formulations developed by the Hawkesbury studies, is drawn through the plant at a temperature of the order of 160°. When possible this should be circulated.

Finally, the vacuum in the machine is dropped to about 7 inches of mercury, preferably by the use of an additional vacuum regulator fitted to the machine via a tap which is opened at the commencement of this stage of the cleaning operation, and boiling water is flushed through the machine. By reducing the vacuum the full benefit of the boiling water is obtained and a really sterilizing rinse is the result.

Mastitis Control in the Dairy Herd

Field studies carried out over the last year or so in New Zealand, and in other countries, have demonstrated clearly the benefits of good udder hygiene in the control of mastitis. Using a system involving an anti-septic udder soap applied before milking, after the udder had been superficially cleaned by the use of a hose and running water, followed, after milking, by a sanitizing procedure based on spraying an antiseptic on to the cows' teats as soon as the machine had been removed, it was found possible significantly to reduce the leucocyte count in the milk from the cows involved in the experiment and to reduce the number of infections.

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The machine is of course important and it is vital in good milking to have the machine adjusted to operate at the correct vacuum, to have the right pulsator characteristics and, above all, to have it fitted with an end of milking indicator so that over-milking can be avoided. However, even with a good machine, good hygiene is basic.

This has given rise to the search for the ideal udder antiseptic. The perfect antiseptic will, first, be a good detergent, so helping to clean the bacteria away because, after all, if bacteria can be removed from the surface of the teats, this is as good as killing them. Second, the material must have no undesirable odour which could possibly contaminate the milk. Third, it must be a rapid and broad spectrum antiseptic, killing all organisms which are likely to cause trouble. It also should not be interfered with by organic matter. Finally, if possible it should have a low cost.

The first widely-used antiseptic in the cow shed was chlorine, usually in the form of a solution of sodium hypochlorite. Such solutions are highly effective antiseptics but have no detergent properties. Further the chlorine is quickly consumed by organic matter and, being colourless, provides the farmer with no indications that the solution has gone out of action.

Th next widely popular type of antiseptic in the dairy was the quarternary ammonium compound. These compounds are bactericidal and also have detergent properties. Unfortunately they tend to de-fat the skin and are also somewhat selective, not attacking all of the organisms which are important to milk hygiene. More recently the iodophor has come to the fore in dairy hygiene. This is a new type of iodine complex in which the iodine is combined with a non-ionic wetting agent. The result is a solution which is highly germicidal and with properties in this respect similar to chlorine. The solution, being coloured, is self indicating. As soon as the colour disappears the farmer knows that the iodophor solution is no longer working. Like chlorine, iodine acts quickly but has very little persistence. It does, however, in the form of the iodophor, have good detergent properties.

Another type of antiseptic is chlorhexidine. This substance has a broad spectrum of attack on bacteria and is persistent. When combined with a suitable amount of wetting agent it will both clean and sanitize when used for the preparation of a cow's udder. In the control of mastitis it has been shown to be effective. The only objection to it is the fact that, due to its complexity, it is expensive when compared with the type of compounds referred to already.

Another class of antiseptic which is a relative newcomer in the field of dairy hygiene is the amphoteric or ampholytic compound. These compounds in their original form derived, in a sense, from the quaternary ammonium compounds but have quite different bactericidal properties. They are also more effective detergents. They have the property of being most effective as germicides at the naturol acidity of the skin and tend to adsorb onto the skin very strongly so that they are highly persistent. Being detergents they are also effective in the removol of dirt and the dislodgement of bacteria from skin surfaces. This class of compound has been known for about 10 years and much progress has been made in applying such germicides. Quite recently in Sydney a highly significant development has occurred in that a new type of ampholytic compound has been discovered. This compound, or class of compounds, combines the high detergency of the original ampholytics with a much more effective bactericidal action. It would appear from earlier studies with amphoterics that they make the ideal skin antiseptic becouse of their low irritation. The new amphoterics would appear also to have this low irritability, combined with a quite remarkable germicidal action and a high persistence. Studies at present in progress indicate thot they may also be much cheaper to use than many of the earlier organic antiseptics, while at the same time having, at the recommended use concentrations, a very effective oction.

Just as there are three fundamental steps in the cleaning of the milking machine, so there are three basic requirements in the sanitizing of the cow's udder at milking time.

- The first step is the washing of the udder, using a hose and running water to remove most of the superficial dirt, followed by the application of a good detergent sanitizer rubbed thoroughly into the skin of the teats and lower udder and then flushed away. This removes bacteria and kills them as well. The teat cups are then placed on and, after milking, removed as soon as the milk flow rate has fallen to half a pound a minute as shown in the indicator.
- Before the cow goes out, a layer of antiseptic is sprayed onto the teat and rubbed in briefly to ensure that the sphincter, in particular, which has been opened by the milking action is protected against infection by a droplet of highly active germicide. This is the second step.
- The third step in preventing the spread of infection from one cow to the next by the machine is either the dipping of the teat cups two ot a time with vigorous movement in an effective germicide, or the backflushing of the cups through a suitable flushing valve with water containing an active germicide.

If the farmer is prepared to apply the three main steps in machine cleaning and the three steps in udder hygiene, while it may slightly increase the cost of his cleaning and sanitizing operations, it will undoubtedly result in a uniformly high quality of milk, and—more important still from an economic point of view—a highly significant reduction in the incidence of mastitis. Sub-clinical mastitis reduces the chemical quality of the milk by reducing total solids and causes the contamination of the milk with leucocyte cells and with bacteria. It also reduces the cow's ability to secrete milk efficiently.

In a typical dairy herd with perhaps 20% to 30% of the cows sub-clinically infected, one may estimate that those cows have had their production reduced by at least 10%. Thus one can say quite definitely that the introduction of a good system of hygiene will save the farmer money and produce a better product. —(The N.S.W. Milk Board Journal.)

MASTITIS CONTROL IS NECESSITY, NOT LUXURY

Says Dr. Murnane D.V.Sc.

Wherever there is a dairy herd, there is also mastitis!

We sometimes hear an owner boast that his herd is "free from mastitis," or another claim that he has eliminated the disease by this or that.

Such statements delude only themselves; they are not swallowed by the experienced dairy farmer nor by the veterinarian with wide experience in the investigation and treatment of the disease.

In over 30 years of searching, I have not found a single herd free from infection, and I do not believe that one exists.

Some are closer to it than others.

Neither is there any such thing as "a sure cure" — at any rate, not for Staph infections. Fortunately, the Strep is much more easily disciplined.

What can't be cured should be prevented. In fact, even what can be cured should be prevented. Mastitis comes into both these categories.

For years we have been preaching the gospel of preventing the spread of the disease by improving our milking methods and shed hygiene. Research workers in all other civilised countries harp on the same string.

From England comes an article by a leading authority and research worker which commences thus: **"The short answer to ridding our herds of mastitis is Hygiene."**

We couldn't agree more, except perhaps that we would say "easing" instead of "ridding."

FARMER MUST MAKE REAL EFFORT

We are pessimistic enough to believe that, up to the present, it just isn't possible to RID a herd of Staph infection, but we are optimistic enough to be absolutely convinced that it is possible to keep it under control and down to a low level — provided the owner is sincere in his endeavours to overcome the problem.

To quote from another article which came to hand recently, this time from U.S.A.: "Helping a dairy-farmer with his mastitis problem is like helping an alcoholic with his drink problem — both men must want to be helped if anything is to be achieved."

Very true. Some owners just accept mastitis as inevitable and make no efforts to control it other than to reach for the antibiotic tube.

Others seem to think that they have so much of it that they can't do anything about it until some miraculous vaccine is pulled out of the hat.

But let us be realistic, and face the facts. Mastitis can be controlled. It has been controlled, but not without honest and sincere effort. It just doesn't happen.

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INCENTIVES WOULD HELP

In Australia I think we are lagging in our efforts to control this disease on a national scale. The reason for this is not hard to find. Pounds, shillings and pence play a leading role in many aspects of our existence.

There is little incentive for one farmer to strive for a top grade product while the chap down the road receives just as much per gallon for a mediocre product which "just gets by."

And until he is paid a premium price for quality, or the chap down the road receives a "penalty" price for an inferior or sub-standard product things will go on that way.

Apart from fat and S.N.F. content, the quality of milk can be assessed on its bacterial content which influences keeping quality, flavour, odour, manufacturing properties, etc.

The bacterial population of a milk arises from two sources,

Within the udder (i.e. infection of the milk secreting system).

- Extraneous contamination with organisms on the surface of the udder or on, or in, improperly sanitised milking machines and milk handling equipment.

This bacterial population, irrespective of its source, is further increased by storage and temperature as every dairyman knows.

It is not difficult to determine by simple laboratory methods whether the predominating bacteria in a milk sample have originated within the udder or from the milking equipment.

It has long been known that mastitis, whether clinical or subclinical, has a marked effect on milk quality. Not only does it render the product objectionable as a liquid food, but it also impairs its manufacturing value.

LEUCOCYTES A GUIDE

All veterinarians, most factory operatives, and many farmers are nowadays aware of the significance of the leucocyte content of milk.

The number of leucocytes is the most reliable indicator of the degree of inflammation present in the udder, and the degree of inflammation is proportional to the extent of injury caused by bacteria or by mechanical damage.

While total bacterial counts and methylene blue tests have done much to improve the standards of milk sanitation, handling, and refrigeration they are not reliable indicators of the quality of milk as it leaves the udder.

In the U.S.A., public health authorities are concerned about this and nation wide attention is being given to methods of testing. In some States, milk with leucocyte counts in excess of certain levels is not accepted for human consumption or for processing.

It is expected that the practice of testing milk for leucocytes will extend. As it does, dairyfarmers will be faced with the necessity of reducing the incidence of mastitis in their herds.

The first requirement is a means of measuring the level of these leucocytes.

We know that normal milk from a healthy quarter contains leucocytes in numbers ranging from a few thousand to about 100 thousand per c.c. When we get up to 300,000, and above something is wrong.

And when leucocyte counts reach 5 to 10 million per c.c. the red light should flash on!

There are several ways of detecting excessive numbers of leucocytes in a milk sample.

One crude method is to take a sample from a suspect quarter into a tall test tube and let it stand for six or eight hours. The leucocytes will settle down as a sediment in the bottom of the tube and be visible to the naked eye.

But the count has to be extremely high (in the millions) before the sediment is heavy enough to be very obvious.

The next method is to have samples examined at a milk laboratory. This is time consuming and hence limited in application.

