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Editorials

The opinions and ideas expressed in papers and editorials are those of the respective authors. The expressions of the Association are completely recorded in the transactions.

A PROPOSED INSTITUTE OF SANITATION

THE growth in the number of organizations that operate in the field of environmental sanitation, the increase in the number of periodicals which cater to these groups, the awakening public consciousness as to the importance of sanitation, and the corresponding regulatory activity of governmental and industrial groups have led to the need for some sort of coordination in this development. In response to this situation the Engineering Section of the American Public Health Association has undertaken a study to devise ways and means of coordinating these efforts. The Council of that section appointed a Policy Advisory Committee which has brought back the following suggestions (abstracted by editor as follows):

1. It is desirable to form a close association between sanitation organizations and the Engineering Section.
2. The scope of the Engineering Section should be broadened to represent more clearly all fields and personnel in environmental sanitation but no change in name of the Section at this time.
3. Papers and committee reports in the broad field of environmental sanitation should be encouraged.
4. All groups should actively participate in a study to a clearer understanding, closer working agreement, and more unified trend in this subject.
5. A clearing house should release papers which cannot be published in the Journal for those of affiliated organizations.
6. Recommendations and suggestions of national organizations should be channeled through the Engineering Section.

This work of the Engineering Section is highly commendable. Such spade work would have to be done by some well recognized group to effect progress in the coordination in the rapidly growing field. However, it would seem that further developments are likely to be shaped in the direction of containment within the functioning limits of the Engineering Section as it is in turn limited in its freedom of action by the framework of the American Public Health Association.

At this point we cite the experiences of the engineering societies in forming their Council which coordinates the several constituents. Somewhat similar is the American Institute of Physics. Delegates from the American Physical Society, the Optical Society of America, the Acoustical Society of America, and the Society of Rheology constituted collectively a Governing Board of the Institute. The American Association of Physics Teachers became a fifth member society. The Institute handles the publication of the journals of the Founder Societies, issues two journals on its own account, encourages cooperation between

these groups with other professional, industrial, educational and governmental agencies, disseminates information, operates in the public interest, and serves the interests of its members. It is a non-profit corporation, supported from four principal sources:

1. Reimbursement from the Founder Societies for expenses incurred in publishing the Society-owned journals, and Institute overhead;
2. Apportionment of membership dues;
3. Profits from Society-owned journals;
4. Grants and funds from outside agencies.

All members of the Member Societies become individually members of the Institute, with certain voting and other privileges. The individual Member Societies continue to function as they did in the past with no discrimination in their value or importance.

Such an institute was proposed for sanitarians in 1944.[1] The broadening of the membership of the International Association of Milk Sanitarians to include food sanitarians advanced the project. Now, demand is being made that full membership be made available to industrial as well as governmental workers, all on an equal basis.

Sanitarians in governmental employ are usually directed by physicians or engineers; those in industry work under no such formal arrangement but may be responsible to top management. The development of a coordinated group of sanitation organizations by the Engineering Section of the A.P.H.A. is likely to "keep the sanitarians in their place".

We contend that the place of sanitarians is "a place in the sun". An independent, self-governing, fully developing Institute of Sanitation can grow as it wishes, handle its own affairs when, as, and if it pleases, cooperate with everyone, and stand on its own. Moreover, the added strength of such integrated functioning imparts strength for weathering the problems of depression periods, insures stability of management in publication enterprises, and speaks authoritatively in educational requirements and public relations. Let's think it over. J.H.S.

1. *J. Milk Technol.*, **7**, 128 (1944).

QUALITY WITH A NEW EMPHASIS

H. C. SHERMAN, concluding his discussion of "Trend of Interest in Food through Sanitation to Nutrition", writes:

"The student of food problems should cultivate a clear view and a firm grasp of the importance of both the sanitary and the nutritional aspects of the subject, and of their interrelations and interdependence. . . .

"Thus through no contest of rival sciences or professions but because the sanitary and regulatory work has been, and is being, so well done, the center of gravity of the general problem of the relation of food to health and human welfare has moved forward from sanitation to nutrition."

This newer nutritional emphasis insofar as milk is concerned is revealing itself in two clearcut ways: education of the public and improvement in intrinsic quality of the milk itself.

With regard to the first of these, it would seem that the education of the public as to the relative nutritional value (taken in a broad sense) of milk might be considered to have begun with the development of the idea of Certified Milk. The public were taught to discriminate on the basis of overall quality. All milk is not just more milk. This led to advertising, sales promotion, and plant tours—all expensive but warranted in order to inform the public that milk has distinctive qualities (although sometimes real and sometimes fancied). Following the general lead of the industry, the regulatory officials began to appreciate the value of public comprehension as to what quality really means. From beginnings of sporadic demonstrations and occasional "bulletins", the up-to-date health department is now committed to a definite continuous educational program implemented by specially trained personnel. Education is now an important tool of both industry and regulatory officials, the former seeking to impress the public with the care that is taken in handling and the latter seeking to educate the public as to their nutritional needs and the unique value of milk in particular to meet that need.

With regard to the second factor of intrinsic nutritive value, there has been a good beginning—just a beginning. This is manifested in fortification with vitamin D, in improvement in flavor, and in homogenization (a borderline factor at least insofar as this discussion is concerned). A few firms here and there add several other food accessories.

The first of the above—vitamin D fortification—is now about twenty years old. The second is about as old, and really involves no particular inventive or otherwise novel effort: it is merely the correction of faulty processing in handling procedures that good technology demanded anyhow (metallic contamination, extraneous material, exposure to light, cream line irregularity, etc.). The third—homogenization—is lifted over bodily from the evaporated milk and the ice cream industries. (Such other good innovations as covered caps, lettered bottles, fiber packages, and square containers are desirable but do not contribute to the intrinsic food value.)

We wonder how long the milk industry is going to rest content to coast along on these past advances. A large amount of authenticated information has been published to show that enhanced nutritional quality can be born in the milk, so to speak, by directed animal husbandry. Moreover, valuable food accessories, naturally occurring in milk, can be conserved by better technology. Milk technologists know this. The front offices, the advertising departments, and the stockholders are not so well informed—now. Hadn't they better?

The milk industry might consider just one development that is jolting, to say the least, to one of our allied industries. This is the competition that present-day oleomargarine and its related products is giving to the butter industry. The latter, in a short-sighted effort to stabilize consumer acceptance, secured legal permission (!) to add artificial color to butter to cover up the loss of the popular June color, to this extent concealing the inferiority that comes from seasonal fluctuations in certain nutritive values. In contradistinction to this, we note that their competitors can market a product whose nutritive value is constant and dependable. (We mention this as a factual matter with no reference to the present issue in Congress over questions of the tax on oleomargarine.) Moreover, another allied industry adds coloring matter to make the public think there is more fruit or flavor added than there actually is.

Sooner or later the public will "catch on". Why does the great dairy industry wait until it is on the defensive? Here is a field where the milk bottling and distributing services of the dairy departments of the state universities and experiment stations can blaze the trail just as they emboldened the industry by working out the technology and by revealing consumer acceptance for homogenized bottled milk. This program of increasing the intrinsic food value through research and technology would increase the cost to the station but this is important enough to justify a subsidy. Here is a five year plan indeed. J.H.S.

REFERENCE

1. Food Products, by H. C. Sherman. Macmillan 1949.

REGISTRATION IN SANITATION

REGISTRATION, standardization, regimentation, licensure, joining-up—all this is in the air. Association of kindred minds into professional groups is desirable because it stimulates the spirit, enriches the mind, and increases the power of collective expression and technical advance. Advantage is taken of such a situation to unionize the field of sanitation. Of course this objective is not stated openly.

The plea for registration (and/or licensure or equivalent) masquerades under the pleas that registration of sanitarians is necessary to raise their technical ability and to secure professional recognition and to increase their pay. In support of this program, its proponents cite the licensing (or equivalent) of psysicians, engineers, lawyers, public accountants, and nurses, but they discreetly do not include in the roster the plumbers, the barbers, the undertakers, and the beauticians. The original and emphasized reason for such practise in all of the above is the protection of the public.

It is clear that workers in each of those occupations are engaged directly by the public. The average citizen has no means of discerning the qualified from the unqualified. So government is called upon to label the individual as to his qualifications.

The sanitarian is in no such relation to the public. He is always an employee of a governmental unit or a successful business concern. These groups know how to select employees of proper training. They need no label to certify as to quality. They see no occasion for looking to some distant official or unofficial organization to tell them who they should employ—as if the employing unit did not know what it wanted in the way of qualifications of its personnel. Therefore there is no occasion for setting up registration to protect the undiscerning public from the services of unqualified sanitarians.