The third method is the use of the Rapid Mastitis Test (called the California Mastitis Test in the U.S.A.) by the veterinarian or by the farmer himself after being instructed in the application and reading of the test.

This test, although not 100 per cent accurrate, is a very valuable and rapid indicator to the leucocyte level in a milk sample, and is being used very extensively in the U.S.A. and in the U.K. for this purpose.

More recently it has been introduced in Australia and New Zealand and is destined to play an even greater part in the control measures against mastitis if we are to produce quality milk on all farms.

In the next section we will describe the actual methods being employed in America, the U.K. and in its infancy in Western Australia, to do something really worth while in the control of mastitis.

In the previous section we dealt with the need to control the disease and methods of detecting it — particularly the mild, or sub-clinical, form of infection which causes a greater total loss to the dairy farmer than the clinical (obvious) cases. In this section we will outline a method of getting herd infection down to a minimum.

The general principles have been advocated for years in most dairying countries; most of these principles have been practised in a half-hearted manner, off and on, at some time or other, by many owners.

Few, however, have made an "all out" attack on the disease and kept it up sufficiently long to gain worthwhile and lasting benefit.

To their credit, Department of Agriculture officers in Western Australia have recently picked out the vital steps in control and put them into practice — and they have something to show.

We will outline the system adopted, but before doing so we will forestall the critic who will say, "It couldn't be done, it takes too much time."

Well, you either want to control mastitis or you don't — you take your pick. Weigh your losses due to the disease from all angles against the time taken to apply the control programme and you will soon find which scale pan goes down.

DAIRY PRODUCE AND HEART-DISEASE

It will be a long time, if ever, before the last shots are fired in the "battle of the fats."

The report of Professor Blackett's research on the effect of a "modified diet" aimed at reducing the level of serum chloresterol in the blood, which was published in the Australian Medical Journal early this year, has been followed by considerable correspondence in the Journal criticizing certain aspects of the research, and querying the validity of the conclusions which Professor Blackett made.

The subject has recently been raised again in South Australia with the introduction of the "poly-unsaturated" margarines for which the claims concerning the reduction in serum chloresterol are made, and it is heartening to be able to report that no new medical evidence has been produced, since the entry of this margarine, to support these claims.

Rather, the only authoritative statements have been in contradiction of the claims.

From London has come the news that a group of doctors there are stating that "a low-fat diet has no place in the treatment of people with coronary heart disease"; their opinions being based on a six-year survey of 264 heart-case patients.

A Melbourne heart specialist, whilst not going quite this far, was prepared to state that "the use of the so-called paly-unsaturated oils is still in the experimental stage, **and to exploit them for commercial use is entirely premature.**" He said that the real health problem in Australia was not eating too much butter but eating too much food. Any food could produce chloresterol, but it was the total quantity of food eaten that was significant, and most Australians ate too much and were, on average, many pounds over-weight.

The latest, but certainly not the last, comment comes from the S.A. Medical Officer of the National Heart Foundation of Australia, Dr. C. C. Jungfer.

Dr. Jungfer said that the **latest medical thinking could find no basis for the supposition that fats did cause heart disease,** and the matter was "quite unproven."

The dairying industry, whose produce contributes so much to the nutritional needs of this country, are grateful for these statements, but because they are not spread in huge black type over a whole page, they may well escape the notice of the average reader.

CERTAINLY EVERY EFFORT SHOULD BE MADE TO DRIVE HOME TO THEM THAT WHATEVER CLAIMS ARE MADE, EVEN BY THE MANUFACTURERS, SUCH CLAIMS APPLY ONLY TO SPECIAL MARGARINES, SELLING AT ABOVE THE PRICE OF BUTTER.

NO CLAIMS AT ALL CAN BE MADE FOR ORDINARY MARGARINES WHICH WERE RIGIDLY EXCLUDED FROM PROFESSOR BLACKETT'S MODIFIED DIET.

FIVE STEPS TO FOLLOW

Here is the basic plan to follow:—

- **Have the milking machine tested and any faults corrected.**
- **Rapid Mastitis Test (RMT) all cows for three successive days.**
- **Classify cows into:—**
  (a) a "clean" group made up of cows with all quarters RMT negative and 1 positive, and those with quarters RMT 2 or 3 positive AND UNDER TREATMENT. All cows in this group are milked first.
  (b) an "infected" group comprising all cows with one or more quarters RMT 2 or 3 positive AND NOT UNDER TREATMENT. This group is milked last.

  The animals in group (b) are identified by means of dog chains around their necks.

  [This is a very good, quick, practical method of marking cows. They can be seen easily, and when no longer required the chain can be removed in a moment and used on the next cow. Dog chain can be bought by the yard very cheaply and can be cut in suitable lengths. Fit a halter snap or other type of spring clip to one end of each neck chain.]
- **Newly calved cows are RMT tested and allocated to group (a) or (b) according to result of the test, and whether treated or not.**
- **All cows are RMT tested weekly and results recorded.**
  Quarters in the clean group (which were previously RMT negative or 1 positive) and have now gone to 2 or 3 positive are not treated immediately unless the milk is obviously abnormal, but if still positive the following week they are treated.

  Any cows with treated quarters which remain 2 or 3 positive are returned to the infected group and neck chained.

TWO-GROUP SYSTEM IN ACTION

The above may sound somewhat complicated, but it isn't. What it boils down to is this: Classify the herd into two groups on the RMT results.

(a) "Clean" group, milked first, containing RMT negative and RMT 1 positive, AND RMT 2 or 3 positives UNDER TREATMENT.

(b) Infected group containing RMT 2 or 3 positives NOT under treatment, with neck chains, and milked last.

On the basis of weekly RMT tests, and treatment, cows are moved from one group to the other, and chained or unchained accordingly.

Dividing the herd at milking time may not always appeal to the owner; the advisability of keeping infected cows in the herd may be questionable.

However, in practice, it is found that most dairy farmers can not afford to cull all positive cows at once. Neither can they afford the severe loss of milk for a week which would arise from wholesale treatment of all positive quarters at once.

The two group system is therefore an acceptable alternative to drastic culling.

Once the owner realizes that the spread of mastitis is under control in group (a) he becomes owore of the undesirability of maintaining group (b) and tends to sell them off as it becomes economically feasible.

ACTUAL RESULTS IN THE WEST

With this programme, of course, it is absolutely essential to practise good milking shed hygiene, otherwise much of the good work goes for nothing.

As an example of what can be attained by this Western Australian system, the experience in three herds can be quoted.

The first was a herd in which mastitis was a real problem, as evidenced by the fact that in the 12 months prior to the initiation of the system 15 out of 18 heifers had been culled.

The programme was commenced in July, 1963. The milking machine was tested and faults corrected. The RMT was carried out on all cows, on each of four days prior to the commencement of the programme.

There were 71 cows in the herd, with 283 functioning quarters, of which 134 (47%) were RMT negative, 56 (20%) were RMT 1 positive, 42 (15%) RMT 2 positive, and 51 (18%) were RMT 3 positive.

On the last of the four-day preliminary testing, only 12 of the 73 cows then in the herd had all four quarters negative.

SIMILAR FIGURES IN OTHER HERDS

The herd was then divided into the two groups — the "clean" group of 43 cows in which 46 quarters 2 or 3 positive were placed under treatment immediately, and the infected (chain) group of 30 cows NOT under treatment.

Six months after the commencement of the programme the situation was: 71 cows milking, 277 quarters functioning, of which 217 (79%) were RMT negative, 42 (15%) were 1 positive, 11 (4%) 2 positive, and 7 (2%) 3 positive.

By now only seven cows remained in the "chain" group being milked last.

After a further six months the situation was: 74 cows, 288 quarters of which 239 (82%) were negative, 36 (13%) 1 positive, and 13 (5%) were 2 and 3 (combined) positive.

In another herd of 90 cows the results were:

At the beginning: 196 quarters (55%) negative, 52 quarters (14%) were 1 positive, and 110 (31%) 2 and 3 positive.

After six months, 226 (84%) were negative, 31 (12%) were 1 positive, 12 (4%) were 2 and 3 positive. Six cows in the "chain" group, being milked last, were responsible for 10 of the twelve 2 and 3 positives.

In a third herd of 57 cows, 110 (49%) of quarters were negative, 54 (24%) were 1 positive, 63 (27%) were 2 and 3 positive.

Six months after the programme was commenced, the situation was: 186 (82%) quarters negative, 14 (6%) 1 positive, 26 (12%) 2 and 3 positive. Twenty-four of the twenty-six 2 and 3 positives were in the "chain" group.

It should be clear from a study of the above figures that much can be achieved by systematic control measures, coupled with good hygiene.

The Western Australian investigations are being extended. If, as expected, they prove to be a real step forward, one would hope that they will be adopted as the basis of a nation-wide anti-mastitis move.

Cessation of lactation, or "drying off", is in the main due either to natural processes or to the effect of disease, especially when the disease happens to be mastitis.

In both cases the "mechanics" of the reduction in yield, whether it be partial or complete, is the same. It results from some, or all, of the milk-secreting cells in the udder going out of business.

To begin with, let us refresh the memory by a brief run over the make-up of the four individual and separate glands (quarters) which comprise the udder.

At the lower extremity of each quarter is the teat—a tough "delivery tube" with a circular purse-string muscle at the tip which prevents the escape of milk between milkings.

The teat canal opens above into a large storage cavity called the milk cistern, capable of holding approximately half a pint.

From the milk cistern several large milk ducts go off. These ducts branch and re-branch into smaller and smaller ducts, like the branch of a tree, until finally they reduce to a size far too small to be seen with the naked eye.

At the terminal end of each of these tiny ducts is a minute milk-sac (alveolus), so small that each cubic inch of udder tissue contains four or five millions of them.

Each alveolus is a thin-walled sac lined by a single layer of milk-secreting cells. When empty these sacs are in a soft collapsed state; when full of milk they are distended and tense.

Each individual milk-secreting cell is a complete milk manufacturing plant.

It draws the components of milk (fat, protein, carbohydrate, minerals, vitamins, water, etc.) from the bloodstream circulating in a network of fine blood capillaries in contact with it.

TINY CELL DOES BIG JOB

It should be stated here that actually milk fat (or butter fat) does not exist as such in the blood stream, but the "raw materials" do. The milk-secreting cells extract these raw materials and build them into milk fat.

Similarly, milk protein (casein) does not exist as casein in the blood so the cell has to extract the raw materials from the blood and build them into casein.