With regard to professional recognition, it is patent that the practise of railroading every joiner-up into registration status operates to discredit the very objective sought. Professional men who are really such recognize that these short-cut practises are devices of aspirants to lift themselves by their bootstraps. The invocation of grandfather clauses loads up the roster with many names of persons who can get a "degree" by no other means.

The question of salary is not one that is determined by whether or not the employee is "registered" (because this word does not guarantee quality). What does determine this is ability that is recognized by competent authorities, namely, men (or organizations) that have "arrived", men who have demonstrated their professional status by years of work at levels of performance commensurate with those of such responsible groups as the physicians and engineers.

To raise the practise of environmental sanitation to professional quality is desirable. There are some desirable aspects of registration. We venture to suggest the following steps as contributing to this end in a manner which commands respect and which is more likely to insure the results sought:

1. Draw up a set of educational, experiential, and ethical requirements by a group that has high recognition among professional groups (see accompanying editorial);
2. Provide registration for those who want it, carefully avoiding any unseemly effort to legalize and restrict employment only to registrants and omitting any grandfather clauses; and
3. Adopt the policy of leading the development of sanitary practise by the superiority of knowledge and quality of performance rather than by coercive legislation of restrictive and related strong arm methods.

J.H.S.

PENICILLIN AND DYE REDUCTION TESTS FOR MILK QUALITY *

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RECENT studies (2, 4) have shown that acid production by cheese starter organisms may be inhibited or checked by extremely low concentrations of penicillin. Even 1 part of penicillin in 330,000,000 of milk had a demonstrable effect with one starter. With the growing use of penicillin in the treatment of mastitis, herd milks may occasionally contain penicillin in concentrations considerably in excess of this. These concentrations may hinder the metabolic activities of many of the bacterial species present, unduly long reduction times with the resazurin and methylene blue tests may result, and an erroneous impression of the quality of the milk may be obtained.

In order to investigate this, several series of samples of raw herd milk were obtained from a local dairy. After overnight storage at 2° C., the milks were dispensed in 10 ml. amounts into sterile test tubes each containing 1 ml. standard resazurin of methylene blue solution (1). Solutions of penicillin ** of the required concentrations were freshly prepared in sterile distilled water and added to the dye-milk mixture in the test tubes. After tempering, the tubes were stoppered, mixed, and incubated in a water bath at 37° C. Tubes were examined and readings recorded every 30 minutes up to 2 hours, then every hour. The tubes were inverted every hour (1).

In the first series of tests, concentrations of penicillin employed ranged from 833 to 0.083 International units per milliliter. One interesting observation, confirmed in subsequent tests, was that penicillin, even in strong concentrations, usually had little or no effect upon the early stages of resazurin reduction (Table 1). This is of importance in the resazurin triple reading test, where Colour No. 8 (Munsell P7/4) is taken as the endpoint (1). As is evident from the data in the several tables, reduction to this endpoint is rarely retarded by the presence of penicillin. (Milk D in Table 2 is the only one which has shown marked retardation. This milk is by far the most sensitive to penicillin of any of the 27 milks tested.) In the later stages, however, the effect of increased concentrations of penicillin is generally more evident. Since the methylene blue test employs complete reduction as the endpoint, results with this test are more likely to be disturbed by penicillin than are those of the resazurin triple reading test. This is clearly illustrated by Milks A and C in Table 1.

A second series of tests was conducted using concentrations of 0.5 and 0.05 unit of penicillin per milliliter. With the exception of 3 samples which were completely reduced within 2 hours, all of the 18 milks showed retardation with the higher concentrations, and 8 with the lower. Five of the latter were used the following day in studies to determine the minimal concentration of penicillin having any effect. Results from four of these appear in Table 2.

* Contribution No. 281 (Journal Series) from the Division of Bacteriology and Dairy Research, Science Service, Department of Agriculture, Ottawa.
† Senior Bacteriologist.
‡ Bacteriologist.
** Crystalline Sodium Penicillin G, Merck (60 mg. = 100,000 units).

TABLE 1

EFFECT OF VARIOUS CONCENTRATIONS OF PENICILLIN ON DYE REDUCTION

International units of penicillin per ml. of dye-milk mixture	Milk A							Milk B							Milk C						
	Resazurin color No.[1] after (hrs.)						M.B. reduction times (hrs.)	Resazurin color No.[1] after (hrs.)						M.B. reduction times (hrs.)	Resazurin color No.[1] after (hrs.)						M.B. reduction times (hrs.)
	1	2	3	4	5	6		1	2	3	4	5	6		1	2	3	4	5	6	
833	8	*10*	12	13	13	14	8	6	*10*	10	12	13	13	9	*10*	13	14	15	15	15	10
83	8	*10*	12	13	13	15	8	6	*10*	10	12	13	13	9	*10*	13	14	15	15	15	10
8.3	8	*10*	12	13	15	22	6	6	*10*	10	12	13	13	9	*10*	14	15	15	15	15	10
0.83	8	*10*	13	15	22	24	5½	6	*10*	10	12	13	13	9	*9*	14	15	15	16	16	8
0.083	8	*10*	13	23	24	..	4	6	*10*	10	12	13	13	9	*10*	15	23	23	24	..	3½
Control	8	*12*	14	24	..	..	4	6	*10*	10	12	14	14	8	*10*	24	..	..	..	..	2

[1] Colors range from 0, the initial color of fresh milk, to 16 (full pink) then to 24 (white). Figures in *italic* indicate first readings beyond the P7/4 endpoint of the triple reading test.

Various workers (5, 6, 7, 8) have studied the concentrations of penicillin present in milk from treated quarters, and have reported wide variations from one quarter to another. For a herd milk, the calculation of the probable penicillin concentration is further complicated by the variable degree of dilution with milk from untreated quarters and udders. To obtain some indication of what might be considered *the maximum probable concentration*, we have taken Packer's (5) data for a quarter (which had been treated with 100,000 units of penicillin) yielding only 825 milliliter in 12 hours. By our calculation, the milk obtained at the first and second milkings after treatment would contain around 15 units per milliliter in 3.6 pounds of milk. Assuming a similar yield from the remaining untreated quarters, this would mean around 4 units per milliliter for the 15 pounds of milk from this cow. If there were only four cows in the herd, each yielding 15 pounds of milk per day, the penicillin concentration for the mixed herd milk would be around 0.8 unit per milliliter. It should be emphasized that this represents *a maximum probable concentration,* considerably in excess of what might ordinarily be encountered. In our studies, 0.5 unit per milliliter retarded reduction in all milks (excluding those completely reduced within 2 hours), while the most sensitive sample (Milk D, Table 2) showed a slight but definite retardation with 0.01 unit per milliliter. It is thus evident that milk from herds in which penicillin treatments have been given may contain sufficient of this antibiotic to affect the grading by the dye reduction tests.

The action of penicillin was clearly illustrated by direct microscopic examinations of smears prepared at the time of reduction of control tubes. The control tube of one milk, which was almost completely reduced at 4 hours, contained almost all coccus types, while the tube containing 0.05 unit penicillin showed rod types exclusively. The contrast was so striking that it was hard to believe that these represented portions of the same milk. Similar, though less extreme, differences were noted with other milks.

Leucocytes, or substances associated with them, bring about color changes with resazurin (3). To determine if penicillin would hinder such changes, a milk with a plate count of 50,000 per milliliter and a leucocyte count of 1,500,000 per milliliter was selected. The results (Milk B, Table 1) indicate no effect upon the color change due to non-bacterial factors.

The action of penicillin is specificaliy neutralized by the enzyme penicillinase. Where a sample of milk showed an unexpectedly slow reduction of either methylene blue or resazurin, and where the presence of penicillin was suspected, it was thought that this might be presumptively confirmed by running an extra tube of milk containing an appropriate concentration of penicillinase. Investigating this possibility, three samples of herd milk were subjected to various concentrations of penicillin (2 to 0.1 units per milliliter) and of penicillinase * (2.1 and 0.63 units per milliliter). The data from one of these, fairly typical of all three, are shown in Table 3. It will be observed that with the two lower concentrations of penicillin (D and E) the weaker penicillinase solution was quite effective, color readings generally being practically identical with those for the control (F3) tube. Furthermore, this concentration of penicillinase by itself was not inhibitory (compare F2 and F3). In contrast, the stronger concentration of penicillinase was distinctly inhibitory in the absence of penicillin (F1), while in its presence it tended to intensify the inhibitory effect. Since a herd milk is unlikely to contain more than 0.2 unit of penicillin, it might be feasible to employ a concentration of penicillinase in the neighborhood of 0.63 unit to detect inhibition of dye reduction by penicillin.

* Penicillinase Schenley.