Again, milk sugar (lactose) does not exist in the blood. The sugar in blood is glucose, so the milk cell has to take in glucose and convert it into lactose.

Then to all these components it adds minerals, vitamins, water, etc. in the correct proportions and turns out the finished and complete product — Milk.

Not a bad performance for a single cell a thousand times too small to be visible!

THEY CAN'T GO ON FOR EVER

As each cell becomes distended with milk, it ruptures and discharges its contents into the cavity of the milk sac. The break in the cell wall heals rapidly and the process goes on again and is repeated many times between milkings.

As the milk-sac cavity fills, it drains into its little duct, which in turn drains into larger and larger ducts down the line and eventually into the milk cistern and the teat.

It will be obvious that, as these little milk factories operate at full capacity, non stop, day and night for months on end, they eventually wear out.

They gradually deteriorate, shrink and wither away. The udder dries off. How soon or how late this happens depends on the individual cow.

Some dry off after only a few months' lactation, others after nine or 10 months, some milk through from one lactation to the next.

MASTITIS SPEEDS TISSUE DAMAGE

Most, if not all, of these milk sacs completely disappear during the dry period, leaving the duct system intact.

Just before the commencement of the next lactation, i.e. when the cow "freshens" or "springs", new milk sacs are budded off from the ends of these millions of ducts and spring into activity, producing milk.

This is the normal course of events in a healthy udder.

What happens when mastitis intervenes?

The course of events then is a somewhat similar story, but much accelerated if the infection is mild or if treated successfully in a very early stage. But there is a much more dismal picture if the infection is severe or if treatment is delayed and unsuccessful.

EVEN DUCTS CAN BE DESTROYED

Any infection damages secreting tissue. If it is mild, it may partially damage a certain number of milk-secreting cells and milk sacs, or completely destroy a small number of them.

If it is severe, it will ruin large numbers of both.

If the infection is more severe still, it will destroy not only the milk cells and the milk sacs but also the little ducts.

Hence, in mild infections where the ducts have not been destroyed, there is a good chance that new milk sacs will be budded off from them subsequently or at the next lactation and that yield will return to something like normal.

But in severe infections, where large numbers of ducts have been destroyed and replaced by fibrous tissue, new milk sacs can not be formed and there is virtually no hope of a return to normal yield.

"THE VICTORIAN DAIRFARMER"

SENIOR V.P.'s LONG SERVICE RECOGNISED

The many years of service given to the dairying industry in South Australia since the early 1920's, and to the South Australian Dairymen's Association since its formation in 1935, by our Senior Vice President, Mr. "Jock" Gormlie, of Pompoota, were recently given recognition in tangible form by his colleagues of the River Murray and Jervois Districts. At a social held in Murray Bridge on 16th September, attended by about 70 persons, Mr. Garmlie was presented with a gold automatic wrist-watch. (Not a calendar watch: no one can say that Jock doesn't know what day it is!—Ed.)

The social, which was convened and presided over by Mr. N. Green, President of the River Murray District, was to have been attended by the Leader of the Opposition, Sir Thomas Playford, a life-long friend of Mr. Gormlie, and it is unfortunate that a late sitting of Parliament prevented this, as Sir Thomas' attendance would have been a fitting tribute to Mr. Gormlie's unique position in the industry. In Sir Thomas' absence, Dr. V. G. Springett was present instead, and gave those present a fascinating glimpse of his personal acquaintance with some social problems that are assuming major proportions in this State.

Others who spoke of Mr. Gormlie's service were the General President of the Association (Mr. H. E. Loechel), Mr. Frank Honnaford, who shared Mr. Gormlie's experiences in the work of organizing dairyfarmers in the early days, Mr. Green, and the General Secretory (Mr. David Higbed).

A vote of thanks to Dr. Springett was moved by Mr. Tony Kenny and supported by Mr. Tom Nolan.

The presentation was then made to Mr. Gormlie jointly by the Presidents of the River Murray District (Mr. Green) and the Jervois District (Mr. Roger Vogt).

In his reply, Mr. Gormlie referred in typical Jockular fashion to the difficulties that were encountered in the early years of the settlement, not only with the practice of dairyfarming, but in negotiations with the milk buyers and in organizing the farmers for their mutual protection. Once some form of organization was achieved it was then necessary to bring stability to the industry by developing the Milk Marketing Committee and by having the legislation passed to set up a Milk Board and a Dairy Products Board, and Mr. Gormlie's personal reminiscences of the difficulties encountered in establishing the industry framework that we now take for granted revealed the debt that today's dairyfarmers owe to the industry's pioneers.

The work of organizing the River Murray farmers into the River Murray Dairymen's Association, of which Mr. Gormlie then became vice president, was followed by the formation of the Amalgamated Dairy Council, of which also he was appointed vice president and dairyfarmers' representative on the Australian Dairy Stabilization Committee (the "Potterson Scheme").

From this to the formation of the South Australian Dairymen's Association was another step, and Mr. Gormlie has filled the part of senior vice-president of this Association for the past 30 years.

CAN YOU HELP

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LET'S BE SENSIBLE ABOUT MASTITIS

In an article published in the previous issue of this Journal, Dr. Murnane set out a regimen for MASTITIS CONTROL in the dairy herd because he claimed that "IT JUST ISN'T POSSIBLE TO RID A HERD OF STAPH INFECTION BUT . . . IT IS POSSIBLE TO KEEP IT UNDER CONTROL."

This outlook has been strongly contradicted by the Senior Veterinary Research Officer (Cattle Diseases), Mr. Martin Dodson, who claims—

- *that IT IS POSSIBLE TO ERADICATE MASTITIS, including Staph. mastitis;*
- *that THERE ARE EXAMPLES WHERE THIS HAS BEEN SUCCESSFULLY ACHIEVED;*
- *that, PROVIDED THE INDUSTRY GETS BEHIND IT, A SUCCESSFUL CAMPAIGN CAN BE CARRIED OUT;*
- *that, AS AN ECONOMIC MEASURE, SUCH A CAMPAIGN DESERVES EARNEST CONSIDERATION AND HIGH PRIORITY.*

Mr. Dodson discounts as "defeatist" and dangerous the regimen proposed by Dr. Murnane for control, and strongly criticizes the use of the California test, and describes in the following article the way in which he belives the problem should be tackled.

The treatment of mastitis goes on and on and on: new, more powerful, quicker curing, longer lasting, broader spectrum antibiotics are constantly coming

EAST LYNNE KING

This champion Friesian bull at the 1965 Royal Adelaide Show, artificially bred by SNIDER'S FOND HOPE KING (Imp.) out of CRAIGMORE PAULETTE was well commended by the judge as being a beautiful type of bull, showing all the dairy qualities.

on to the market and are being lapped up eagerly by all and sundry, hungry for the magic cure.

Have Dairy Farmers, possibly unconsciously, become philosophical about mastitis, accepting the fact that it is just part of dairying, the same as flies, mud and low butter-fat tests?

IS PENICILLIN EFFECTIVE?

We all know, because we have been told so, so often, that Penicillin cures mastitis. Well, does it? If you ask any dairy farmer with a mastitis problem you will get a variety of answers, such as: "Yes, but it breaks out again", or "No, I have had no success with Penicillin, but I got something stronger from the vet. which did", and he may go on to say: "but it wasn't long before I had another case."

If you further ask a dairy farmer why he keeps getting mastitis, he usually becomes a bit vague and starts talking of faulty milking machines ("but I had them checked") or cleanliness ("but my shed is pretty good I reckon, compared to some and I do use a lot of disinfectants"). Perhaps it is like a cold, you suggest—you can cure a cold (can't you?), but that doesn't stop you from getting a fresh one.

Well, is mastitis like a cold? It's not that we can't cure it (of course, we can—read the advertisements—look how much Penicillin is sold; surely nobody would buy it if it didn't do what was claimed) but once cured there is no certainty that the cow will not contract it again, just as we catch a cold, recover and then sometime later catch another cold.

CONTROL, CURE, OR ERADICATE?

So, if we have a cure for mastitis, have we a method for preventing fresh outbreaks? If a cow recovers from mastitis and then contracts it again is it a fresh outbreak or the old one recurring?

If it comes to that, do we have to have a cure for a disease to eradicate it? After all, there are lots of diseases for which there is no cure that have been eradicated.

This leads to the interesting question: If there were no cure for mastitis would we still have mastitis?

HOW BIG, AND HOW COSTLY, IS THE PROBLEM?

How much mastitis exists in South Australia? On how many farms does it exist? What percentage of cows are affected? Are some districts more affected than others?

How much milk is lost through mastitis and, of course, how much is spent on curing it? And, let's be realistic about this, does the cost of treating mastitis exceed the amount lost in production, for the value of milk lost during treatment must not be overlooked in this calculation.

Suppose every dairy farmer suddenly got sick of spending all that money on Penicillin ("I won't buy another tube"), what would happen? Will we get more mastitis? How much more before the loss of production equalled the amount now saved that would otherwise have been spent on treatment?

THE TRADITIONAL APPROACH

Could a different approach be made to the problem of mastitis?

Before this question is answered, it might be advisable to analyse our present attitude and see if any weaknesses in our thinking show up.

Our approach, in general, is the traditional one: (1) Diagnosis; (2) Treatment; (3) Some attempts to eliminate the cause either by checking the machine for faults or the husbandry and milking techniques.

Since, by definition, mastitis is an inflammation of the udder resulting in abnormal milk, diagnosis is clinical. After the diagnosis has been made the treatment is started, and since some knowledge has accrued that mastitits is associated with such factors as faulty milking machines, and hygiene, an attempt to rectify these things is an obvious step. In general this is about as far as most thinking and action goes.

There are several weaknesses in this simple approach.

First, a bail side diagnosis is not sufficient. This does not show what the causative organism is. It is essential to know this to know what type of mastitis is occurring.

Second, the diagnosis does not indicate whether the organism is sensitive to Penicillin. If it is not sensitive to Penicillin then obviously it is a waste of time and money administering Penicillin.

The third weakness in this simple approach is that no indication is obtained of the source of the infection. Obviously without this knowledge it is impossible to prevent further cases.

THE VALUE OF DIAGNOSTIC AIDS

Much used to be made of the importance of the strip cup. Now we have a new gadget that is supposed to supersede the strip cup. This is the California mastitis test. Much publicity has surrounded this utensil. No claim is made that the use of this gadget will eradicate mastitis; what is claimed is that cases are detected earlier and thus treatment can be started earlier, and therefore it is better than the strip cup.