TABLE 2

MINIMAL EFFECTIVE CONCENTRATION OF PENICILLIN IN RESAZURIN TEST

International units of penicillin per ml. of dye-milk mixture	Milk D Resazurin color No. after (hrs.)						Milk E Resazurin color No. after (hrs.)						Milk F Resazurin color No. after (hrs.)						Milk G Resazurin color No. after (hrs.)					
	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
0.05	2	4	5	7	*15*	24	3	5	8	*12*	15	18	*10*	14	18	22	24	..	*9*	16	22	23	24	..
0.02	2	5	7	*14*	23	24	3	5	*9*	13	20	23	*10*	17	24	..	..	..	*9*	18	24	..	..	..
0.01	2	5	*11*	20	23	24	3	5	*9*	14	22	24	*10*	19	24	..	..	..	*9*	18	24	..	..	..
0.005	2	5	*14*	22	23	24	3	5	*9*	14	22	24	*10*	19	24	..	..	..	*9*	18	24	..	..	..
0.002	2	5	*14*	22	23	24	3	5	*9*	14	22	24	*10*	19	24	..	..	..	*9*	18	24	..	..	..
Control	2	5	*15*	22	23	24	3	5	*9*	14	22	24	*10*	19	24	..	..	..	*9*	19	24	..	..	..

SUMMARY

Dye reduction in milk may be retarded by concentrations of penicillin as low as 1 part in 167,000,000. This is rarely evident in the early stages, so that the P7/4 endpoint of the resazurin triple reading test is usually reached at approximately the same time whether or not penicillin is present. Complete reduction, as in the methylene blue test, on the other hand, may be delayed as much as 6 hours or more.

Reduction of resazurin by non-bacterial factors does not appear to be retarded by penicillin.

Within a narrow range, penicillinase was effective in counteracting the retarding action of penicillin. In general, a stronger penicillinase solution actually increased the inhibitory effect.

ACKNOWLEDGMENTS

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TABLE 3

EFFECT OF VARIOUS CONCENTRATIONS OF PENICILLIN AND PENICILLINASE ON RESAZURIN REDUCTION

Tube No.	International units of penicillin per ml. dye-milk mixture	Units of penicillinase per ml. dye-milk mixture	Resazurin color reading after (hrs.) ½	1	1½	2	3	4	5	6
A1	2	2.1	6	10	12	12	13	14	14	15
A2		0.63	6	10	12	12	14	16	23	24
A3		0.0	6	10	12	12	13	14	15	16
B1	1	2.1	6	10	12	12	13	14	15	16
B2		0.63	6	10	12	13	14	16	23	24
B3		0.0	6	10	12	12	13	14	18	23
C1	0.5	2.1	6	10	12	12	14	14	18	23
C2		0.63	6	10	14	15	23	23	24	..
C3		0.0	6	10	12	12	14	14	20	23
D1	0.2	2.1	6	10	12	12	14	14	17	23
D2		0.63	6	11	14	20	24	..	..	..
D3		0.0	6	10	12	14	14	14	22	23
E1	0.1	2.1	6	10	12	13	14	14	18	23
E2		0.63	6	11	14	22	24	..	..	..
E3		0.0	6	10	12	14	14	17	22	23
F1	0.0	2.1	6	10	12	13	14	14	19	23
F2		0.63	6	12	15	23	24	..	..	..
F3		0.0	6	12	15	23	24	..	..	..

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MILK and FOOD SANITATION

ABSTRACTS OF THE LITERATURE OF MILK AND FOOD DURING 1948

THESE ABSTRACTS WERE COLLECTED AND EDITED BY C. K. JOHNS, OTTAWA, CANADA WITH THE COLLABORATION OF F. C. BASELT, A. E. BERRY, P. B. BROOKS, F. W. FABIAN, C. R. FELLERS, R. W. HART, M. D. HOWLETT, AND G. H. WILSTER

Abstracts as published in several journals during the year 1948 are the basis for the following summary of literature in the field of the dairy industry. Consequently some of these papers were printed in 1947. However, the summary is not restricted to either of these calendar years. Limited space made it impossible for us to include all articles that are worthy of mention, but we estimate that about four-fifths of the available literature has been covered.

The following abbreviations have been used:

CA means *Chemical Abstracts,* vol. 41 (1948).

JDS means *Journal of Dairy Science,* vol. 30 (1948).

In a few cases, the volume and year of a reference is different from those of the year 1948; in such cases, specific publication data are fully given.

ANALYSIS

The methods for measuring the specific refractive increment of some purified proteins are described by Perlman *et al.* (1).

Routine tests in the dairy industry are discussed by Davis (2), especially the Rapid Abnormality Indicator and Meter as new instruments for detecting abnormal milk by measurement of chloride concentration.

Borrell (4) outlines methods of determining total N., nonprotein N and globulin N in protein fractions of milk.

Sjostrom (5) studied reactivation of phosphatase activity after alkali and acid treatment of milk. If pH is lowered to 3.7 by bacterial action, activity cannot be restored.

Gunnar *et al.* (6) contribute various methods of determining fat-content in whey products compared to the Gerber method. Suggest two Gerber determinations for each sample; with low fat content Gerber method not reliable.

Starnert (7) describes a quick method for estimating salt content that can be used for fresh and ripe cheese.

About 11% lower values were obtained by Starnert's quick method for determining salt in cheese than with Van der Burg's method (8).

The Swedish laboratory method for determination of H_2O content in butter is compared with modified method and that of Olsson (CA 39, 23524[4]) by Sjöstrom, (9) who suggests drying at 120° for two hours weighing, repeated drying for one-half hour, and weighing.

Rangappa (10) reports little correlation exists between refractivity constant and freezing point, due to fact that constituents other than those in true solution affect refractive constant.

Coleman *et al.* (11) reported on trace metal determination in fats, with special reference to copper in milk fat. Discussion of ashing techniques to eliminate errors in final determination of copper by spectrophotometric reading of dithizone complex and by polarigraphic methods.

Lythgoe (12) made historical survey of methods for determination of fat content of milk. Discussion of methods used since 1876 with special reference to Babcock method.

Gould *et al.* (13) verify lactic acid determination by Hillig in ice cream. No relationship exists between lactic acid titrable acidity and pH.

Carter (14) describes a method for the determination of DDT in milk by determining the total organic chlorine. The method is rapid and simple but not specific for DDT.

Schechter *et al.* (15) describe a colorimetric for the determination of DDT in milk and other foodstuffs containing considerable amounts of fatty matter.

The various colorimetric methods for the determination of DDT are discussed by Schechter *et al.* (16) with respect to their suitability for determining DDT in fatty materials.

The mineral content of milk and cheese and the effect upon it of differences in forages and soil was studied by Leyton (17).

The refractive index was determined on cow and buffalo milk by Rangappa (18) and the values were used to determine the amount of water and sugar that could be added to skimmed milk.

Kveton (19) reports watery buttermilk was detected by gravimetric determination of the dry substances of milk. Determination of detection of sweet and sour milk with the lactodensimeter is discussed.

Izmen *et al.* (20) studied the composition of the milk of Angora goats during lactation.

The gravimetric method of Rose-Gottlieb and the azide-butyrometric method for the determination of the fat content in skim milk, buttermilk, whey, centrifuged skim whey, and albumin-free whey were discussed by Hostettler *et al.* (21).

A study was made by Izmen (22) on some chemical and physical constants of the milk fat of Turkish goats and the influence of the lactation time on these constants.

A method is described by Vonesch (23) for the determination of ascorbic acid in milk with the aid of Chloramine-T.

Tests by Aschaffenburg and Veinoglou (24) of the freezing point of milk from individual cows of a Shorthorn herd during a 16 month period showed variations of less than 4.5% from the mean in all but two of 2773 values. On a given day, differences in freezing points of morning and evening milk tended to be of the same sign. Differences also seemed to be associated with season, temperature of environment (inverse correlation), solids-not-fat and breed of the herd. Age of the cow, state of lactation, and milk yield were not related to the freezing point.

Earlier work on three serum methods for the detection of added water in milk is reviewed by Mitchell and Frary (25) and additional data are presented on 27 herd samples of raw milk. The Cu-serum method is the quickest of the three from the standpoint of preparation of the serum and is desirable since it gives a narrow range of readings. The cryoscopic method is rapid, accurate, and most reliable.

Duggan (26) describes a proposed technique for determination of free tryptophan. Negligible amounts of free tryptophan are present in normal sweet milk and cream. The amount of free tryptophan in milk and cream increases with age if the products are held under conditions conducive to bacterial and enzyme activity. The amount of free tryptophan in butter depends on its content in the original cream.