It is true that the California test does pick up cases earlier than the ordinary strip cup—if it is assumed, of course, that the test is read properly. This does not unfortunately always happen. It is harder to interpret than the strip cup and furthermore does not correlate very well with the more accurate laboratory test which is the only worthwhile criterion we have.

Since, however, the marketers of this utensil recommend only monthly routine tests, it is obvious that some, if not all, of this advantage of early detection is lost when compared with the daily use of the strip cup.

The strip cup and the California test are but aids in the detection of mastitis; **they therefore play no further part in eradication, the ultimate of all mastitis control.**

It is therefore a rather dubious advantage to use the California test, especially performed monthly, rather than the strip cup done twice daily as an integral part of preparation for milking the cow.

THE INADEQUACY OF TREATMENT

Merely to treat a cow because either the strip cup or the California test has shown positive demonstrates an incomplete understanding of the situation. Such a procedure ignores two basic facts:

First, nothing is known of the causative organism; second, nothing is known of the source of the organism.

Mastitis is a bacterial infection of the udder, but there are additional factors essential to this; first, a source of infection, and second, a predisposing cause leading to the weakening of the udder's resistance to the invading organism. It is the lack of knowledge of these two latter things that will negate any attempts to eradicate mastitis.

FINDING THE SOURCE AND CAUSE

Is it possible ot discaver the source and the predisposing cause? The onswer to the first is **almost certainly "yes"**, the answer to the second is **often "yes."**

Is it possible, knowing the answers, to eliminate mastitis from a herd? **The answer to this is "yes" in most cases.** Naturally there are many uncontrollable factors that must modify such an answer. One is obviously the dairy farmer's own desire to eliminate mastitis and his willingness to co-operate.

A PROGRAM FOR ERADICATION

What steps, then, must be taken to eradicate mastitis from the industry. I will list them:—

(1) **The recognition by the Industry itself that mastitis is an industrial problem leading to a serious economic loss and therefore an industrial responsibility to attempt to eradicate it.** No industry can tolerate a running sore without some sort of an analysis of the situation.

(2) **Full recognition can only come from a survey of the incidince of mastitis throughout the Dairying Districts of the State with an intelligent attempt to assess the cost of mastitis to the Industry both in loss of production and from cost of treatment.** This is the first positive step and therefore the most important. Careful consideration to the method of surveying must be given so that the most information with the least effort is obtained. Much thought therefore must be given to the sort of thing that should be known, not only in regard to the extent and cost of mastitis, but also information should be sought that will assist in developing an eradication program. Where to start, how big should the team be and so on, these things would have to be known.

(3) **Once the full significance of what mastitis means to the Industry, consideration must then be given to the best method of eliminating it.**

Other States are considering startling work on this. West Australia in particular has already started a campaign and it behoves this State to do something too.

HOW IT WOULD BE DONE

A central laboratory staffed with personnel capable of doing the Bacteriology and Cytology is the first essential, with a team of field personnel to handle each farm possessing a mastitis problem.

ELIEVE **CALF SCOURS** IN HOURS
WITH NEW '**NEFTIN**' TABLETS

can strike — and spread quickly — at any time, on any farm, even a well-
m. Bacterial scours are the greatest health threat to your stock investment.
ht, a scours outbreak can turn profits into losses. Prompt, effective, 'Neftin'
nt is essential if your losses are to be kept to a minimum.
the big factor — both for the infected animals and to prevent spread of the
to others. 'Neftin' tablets work fast. Relief is apparent in a matter of hours
ves recover in a day or so.
eftin', there are no future problems of bacterial resistance as there are
phas and antibiotics. And 'Neftin' is only half the cost of broad-spectrum
ics when used for a full 3 day course of treatment.
ftin' is so effective that just two doses, twelve hours apart, are often
nt.
terinary supplier will advise you that 'NEFTIN' tablets are the modern,
e, economical treatment for calf scours.

Smith Kline & French Laboratories (Australia) Ltd.,
Warringah Road, French's Forest, N.S.W.

SK&F

SKF23a.86.85ScN

This team would not be concerned with treatment at all, only with advice as what should be done. It will be the responsibility of the farmer himself to eat the animals under Veterinary Supervision.

Only by such a system as this can we hope to accomplish any significant re-uction in mastitis. Let's be sensible about all this. Mastitis is not something an can be done on the "do-it-yourself-kit" principle. **Few farmers really under-and mastitis, and the Veterinary Surgeon, although he understands it, hasn't ally the time.** He must be able to call on a special unit to assist them.

ETTING AT THE CAUSE

If the Industry really wants to rid itself of mastitis it must think past merely eating cases as they appear. There is ample evidence from past experience at this hasn't worked.

It cannot be emphasised too often that **Mastitis is an infection of the udder aused by a variety of organisms: which organism is responsible in each case ust be known.** Neither the strip cup nor the California test tells this.

If a cow has mastitis she has obviously got it from somewhere. **This source ust be found and eliminated** otherwise other cows will contract it. It is this at takes time and careful observations, only a fully trained team can do this.

Often the source of infection is in the least suspected animal; one that gives erfectly normal milk, but secretes bacteria capable of giving mastitis. Since she xcretes no cells, the California Test does not detect this type. **Only a full bac-eriological and cytological examination of every quarter will reveal this,** and though this is both time consuming and expensive **it is essential to any eradi-ation scheme.**

Limited experience has demonstrated that if the whole herd be sampled and xamined bacteriologically an assessment can be made of bacterial status of the erd, how heavy the bacterial population is, and which cows may be spreaders ithout actually having mastitis themselves.

HE TREATMENT

Those cows requiring treatment can then be treated with the **most suitable** ntibiotic and a further assessment made. Further treatment may be necessary nd also culling of certain cows can then be considered.

This method has been shown to be the most effective in eradicating mas-tis. It is in fact probably the only one that will eradicate it from problem erds.

I am quite certain that until this approach is made no worthwhile reduction the incidence of mastitis can be obtained. It is unlikely that mastitis will ver be completely eradicated. From a whole region this is too much to hope r, but what is possible is a farm by farm program that will effect a reduction a level where it is no longer economically significant.

But the demand for such a program must come from the industry. Without s support, co-operation and assurance it could not succeed.

Statistics

ADELAIDE METROPOLITAN MILK SUPPLY AREA

PRODUCTION (000 gallons)

	For Month		Total since July 1		Total since Jan. 1	
	1964	1965	1964/65	1965/66	1964	1965
October	5,479	5,716	18,123	19,168	36,963	39,158
November	5,373	5,076	23,496	24,244	42,336	44,234

SALES (000 gallons)

	For Month		Total since July 1		Quota %		C.M.B.	
	1964	1965	1964/65	1965/66	1964	1965	1964	1965
October	1,679	1,756	6,672	6,932	30.6	30.7	1/6⅛	1/7⅛
November	1,653	1,734	8,325	8,666	30.8	34.2	1/6¼	1/9

Moving Average Quota for 12 mths. ended 31/10/65, 41.39%; 30/11/65, 41.80%

INTERIM PRICES TO LICENSED SUPPLIERS

(All prices are interim only and subject to adjustment by restrospective payment)

	Basic	C.M.B.	Total	3%	3.5%	4%	4.5%	5%
1965	(per lb. butterfat)			(per gallon)				
October	3/6½	1/7⅛	5/2½	1/7¼	1/10½	2/1¾	2/5	2/8¾
(cents)	35.42	16.35	51.77	16.03	18.70	21.37	24.04	26.71
November	3/6½	1/9	5/3	1/7¾	1/11	2/2¼	2/5½	2/9¼
(cents)	35.42	17.50	52.50	16.25	18.96	21.67	24.38	27.09

LONDON PROVISION EXCHANGE QUOTATIONS

(Sterling Currency)

	October		November	
	1964	1965	1964	1965
Butter—Choicest Australian	334/–	314/–	350/–	314/–
Cheese—First Grade Australian	248/–	235/–	260/–	235/–
Rindless Australian	257/–	260/–	270/–	260/–

ALL TIME RECORD IS FOLLOWED BY DOWN-TURN

The intake of 5,716,017 gallons during October, 1965 was the highest monthly production ever recorded in the Adelaide milk supply area, exceeding the previous record set in October, 1964, by 4.3%.

Unfortunately the continued effect of the adverse season has prevented this trend from carrying through November, the intake for the month being 5.7% less than that of the previous year.

RETROSPECTIVE PAYMENT 1964-65

The Commonwealth Dairy Produce Equalization Committee has increased the interim rates for cheese for the 1964-65 season by 70c per cwt. cheese.

This will be paid to licensed producers at the rate of 0.94 cent (1.128d.) per lb. butterfat, equalized on all production for that period. The payment will be made early in March, 1966.

A REVIEW OF THE POLY-UNSATURATE POSITION

With the introduction of the poly-unsaturated margarines into the the South Australian market, the battle of the fats has taken on a new significance. We are pleased to be able to report that State Government has instituted proceedings against the interstate manufacturers who have come into the field in breach of the State legislation, but claiming protection under Section 92, and we will watch with great interest the passage of the case. We are grateful to the Government for acting in this way.

But we also know that many people are disturbed by the restrictions on the sale of margarine, claiming that this is an intrusion upon the freedom of the individual, and, most importantly, **that it threatens their health.**

So far as this is concerned, we know that medical experimentation has purported to show an improvement, following a major dietary change, which included the use of poly-unsaturated margarines, in the health of certain sufferers from heart disease, but we also know that much criticism of this experimentation has come from the medical profession, which has also expressed misgivings concerning the other effects that may follow a dietary change from butter to p-u. margarine.

The margarine industry has chosen to disregard this, and has pressed on with its promotional campaign to an extent where in the last year it has incurred the criticism of the medical profession and has come increasingly under the scrutiny of governments.

But, like wars, marketing contests are won by the big battalions, and clearly we have not done enough to publicize the true position.

Meantime the manufacturers of poly-unsaturated fats continue to exploit the doubts and uncertainties in the public mind caused by conflicting opinions expressed in medical and scientific circles.

The dairy industry fully supports any research which throws light on the connection between good health and good eating, but it is becoming more and more resentful of the methods used by some of its competitors who serve up half truths as facts, and we are heartened by the caustic comments which are printed below.

POLY-UNSATURATES APPEAL ILL ADVISED AND MISLEADING

. . . Government Body Rebukes Margarine's Unethical Advertising

Appeals to the emotions of potential consumers which are based upon unproven theories are ill advised and misleading.

This forthright statement can be found in a report of the Statute Law Revision Committee dealing with false and misleading advertising in the section of the report covering margarine advertising.

The Committee was appointed in June, 1964 and commenced its formal enquiries into false and misleading advertising in the middle of August, 1964, published its findings in December last. During its deliberations it heard evidence and considered documents submitted on behalf of the dairy industry by the Australian Dairy Produce Board and the Victorian Dairy-farmers' Association.

The text of the report on margarine advertising is reprinted below. We

Watch your poddies . . .

and your profits . . .

GROW!

Kaf-O-Milk is the complete calf milk that begins to build good milkers . . . and sturdy mothers . . . right from the start. Kaf-O-Milk is a balanced blend of 14 ingredients including a body building meal which is made readily digestible by the inclusion of three essential enzymes.

Giving the rumen an early start

Kaf-O-Milk should be fed from the fourth day. When a calf is naturally ready, there is sufficient "body" in the diet to start the rumen working, promoting rapid development and a strong constitution.

One factory . . . Strict quality control

Kaf-O-Milk is made only by the D.H.A. Rural electronically controlled feed mill. Every batch is true to formula, every ingredient thoroughly dispersed to ensure complete uniformity in the diet.

Maximum feed conversion . . . greatest economy

You'll get healthier development and better herd stock with Kaf-O-Milk at a fraction of the cost of feeding whole milk. Kaf-O-Milk has proved to be a profitable investment for dairy farmers everywhere. Order a trial batch now and watch your poddies . . . and your profits . . . grow!

DHA

KAF-O-MILK

Packed in 50 and 100 lb. Polyethylene-lined bags.

MILK REPLACER
FOR CALVES AND PIGS

A product of
DRUG HOUSES OF AUSTRALIA LTD.
RURAL DIVISION

Distributed in South Australia by BENNETT & FISHER LIMITED

think the public ought to know about it. (Block letter type ours.)
MARGARINE.

75. THERE WAS STRONG OBJECTION TO THE EMOTIONAL ADVERTISING BY THOSE PROMOTING THE SALE OF CERTAIN MARGARINE. It was submitted that housewives are given the impression that they are failing in their duty to their families if they do not regularly use margarine. LOOSE PHRASES SUCH AS "INFORMED MEDICAL OPINION" AND THE USE OF THE Rx SYMBOL — A RECOGNISED MEDICAL SYMBOL — IMPLY THAT THE STATEMENTS MADE IN THE ADVERTISEMENT HAVE SOME AUTHORITATIVE MEDICAL BACKING. The advertisements presented as exhibits contained technical terms such as "saturated fats" and "poly-unsaturated fats" which are meaningless to most people. Another undesirable feature was said to be that a food such as margarine should be pushed into what might be termed the curative field, AND THAT IT WAS UNWISE TO PERSUADE THE PUBLIC TO MAKE DIETARY CHANGES WHICH CANNOT BE SUPERVISED ADEQUATELY. SUCH CHANGES, IF IMPLEMENTED WITHOUT SUFFICIENT KNOWLEDGE OF NUTRITION AND FOOD VALUES, COULD LEAD TO DIETARY IMBALANCE.

76. THE BASIS OF THE INSINUATIONS OF MISLEADING STATEMENTS APPEARS TO BE VALID. The advertisements infer that by using margarines as a substitute for dairy foods, the intake of cholesterol will be reduced and better health will result. This conclusion is based on fact that is, on the evidence brought forward, one of the most sharply debated questions in medicine today. Opinion is divided on, first, whether cholesterol circulating in the blood is the chief culprit in heart disease, and second, whether by changing from high-cholesterol foods (dairy foods, etc.) to poly-unsaturated fats (vegetable oils), people can hope to escape heart disease. IF THERE ARE NO SOUND AND GENERALLY RECOGNISED CONCLUSIONS ON THESE POINTS, THEN THE COMMITTEE AGREES THAT APPEALS TO THE EMOTIONS OF POTENTIAL CONSUMERS, BASED UPON THEORIES WHICH ARE UNPROVEN, ARE ILL-ADVISED AND NO DOUBT MISLEADING.

77. Again, the Committee cannot arbitrate upon specialised questions such as the merits of poly-unsaturated fats over any other foods, nor upon the effect of high-cholesterol diets on the incidence of heart disease. BUT IT IS CLEAR THAT CLAIMS OF HEALTH BENEFITS, EITHER PRECISE OR INFERRED, WHICH ARE BASED UPON INCOMPLETE OR INCONCLUSIVE RESEARCH, ARE OBJECTIONABLE. The use of medical symbols such as Rx are calculated to mislead by inference of some degree of medical approval, and it is undesirable that medical terms unlikely to be understood in their true concept should be used on packaging or promotional advertisements.

OTHER AUTHORITATIVE COMMENTS MADE DURING THE PAST TWELVE MONTHS

"We honestly don't know how to prevent heart attacks" . . .

—Dr. Irvine Page,
noted heart specialist and
Chairman of the National
Diet-Heart Study (U.S.A.)

"There is danger in substituting unsaturated fats for saturated fats . . . that saturated fats produce free radicals in tissue . . . that there is an association between accelerated ageing and such free radicals, as there is with tumour production."

—Dr. R. W. Pritchard,
Bowman Gray School of
Medicine (U.S.A.)

SUPPORT THE FIRMS THAT SUPPORT YOUR JOURNAL

The U.S. Food and Drug Administration has ruled that any vegetable oil product labelled "poly-unsaturated" and supposedly effective in preventing, mitigating or curing heart disease, is making false and misleading claims and is misbranded under Federal law.

"Pregnant women who go on low cholesterol diets may have mentally retarded children."

—Dr. David Turner,
Hospital for Sick Children,
Toronto (Canada)

The changing of established dietary habits is "too radical and if widely adopted might cause more harm than good . . . "

—Victorian Division,
National Heart Foundation.

"There is not a shred of evidence that merely substituting unsaturated fat for saturated fat in the ordinary . . . diet will in any way affect the course of (coronary heart) disease . . . "

—Dr. David R. Rutstein,
Harvard Medical School (U.S.A.)

The National Heart Foundation of Australia suggests that "modification of dietary fats is unlikely to be warranted in the case of healthy, normal weight persons."

Why? Because conventional fats are a voluable food essential to our well-being. The energy content is more than double that of either protein or carbohydrate—the other two food sources of energy.

The Safflower Council of the National Institute of Oilseed Products is putting another $5,000 into continued research TO DETERMINE WHETHER ALTERING THE KIND AND AMOUNT OF FAT CONSUMED IN THE DIET CAN LESSEN THE RISK OF HEART ATTACKS AND STROKES."

—News Item,
"Significant Food News,"
(U.S.A.)

SIMPLE DEVICE COULD HELP CHECK MASTITIS

A simple device designed at the Ruakura Agricultural Research Centre New Zealand, for flushing teat cups before each set is put on to the next cow could be a powerful weapon in checking the spread of mastitis in N.Z. milking sheds.

Designed by Mr. D. S. M. Phillips, specialist in milking techniques at Ruakura, the teat cup flusher is an idea that was first tried four years ago.

It had been in constant use for the first time this season and since it was installed Ruakura has not had a case of mastitis, states a report in "Straight Furrow."

The flushing device is simplicity itself. A small T piece is fitted into the milk line at a convenient distance from the teat cups. To flush the cups the T piece is merely pushed into a valve fitted to the water pipe above the teat wash hose.

Water is automatically diverted through the cups without any possibility of it finding its way into the milk line.

It has commonly been believed that bacteria must be killed if mastitis is to be eliminated, but Mr. Phillips maintains that if 95 per cent. of the bacteria are flushed out of the cups with clean cold water before the cups go on the cow, then the incidence can be reduced almost to zero.

"There is no better way of spreading mastitis than by putting cups infected by one cow straight on to another cow," he said. "If we can eliminate this hazard, then most of the battle must surely be won."

The Ruakura teat cup flusher, which is subject to a Crown patent, has been tried out in the field this season by a veterinarian doing mastitis research. It is believed that the results have been good, the report says.

- Compliance with Australian Standard N. 46—1963. (Certificate No. CP65C/7.)
- World-beating quality performance.
- Established district service centres.
- Completely designed in Australia for Australian conditions.
- More than competitive price owing to direct factory to farm sales organisation.

Why Buy Less When the Best Is Available

Available For Immediate Installation

For further information and quotation, contact S.A. Manager, Mr. Gordon Menzies, at 76 7477 (Adelaide) or write direct to:—

A. G. WAY & CO. PTY. LTD.

215-223 Franklin Street

Melbourne, Vic.

Phone: 329 6766 (10 lines)

INTERNATIONAL STANDARDS FOR CHEESE

Drafting of individual standards for the main varieties of cheese going into international trade has commenced by a joint session of a committee of the Food and Agricultural Organisation and the World Health Organisation.

The committee comprises 100 government experts from 35 countries.

Assistant Director General of the Food and Agricultural Organisation, Mr. P. Terver, told the committee that the world needs an international standard for cheese imported or exported between countries.

Mr. Terver said this is a field in which experts on the manufacturing side are constantly kept on their toes by connoisseurs among consumers.

The international cheese market is highly competitive and countries exporting great quantities of cheese have established good reputations for the quality of their main cheese varieties, he said. What was needed now was to raise cheese standards everywhere to this level.

Mr. Terver said the FAO/WHO code of principles had so far been accepted by 66 nations. And 55 countries had accepted the FAO/WHO International standard for milk powder, while 40 had accepted FAO/WHO International standards for butter, butter-fat, evaporated milk and condensed milk, he said.

"This is real progress in the field of international standardisation, and I feel sure you will all agree that this clearly demonstrates the importance of these standards of both exporting and importing countries," he said.

The committee is to review a guide to basic principles for milk production drawn up last year. The guide is expected to be of great help to developing countries in fostering the growth of their dairying industries.

BULK MILK HANDBOOKS AVAILABLE

Th HANDBOOK OF REFRIGERATED BULK MILK STORAGE AND TRANSPORT which was published as a supplement to the September-October issue of this Journal has been in great demand from persons and organizations in all States, and has been ordered in quantities as many as fifty at a time.

Anticipating this demand a large number wos printed, and additional copies are available to members and others at 30 cents each, post free, on application to this office.