Horwitz (27) reports the presence of neutralizers in nonfat dry milk solids can be detected by the Hillig's alkalinity of ash method; but the method lacks precision since a large excess of acid must be added to the ash and 95% of it back-titrated. The value of the method lies on its being based on definite chemical constants which can be determined with relatively high accuracy and precision as compared with the empirical alkalinity of ash determination.

Claborn and Patterson (28) describe in detail the determination and identification of lactic and succinic acids in foods.

Sanders (29) reports that the Sanders-Sager method for testing fluid milk and cream and certain cheeses for the inadequacy of pasteurization was recommended as the official method.

Rangappa (30) reported that proteins, lactose, and soluble salts have greatest effect on refractive index of milk. Lactalbumins and globulins have greater effect than does casein. The N of milk serums shows no linear relationship to lactose content.

Methods of sampling and determination of moisture, fat, acidity pH, Fe, N, heat discoloration and water extractable lactose in rennet casein and acid casein were described (31).

Elimination of interfering substances in Kay-Graham phosphatase test when used for hard-ripened cheese was studied by Kosikowsky *et al.* (32). Use of trichloroacetic acid for this purpose was discussed.

Swartling *et al.* (33) describe test of rapid method for determining carotene content of milk. The coefficient of correlation between the rapid method and actual carotene content of milk is + 0.977.

The formula: dry substance — 1.2G + D/4 + 0.26 is suggested by Siffert de Paula e Silva (34) for the determination of dry substance from the d.D and the % of fat G. D/4 + 0.26 is substituted by 1.0348 D/4 if D is less than 1.029.

Bakos and Szieb (35) in investigations on milk, cream, sour cream, and cheese, showed the suitability of BuOH for the Gerber Test. Also a mixture of 80% BuOH and 20% AmOH seemed to be suitable.

Saal and Heukelom (36) report on the oxidation-reduction potential of milk and of butter plasma.

To preserve cream samples for analysis, reports Peter (37), phenol and Cl_2O caused an irregular change in acid numbers. Best results were obtained with $HgCl_2$ (0.5–2.0 cc. of 50% solution per 100 cc. cream). Dichromate solution can be used best, although it increases acidity somewhat.

Thirty-one samples of milk from different parts of Turkey were analyzed for fat by Ungan (38).

The Reichert-Meisl number, the Polenske number, and the butyric acid in 23 samples of milk fat from the cow, sheep, goat, and buffalo were determined from different parts of Turkey by Kiper (39).

Gould (40) reports whole and skim milk heated in sealed cans at 100° for periods up to eight hours and at 116° for periods up to 2.5 hours were examined for increases in titratable acidity by electrometric titration, for lactic acid by a slightly modified Hillig colorimetric method, and for lactose by the polarimetric procedure. Lactic acid measurements on fresh concentrated milk products reveal the quality of the raw milk used in their manufacture.

Gould (41) reports heating skim milk in cans at 116° for one and two-hour periods appreciably increased the volatile acid content of the milk as determined by steam distillation. Redistillation of steam distillate obtained from skim milk heated previously for two hours at 116° resulted in a curve falling between the formic and acetic acid curves at the start of distillation but resembling that obtained from formic acid for the major part of the distillation period. In this experiment formic acid constituted 80–85% of the total volatile acid in the skim-milk distillate.

Whole homogenized or skim milks heated at 100° for periods up to eight hours and at 116° for periods up to 2.5 hours were examined by Gould and Frantz (42) for acidity changes before and after adding oxalate, for formol titration changes before and after adding oxalate, and for pH changes.

The phenol reagent of Folin and Ciocalteau is used by Hull (43) to determine the tyrosine or tryptophan present in protein-free filtrates from milk which has been acted upon by pancreatin. The blue color is meas-

ured in a Coleman spectrophotometer with 650 mu wave-length light. The method can be used to measure minute amounts of milk protein hydrolysis.

A sensitive test for tyrosine has been applied by Storrs (44) to a study of milk modified by the enzyme process with results indicating that the free tyrosine content of the milk increases with the degree of enzymic treatment.

Holmes and Jones (45) measured ascorbic acid losses from milk over a period of ten days.

Choi *et al.* (46) describe a moisture-description method for estimating the H_2O of crystallization of a-lactose and indirectly the crystallization hydrate in whey solids. Results were in close agreement with indirect method using Karl Fisher method. Pasticle size 54 to 110 u had no influence on results obtained by moisture-description method.