FARMERS GET BIGGEST SHARE OF DECIMAL PRICE RISE

In converting milk prices to decimal currency the Metropolitan Milk Board has increased the retail price of milk generally by 2.4 pence which has been divided as follows:

- to producer 2.05 pence
- to merchant 0.02 pence
- to vendor 0.33 pence

to give a price to producer of 39 cents, or 46.80 pence, compared with the previous price of 44.75 pence.

This price is very close to that nominated in a case for a price alteration submitted recently by the Association to the Milk Board, as a result of the renewed inflationary trend in the economy.

Producers generally will be gratified at the result of the price conversion.

ORGANISING AN INTERNATIONAL DAIRY CONGRESS IN AUSTRALIA

An address given by Mr. J. I. Scarr to the Australian Institute of Dairy Factory Managers and Secretaries, N.S.W. Division.

WHAT IS A DAIRY CONGRESS?

Today we live in a rapidly changing and highly scientific age and unless we keep abreast with what is happening in other countries by making contacts with our counterparts overseas, our Australian dairy industry can lag.

An opportunity to meet dairy industry leaders from other countries which will allow for an exchange of ideas and also enable contacts to be made which will be valuable if and when any of you travel overseas at some future date, will occur in 1970 when the International Dairy Congress will be held in Australia.

International Dairy Congresses have been held previously in the great cities of the world.

London, Copenhagen, Rome, Berlin, Stockholm, The Hague are among the great cities which have had the honoured privilege of acting as hosts on the occasion of past congresses to the world's leaders in dairy science, dairy technology and dairy administration, and Munich is the venue for the congress this year.

The holding of an International Dairy Congress in any nation is a widely-accepted symbol of its maturity in dairying. It is the greatest individual event that national dairying can experience.

To give an indication of world interest in Congresses, the following countries were represented at the International Dairy Congress held in Denmark in 1962: Argentina 4, Australia 53, Austria 83, Belgium 73, Brazil 8, Bulgaria 1, Canada 35, Chile 4, Cyprus 5, Czechoslovakia 5, Denmark 499, Egypt 1, Finland 96, France 208, Germany 319, Greece 4, Hungary 2, Ireland 8, India 4, Iraq 2, Ireland 36, Israel 12, Italy 78, Japan 16, Jamaica 2, Kenya 8, Kuwait 1, Lebanon 1, Luxemburg 3, Malta 2, Madagascar 1, Mexico 17, Netherlands 161, New Zealand 18, Norway 100, Peru 7, Poland 8, Portugal 4, Rumania 2, South Africa 12, Spain 61, Sweden 196, Switzerland 86, Syria 1, Tanganyika 2, Turkey 4, United Kingdom 449, United States of America 89, U.S.S.R. 26, Venezuela 5, Yugoslavia 6.

ORGANIZING A CONGRESS IN AUSTRALIA

The benefits to the dairying industry of the host country for an International Dairy Congress are numerous and enduring. Aspects of the industry such as technical efficiency, new techniques, economics, trade development and marketing are all profoundly influenced by a Congress.

The 18th International Dairy Congress will be held in October, 1970, in the Sydney Opera House which has been chosen as the venue because it will offer unsurpassed facilities for the complex requirements of Congress.

The Opera House in its main auditorium alone will accommodate some 2,900 people. Numbers ranging from 310 to 1,200 will be accommodated in each of the additional auditoriums.

Each auditorium will be fitted with equipment to provide simultaneous translation in the three Congress languages: English, French and German.

The Opera House at Benelong Point will be a fitting venue for the 3,000 people who will attend the Congress.

It is a delightful coincidence that the Congress will be held at Benelong Point, because it was on this very spot that dairy cattle from the First Fleet were first landed in Australia 177 years ago.

The holding of an International Dairy Congress in Sydney is of great importance to industry leaders such as those gathered here today for the Dairy Factory Managers and Secretaries Conference.

In fact, the Congress will be of vital significance to all dairy industry executives and technologists across Australia. This has been reflected in the fact that considerable publicity already has appeared in the press in every State.

The expense of overseas travel has unfortunately denied many talented people in our industry from attending previous International Dairy Congresses and drawing from the vast store of industry education which they provide.

There will be no such bars to those of the Australian dairying industry attending the 18th International Dairy Congress which will be held on our own soil.

KNOWLEDGE IS GAINED AND EXCHANGED

An International Dairy Congress is the dairy industry's highest international forum for the exchange of scientific, technological and administrative information.

International Dairy Congresses are held every four years under the auspices of the International Dairy Federation, an organisation set up to tackle problems of common interest to world dairying.

A Congress brings together from some 60 nations leading minds in all sections of dairying. A Congress lasts for 14 days. Half of this time is spent dealing with reports, lectures and discussions in various fields and the remaining time is spent on study tours to dairy production areas throughout the host country.

The combating of contagious diseases among dairy cattle, and all aspects of animal husbandry, the economic future of the dairy industry, trends in packaging of dairy products and a complex variety of topics relating to butter making, cheese making and all other forms of milk manufacture are embraced in the sessional deliberations of a Congress.

Exhibitions of processing and farm equipment are held in conjunction with Congresses.

AUSTRALIA WILL BENEFIT

Australia, as the host country, will be in a virtually unchallengeable position to sell itself, its industry and its products to the dairying world.

The 55th Annual Meetings of the International Dairy Federation will be held in Melbourne immediately preceding the Congress and will be conducted over a period of one week. They, also, are of great international significance.

The Annual Meetings of the Federation are held in a different national capital each year.

These meetings, like the Congress, will enable us to promote in the minds of the world's dairying leaders a new respect for Australia and what Australians can and are doing in the field of dairying.

The industry contacts developed from these meetings, and, of course, from the Congress itself, will be of real value.

Abundant opportunities to enhance the status of our dairy products and win new and wider export markets will undoubtedly present themselves during these historic occasions.

A TREMENDOUS TASK

The detailed planning involved in the staging of an International Dairy Congress provides a tremendous and complex task for its organisers.

The standard of previous Congresses has been very high and left deep impressions in the minds of those from Australia who have attended them. It is, therefore, up to the Australian Dairy Industry to do as well and even better than previous Congress organisers so that our industry's prestige will be enhanced and our contribution to international co-operation and progress in world dairying will be efficient and memorable.

The great task of planning for the Australian Congress rests with the Congress Board of Directors which has been recently created. Organisational details associated with the many aspects of the Congress will be carried out by a number of specialist committees which have already been set up by the Board.

Not all the leaders of the Australian dairying industry are at this stage connected with the newly-formed Congress Board and its various committees. This is because it is in the interests of administrative efficiency to minimise numbers on executive bodies.

In time, however, and certainly during the Congress period and during the Annual General Meetings in Melbourne, there will be great scope for assistance from many more of our industry's figures than those involved in an official capacity at this early stage.

All committees have been formed with a view to making representation and industry enthusiasm as widespread as possible.

This objective so far has succeeded because financial contributions to the Congress have been received already from a number of governmental bodies and private companies from all States of Australia.

It will be of interest for you to know the various committees which have been set up by the 18th International Dairy Congress Board. The Chairman of this Board, incidentally, is Mr. E. G. Roberts of the Australian Dairy Produce Board, and its Vice Chairman is Mr. J. A. Ferguson, of the N.S.W. Milk Board.

Together with distinguished colleagues from every other State I am also privileged to serve as a Director on this Board as Official Representative of the Institute.

THE COMMITTEES

Finance Committee:

This Committee has the task of co-ordinating the activities of the various State Finance Committees which have been set up by the Board to raise funds for the staging of the Congress. The Finance Committee will also advise the Board on the Congress budget. It is expected that nearly £250,000 will be required to hold the Congress and in this regard, I again mention that the Institute has made their initial contribution at a Conference recently held in Melbourne.

Reception and Hospitality Committee:

This Committee will have the important task of organising Congress study tours and will advise the Board on official functions to be held in connection with the Congress. The standard of hospitality of previous Congresses makes the task of this Committee a most difficult one.

Exhibition Committee:

Exhibitions of dairy equipment and dairy produce will be organised by this Committee. The exhibiting of dairying equipment and dairy products is a vital aspect of the Congress, particularly in opening up new export markets.

Publicity Committee:

This Committee will be responsible for the preparation of publicity material for the Congress designed to keep the industry and the public informed on all developments. It will be responsible for providing the press with news releases on the Congress and will be charged with the task of maintaining good industry and public relations.

Editorial Committee:

This Committee has the vitally important task of determining the subjects which will be dealt with by the Congress and also that of editing Congress documents. The high standard of a Congress depends considerably on the work of this Committee. Intricate translations of highly technical Congress papers, in itself, will be a major task.

Leading scientists of Australian dairying have accepted membership of the Editorial Committee.

The Secretariat:

The Congress Secretariat will commence administration on a full-time basis at the beginning of 1967. The Secretariat will co-ordinate the vast amount of planning which will be undertaken by the various Committees.

The Congress Board is counting on the whole-hearted support of the Australian dairying industry, both individually and organisationally, in the desirable objective of making the 18th International Dairy Congress in Sydney, 1970, a resounding success.

Mr. G. W. Flowers has been appointed Secretary General and Mr. J. G. Blackwell who gave considerable assistance in providing information for this address, has been appointed Secretary and I am sure that both of these gentlemen will be most appreciative of any assistance that members of the industry can give them in their important work of organising the Congress.

TEAT CUP AND CLAW DESIGN CONSIDERATIONS

By Dr. W. G. WHITTLESTONE

Senior Principal Scientific Officer, Ruakura Agricultural Research Centre, Hamilton, N.Z.

The work of Murphy and his co-workers (1953a, 1953b, 1955, 1959) has clearly demonstrated the role of the streak canal as a barrier to infection. The streak canal is the short channel through the tip of the teat which is surrounded by a springy sphincter muscle. It appears to play two main roles in preventing infection. First, the sphincter muscle, being springy, closes the streak canal firmly. Second, within the streak canal there would appear to be an accumulation of anti-bacterial material which helps to prevent infection gaining access to the lumen of the teat. Murphy's studies have shown that if infected milk is placed in the teat cavity it immediately causes an outbreak of mastitis. On the other hand, when a similar infection is placed within the streak canal there is a marked resistance to infection. Only two of eleven uninfected quarters which were treated by placing **Streptococcus agalactiae** two to three millimetres up the streak canal by means of swabs developed acute infection. Five out of six cows which were infected by staphylococci, however, showed an immediate reaction when streptococci were placed within the streak canal. The experiments suggest that the organisms grow within the canal and thus move into the cavity of the teat. Mild stresses of the teat, including over-milking at seventeen inches of mercury for ten minutes after normal milk flow had ceased, had no effect on the barrier capacity of the streak canal. On the other hand, the reaming of this channel to remove some of the mucous material collected therein had a marked effect on its ability to resist infection. Murnane (1953) has demonstrated the importance of general shed hygiene in controlling the spread of infection by **Streptococcus agalactiae** and this has been well confirmed by many other workers. Related to this is the important observation by Dodd and Neave (1951) that the patency of the teat sphincter is related to the tendency to become infected. The looser the sphincter muscle the greater the tendency of the cow to develop mastitis infection.

Bratlie and his co-workers (1954, 1962) have made some interesting observations on the role of the machine in connection with mastitis. One is the fact that increasing the pulsator rate from 40 to 80 pulsations a minute increased the cell count of the cows' milk. This suggests that the teat cup has an irritating role and may also be associated with the transfer of infection. If this is a function of some phase of the pulsator action, then one might expect that the faster the pulsator operates the greater the number of chances of infection being transferred and irritation being caused. It is also interesting to note from Bratlie's work that the use of a short squeeze pulsator was not associated with more irritation. Dodd **et al.** (1957) demonstrated that the moulded liner made of a somewhat hard textured rubber was prone to produce more mastitis than the ordinary soft, or extruded, liner. Schalm and Noorlander (1958) have shown that the American wide bore liner is associated with more mastitis than is the soft, extruded inflation. The wide bore liner is also a moulded liner and so it would appear that this class of teat cup liner or inflation must be viewed with some suspicion.

In considering the design of teat cups and claws with regard to mastitis hygiene and clean milk production, it is useful to divide the problem into three sections:

1. *The problem of back flow up the streak canal. This is essentially a teat cup action problem discussed elsewhere.*
2. *The teat cup and claw as a source of infection. This involves the problem of crevices and cleaning efficiency.*

3. *The problem of back flow from the milk rubber into the teat cups.*

The minimising of crevices in the inflation cannot be over-emphasised. Rubber is, from its very nature, prone to the development of fine cracks which are hard to clean. When the construction also involves crevices, as in the case of soft inflations stretched over a metal ring or terminated with a ring and nipple structure, the cleaning problem is difficult indeed. From the point of view of good hygiene the soft moulded inflation in which the claw tube is integral with the body is quite the best, particularly if it is made from a rubber which is resistant to ozone or stress cracking. It is the aim of good inflation design to produce a mirror finish on the inside surface and to use a rubber which does not crack under the influence of fat and detergent. There should in theory be no difficulty in producing a soft moulded inflation in which the action is identical with the common stretched inflation. The claw should be designed so that there are no dead ends anywhere and crevices are completely avoided. All interior surfaces should be smooth and either plated with a material such as tin-nickel alloy or the device should be entirely made of stainless steel or a suitable plastic.

The cleaning of claws and inflations is most effectively carried out by a circulation system using either a liquid detergent or foam. The latter has shown itself to be particularly good in maintaining the condition of inflations and claw pieces.

It is evident that to minimise the spread of mastitis infection it is essential to avoid any back flow from the claw into the teat cups. Obviously if such back flow can occur and one quarter is infected the infection will rapidly spread to the other three quarters. Thus one essential of good teat-cup/claw design is the complete avoidance of back flow. The smaller the volume displaced during the collapse phase, the less the chance of back flow. This is another argument in favour of the narrow bore liner or inflation. When a large volume inflation collapses there is a sudden drop in vacuum and this is followed by a sharp rise as the inflation moves back under the influence of the vacuum phase of the pulsator. This increases the chance of liquid being drawn back up the claw tube. Another important factor in avoiding back flow is a stable vacuum at the claw. The use of an air admission hole in the claw is the traditional means of reducing changes in vacuum caused by liquid flowing up the dropper tube in a pipe line milker. It is therefore quite essential with the standard pipe line machine that adequate air admission be used. In Europe and America it is common to use what is called "two and two" pulsation. This is the system in which one pair of cups is on the squeeze phase while the other pair is released. It has had a certain popularity in Australia and New Zealand. One serious disadvantage of it is the fact that it induces to-and-fro flow. Obviously, as two cups eject their milk while the other two release, there will be a tendency for some of the milk to flow across the claw and out the other side. From the point of view of back flow it is much better to pulsate all cups together.

The importance of back flow has been stressed in America and one approach to the problem has been the so-called breakerbowl. This is a large bowl, usually made of glass, which replaces the traditional claw. It is of sufficient volume to cause a complete break in the flow of the milk between the claw inlet tube and the milk outlet tube. It would appear that with a little care in design it should be possible to achieve this break in flow with a much smaller device. This is an obvious field for development as it is evident that the common H-type claw is inclined to back flow.

In considering the design of cup and claw there is merit in adding a feature which makes possible the simple back flushing of the unit between cows. It has

been shown by many overseas workers that this simple form of hygiene is more effective than dipping the cups in an antiseptic. Thought should therefore be given, when considering the design of the claw, to the back flush feature.

Some American workers have suggested the use of separate end of milking indicators for each teat cup. This would appear to be unnecessary but there is, however, quite a good case for the use of transparent claws so that flow from the cow can be seen at the claw level: particularly in a herring-bone shed this is quite an instructive feature. While a quantitative end of milking indicator built into the claw would be somewhat difficult to achieve, there should be no problem in making at least some part of the claw or cup transparent, so that individual flow can be detected. This is one means of checking on the possibility of obstructed quarters.

In the introduction to this paper the role of the teat sphincter as a barrier against infection was stressed. It is the object of good design in the claw and teat cup part of the milking machine to assist this barrier. The above suggestions, if applied in practice, would help to reduce the amount of infection at the teat by the elimination of crevices and by the reduction of back flow. By the use of flushing techniques cross infection between cows will be substantially reduced and by careful design infection transfer from one teat to another can be eliminated. These approaches, together with the use of good materials and construction avoiding crevices, will do much to improve milk quality and reduce the spread of mastitis.

Automatic Feeder For Cows

A metering device which allows cows to be fed their individual concentrate ration, while being milked, has been put into production.

Comprising a series of metering chambers, one for each manger, the Fullwood Feedmaster automatic feeder is a one-operation unit for feeding predetermined quantities to each cow. The Feedmaster is powered from the vacuum line of the milking plant, although the load on the pump is said to be negligible.

The metering chambers are usually gravity fed from hoppers or an overhead loft, although feed can be augered directly to them. Each chamber consists of a vertical length of wide rubber hose connected at the upper end to the scource of the feed. Two clamps, vacuum operated against springs, prevent the passage of feed.

In action, a master control switch is turned to "fill", which opens the upper clamp on each chamber and closes the lower clamp to allow the feed to flow into the chamber. The lower clamp is mounted on side runners, enabling it to be raised or lowered by flexible steel cable attached to the setting rod on the control panel. Its position determines the amount of feed to be passed to each manger.

When the switch is turned to "feed" the upper clamp closes, the lower clamp opens and the measured feed flows to the manger. The switch operates all metering chambers at once.

The Australian Agents are Country Dairy Supplies Ltd., 323 Main Street, Ballarat, Victoria.

"Instant" Cottage Cheese

Some interesting work is being conducted in the freeze drying of cottage cheese mixed with cultured sour cream. The product needs only water adding to produce a small-curd creamed cottage cheese.

EXOTIC DISEASES OF LIVESTOCK

It's been an uphill fight, but at last we can report that the case put forward by this Association for the prohibition of the importation of cheese from countries where foot-and-mouth disease is endemic has been accepted by the Australian Dairy Farmers' Federation and will be placed before the Australian Agricultural Council for its support and the initiation of the appropriate amendments to the Quarantine Act and Regulations.

Of course there's no guarantee that this support will be given, and even if it is, there's even less certainty that the Federal authorities will abandon the stand that they have taken ever since this question was raised in 1963 and take the action we want.

But we must take one step at a time, and the first step has been taken—it will probably need an outbreak of f-and-m or rinderpest or something equally disastrous to convince the authorities of the need for action, AND BY THEN IT WILL BE TOO LATE.

Because of our doubts on the effectiveness of the legislation and because of the background of irresolution we cannot decide whether to treat with satisfaction or dismay the recent news from Queensland concerning drastic measures taken to counter the possibility of an outbreak of blue-tongue resulting from the use of semen smuggled in from North America. Eventually between 600 and 700 cattle will be slaughtered, and the whole area has been sprayed by the Army to exterminate the sandflies which could carry the virus from infected cattle.

With so great a risk, the apparent swiftness and thoroughness of the action is to be commended, but we cannot be sure that the same thing will not happen again, and we are disturbed that a breeder, of all people, should knowingly have exposed his fellow farmers to such a terrible risk.

Fortunately some of the rising generation of farmers and farm advisers are well aware of the problem. The 1965 issue of "Chiasma," the journal of the Rural Science Undergraduates Society in the University of New England contains a Forum entitled "Are we prepared," which is reprinted below with the permission of the editors.

Are We Prepared?

This is not intended to create wide-spread panic, but instead to induce people to think and so prepare themselves for the inevitable.

STONE THE CROWS!

J. V. NOLAN—Rural Science IV

Tarrawalla in 1969 is the reflection of any other peaceful country town west of the Divide in Australia: a reasonably prosperous rural community with sheep and cattle depastured around the town which depends largely on this rural activity for its existence. How I became District Stock Officer at Tarrawalla is not at all clear. However, work for the last few years has been quite interesting and most stock problems have been handled with a minimum of trouble.

It all began about four months ago now, when Fred Currey remarked that recently he had noticed lameness in his sheep and he told me he intended to

step up his foot-rot control programme. I was interested, but unfortunately, did not pursue the matter. Two weeks later, two other local graziers rang me with an urgent request to come out to their properties. Both had found some of their weaner steers dead, while many others were lame or "frothing at the mouth."

Fool! Even then I had taken the easy way out by deciding that the disease was most probably that innocuous viral disease, bovine papular stomatitis, recognised in Australia for the last four years or so, and known to cause blistering and frothing at the mouth in young cattle. I quickly dismissed the thought of Foot and Mouth Disease—that scourge of aver half the world's cattle population; that economically crippling disease which, in Argentina, causes losses greater than £76 million annually; Europe estimated losses more than £300 million annually; U.S.A. 1962, $133 million to eradicate a single Mexican outbreak threatening the security of her southern boundaries; post war Canada, $1 million to eradicate the introduced disease from only 15 farms under ideal conditions and $200 million in subsequent trading losses . . . . good reasons to quickly dismiss such an unwelcome thought ! !

Anyway, Australia has always been free of these exotic menaces. We have a complete embargo on all stock entry from other countries and our quarantine regulations are as severe as they could humanely and realistically be. Why shouldn't I feel secure?

Armed with this self-justified complacency, I made routine post mortem collections which were air-freighted to Australia's only virology laboratory at Parkville, Victoria. Then I confided in my fellow Stock Officer, Jim Frith. His comment satisfied me: "Foot and Mouth! Mate, don't be bloody ridiculous!"

Unfortunately, this complacency was short-lived. An emergency diagnosis had to be made at the Pilbright Lab. in England when the disease could not be identified in Australia. I was stunned and it slowly began to penetrate that we had FOOT AND MOUTH—actually here—in Australia. The phone nearly slipped from my hand as I listened vaguely to the Director on the long-distance line instructing me to quarantine all stock in my District and prevent all people from moving about (both futile I though dumbly) until help arrived. What would be our plan of action? Complete slaughter of all in-contact stock and compensation of owners as in Great Britain and U.S.A.? . . . probably out of the question here as the disease to my knowledge (and now Fred Currey's had been in the district quite some time already . . . quarantine? . . . impossible! . . . with pitifully small numbers of Vets., who are inexperienced in this disease, with our difficult terrain, vast areas and poor fences making complete musters a farcical impossibility. Overall vaccination as in Argentina where the disease exists? . . . in other countries shown more costly than complete slaughter . . . vaccine production would be required at a rate hitherto never envisaged in the world . . . stock-piling, also impossible because the stored vaccine quickly deteriorates. What would we do then . . . just pray that we would somehow be able to contain the disease within the district? ?

Now seven weeks since I first heard of Fred Currey's "footrot," the picture is already a grim one. The virus is extremely infective and many stock in this district have now died and many more have been affected. Milk has been in very short supply as "fevered" cows go out of milk. Fat cattle have been particularly hard hit, and it is anguishing to watch emaciated animals painfully trying to walk a few steps on ulcerated feet to gather enough feed to stave off starvation. The gluttonous black crows are becoming visibly blacker, more sleek, more lethargic as they alone benefit from the bloated carcasses along the roadsides and in nearby paddocks. Their raucous cries, as always, symbols of despair and hardship for the Australian pastoralist. If we were to run into a drought now . . . .

Frantic attempts by Vets. to confine the disease are proving futile and reports are already flooding in from regions interestate where our stock are transported every year for fattening. Torrawalla is the focus of a nation-wide disaster overshadowing even other international disasters on the ABC News. The disease has crippled Australia and the Australian grazier is releasing pent-up anguish by applauding the Leader of the Opposition as his Parliamentary attack score viciously against the Government and their short-sighted policies of the last five years their preoccupation with foreign policies, threats of Communist infiltration, and war. This is a war on a grand scale—"germ warfare," whose saving grace is only that it does not involve the loss of human life.

The source of the disease has been traced. Fred Currey's new hand—a likeable Pommey—migrated via Colombo to Sydney and immediately boarded a country plane for Tarrawalla arriving here less than 24 hours after sightseeing in Colombo. The virus had entered so simply—probably on his shoes or clothing.

One reflection, I realize that it could have entered just as easily with meat scraps carelessly disposed of from ships and aircraft, in meat delicacies smuggled through Customs by unsuspecting Mediterranean migrants, from S.E. Asia where the disease has existed for centuries, by migrating birds or small craft blown off course beaching along our northern coastline. Even an innocent child could itself possibly contract the disease and become a carrier. How simple for any potential enemy to disrupt a country!

If these routes have always been open, why have we remained free for so long? Why now ! ! In the past, sea voyages used to take weeks or months and provided a "natural disinfection" period. However, since 1962 the number of people arriving at Sydney Airport has more than doubled. Every traveller from overseas has, in effect, given Australia one more ticket in a macabre lottery for which the grand prize is . . . Foot and Mouth ! ! The increased traffic has made it less and less likely that Quarantine Officers would detect the smuggling of animal products and carry out thorough disinfection.

Small comfort and compensation for me to know this amidst the present heartache, knowing that even if we do manage to bring this damn scourge under control, it will for the foreseeable future kill, cripple and reduce the productivity of millions of sheep, cattle, and pigs every year, and, every year, cost Australia millions of dollars.

And I am responsible ! !

Now I recall the timely warnings of my University Professor in 1965 who warned that Foot and Mouth would inevitably be introduced, or probably already had been—it was only a matter of the right chain of events allowing the virus, after entry, to come into contact with any susceptible animal. He reminded us of the almost total destruction of another totally susceptible, non immune population, rabbits, by another exotic disease, myxomatosis. He warned that only token thousands were then being spent training small numbers of Vets., who could never gain experience with Foot and Mouth Disease unless sent overseas to study the disease where it exists and compared the cost of being prepared with the colossal sum which would have to be found every year when the disease did eventually strike—tomorrow, or in ten years' time.

I was interested, I could not fault his logic, but like so many others had remained illogically and unthinkingly complacent. "Things can not be that bad, or somebody would be doing something."

As I contemplate this dejecting rural scene round Tarrawalla—the wretched cows that cannot walk because their hooves have sloughed off with this disease—my reaction is to release my guilt and hurl a rock in the direction of the sombre lazy mass, watchful on that nearby limb.

"Away you filthy black vultures. You prey on pastoral disaster."

Stone the crows! Too late, too late to stone the crows ! !

A hand clutched my shoulder, gripping it, then violently shaking it. Wake up! I felt a chill and shivered although I wos perspiring freely.

Wake up . . . . WAKE UP ! !

What a relief to slowly become aware of the contented stock grazing quietly outside my window. It is the last day of October, 1965—another day.

But dreams do not come true. Do they.

BLUETONGUE

K. DASH—Lecturer, Section of Parasitology, School of Rural Science.

Of all the "exotic" animal diseases, bluetongue is probably the greatest threat to Australian livestock industries. The disease has been prevalent on the African continent for at least 60 years and in the last 25 years it has been identified in Cyprus, Turkey, Israel, Portugal, Spain and the United States. The fact that bluetongue has been introduced into the United States, despite stringent quarantine barriers, indicates that we cannot rely solely on our geographical isolation to maintain our present freedom from this disease.

Bluetongue is an infectious, insect-transmitted viral disease of ruminants. Under natural conditions the disease is confined to sheep but other ruminants are important reservoirs of infection. The disease is transmitted from one animal to another by biting insects, particularly sandflies (**Culicoides spp.**) A number of different strains of bluetongue virus have been identified. The strains vary considerably in pathogenicity and individual strains may change in virulence during the course of an outbreak.

In 1956 a virulent form of bluetongue appeared in Spain and was quickly recognised. In the first province affected, 84,000 sheep out of a local population of 2 million, died in the first 30 days of the epizootic and in some flocks the mortality rate was 50-80%.

However we cannot assume that, if bluetongue is introduced into Australia, it will be an easily recogniseable, virulent disease. A mild form may well go unrecognised for a number of years until it becomes widely distributed or appears in a more virulent form. The history of bluetongue in Cyprus and the United States illustrates this possibility. In Cyprus Bluetongue probably first occurred, in a mild form, in 1924. The presence of the disease was first suspected in 1939, but was not confirmed until 1943. In the U.S.A. a disease known as "sore-muzzle" of sheep was described in Texas in 1948; by 1953 the disease had spread widely and was then identified as a mild form of bluetongue.

In the absence of information on the occurrence and distribution of suitable insect vectors, it is impossible to forecast the extent and rapidity of spread of bluetongue in Australia. However, recent epizootics of other insect-transmitted viral diseases, such as ephemeral fever and myxomatosis, have demonstrated how rapidly such diseases can be spread in a susceptible population, when climatic conditions are favourable for the vectors.

In 1950 myxomatosis was introduced into the natural rabbit population in a number of localities in southern N.S.W. and northern Victoria. The disease flared up in the following summer and spread widely throughout N.S.W.,

southern Queensland and South Australia. Floods during this period provided very favourable conditions for insect development and within three months myxomatosis had reached areas almost 1,000 miles from where it was first liberated. The spread of ephemeral fever during the 1936-37 epizootic was equally spectacular.

If bluetongue is introduced into Australia, eradication will be impossible. The spread of the disease will depend on the suitability and density of the vector population, but a prompt, large-scale vaccination programme will reduce the impact of the disease and should limit the initial rate of spread.

Not only should we be able to recognise the disease when it first appears, but we must also be in a position to commence immediate control measures There are two possibilities to consider. Firstly, we can stockpile multi-strain vaccines now, which can be used immediately the presence of the disease is confirmed. In this case there is a risk of introducing further, and possibly more virulent, strains of bluetongue virus. The second alternative is to wait until the disease occurs, identify the strains present and then prepare vaccines against these strains. During the necessary lag priod before supplies of the vaccine are available, losses on a large-scale may occur if the disease is in a virulent form.

No work on exotic diseases is undertaken in Australia. If a suspected outbreak of bluetongue occurs, we are dependent on overseas laboratories for a positive diagnosis and also for our initial vaccine supplies. However we cannot expect that these laboratories will undertake unlimited routine diagnostic tests and vaccine production once the presence of the disease is confirmed. We must be prepared and equipped to do this ourselves.

There is an urgent need in Australia for a maximum security exotic diseases laboratory which can be used for this purpose. We cannot afford to be complacent and unprepared.

WARNINGS . . .

In Queensland Country Life recently Mr. O. H. Brooks, Department of Primary Industries, stated that foot-and-mouth, rinderpest (or cattle plague), rabies, and bluetongue constitute a grave threat to Australia's rural economy. He continues:

"If foot-and-mouth disease entered this country, Australia's meat export trade, valued at £100 million a year, would immediately be cut off. **The cost of eradication could be 10 times this sum."**

ARE JUSTIFIED . . . !

Australian quarantine regulations urgently require tightening. The annual meeting of the Tasmanian Branch of the Australian Corriedale Association which arrived at this decision, agreed that representations should be made by various rural organizations to the Federal authorities. One member reported that, after a 15 hour flight from Japan, he had filled in the required form of entry declaring his farm visits in Japan.

A Customs officer called the attention of the veterinary department to this statement, but the member's shoes were in no way treated as a precaution against entry of such exotic diseases as foot-and-mouth.

Similar reports in other Australian publications have failed to shake nation-wide indifference.