Brouwer (47) studied the effect of $K_2Cr_2O_7$ on the Storch reaction and the catalase test. It can best be detected and determined by the diphenylcarboxide method.

Several modifications of Rose-Gottlieb fat determination and Gerber method were compared by Hostettler and Hänni (48) and the most accurate procedure described in detail.

Verma *et al.* (49) found no significant difference in the analytical constants of the butterfat from Sindhi, Gir, and Tharparker cows and Murrah buffalos when all the breeds are studied under similar conditions.

Verma and Ananthakrishnan (50) report the Ca content of Murrah buffalo milk averages 0.1910 g. per 100 ml., 77.49% of which is colloidal; whereas the average for cow milk is 0.1526 g. per 100 ml. 67.09% of which is colloidal.

Investigations by Bakos and Szieb (51) on milk, cream, sour cream, and cheese showed the suitability of BuOH for the Gerber test. Also a mixture of 80% BuOH and 20% AmOH seemed to be suitable.

Kent-Jones *et al.* (377) outline a procedure, modified from the American method, for use in England to detect contaminants (rodent hairs, etc.) in cereals.

Kamecki (378) suggests that the low results obtained when determining the fat content of milk products by the SCHMID-BONDZYNSKI method is due to the decomposition of fatty acids during the boiling of the sample with HCl, as well as to the loss of fatty acids by evaporation, and recommends that the drying of the separated fat be limited to 1 hour at 100–2°.

When ascertaining the amounts of chlorine or sodium chloride present in various dairy products, Hostettler *et al.* (379) report that, precipitating the protein and fat and then determining the chlorine by mercurimetric titration gives the best results.

Results of tests used for detecting reconstituted milk are offered by King (420).

Zilliox, Mitchell & Frary (421) offer the results of determinations made of the titratable acidity of milk.

A simple test for determination of quaternary ammonium salts as germicides in the field is reported by Brooks and Hucker (422).

Hager, Young, Flanagan and Walker (423) describe some qualitative and quantitative methods for determination of high molecular weight quaternary ammonium compounds.

Sanders and Sager (424) attest to the reliability of a modified phosphatase test for detecting under-pasteurization of fluid milk and/or cheese.

A suggested modified Babcock procedure for testing homogenized milk is discussed by Lucas and Trout (425).

Harper and Elliker (426) report on a simple and rapid test for determining concentrations of quaternary ammonium germicide solutions.

Trout and Lucas (427) report on a comparison of Babcock, Gerber, Minnesota, Pennsylvania and Mojonnier methods for determining % of fat in homogenized milk.

Recommended changes for 9th edition of Standard Methods for Dairy Products are presented in summary form (428).

Sanders and Sager (429) offer extended use of the improved modified phosphatase test in detecting under-pasteurization of milk and milk products.

The phosphatase tests used for determining the pasteurization of hard cheeses are reported upon by Gilcreas (430).

Sanders and Sager (431) report the results of studies conducted to determine time-temperature conditions required to inactivate phosphatase in various dairy products.

A modified phosphatase test for determining the adequacy of pasteurization of milk and milk products is described by Sanders and Sager (432).

Sanders and Sager (433) discuss the present status of the phosphatase test in a review of difficulties encountered.

Animal Health

Data are given by Boyd *et al.* (52) regarding the rate of placental retention in Bang's positive and negative herds after parturition.

It was shown by Hams *et al.* (53) that pigs cannot be raised from birth using a synthetic milk and colostrum substitutes.

Reid *et al.* (54) have shown that feeding a mineral supplement during the last two months of gestation had no effects upon the calcium and phosphorous blood levels of the cows or their calves.

The effect of inanition on mammary gland development and lactation is given by Sykes *et al.* (55).

Hutt *et al.* (56) describe hereditary epithelial defects in Ayrshire cattle, believed to be caused by a single autosomal recessive gene.

The dose-time-weight relationship is important in administration of penicillin by intra-mammary infusion as compared to the parenteral administration. Diffusion of penicillin from the blood to milk is a problem, according to Welsh *et al.* (57).

The cause of foot and mouth disease (aphthous Fever) and the rigid quarantine measures involved in its control are discussed by H. Steele (434).

Wolf, Henderson and McCallum (435) suggest an association between clinical distemper, enteritis and recovery of 16 salmonella types from the stools of 100 dogs.

Detection, control and treatment of chronic mastitis is discussed by Waechter (436).

Bryant (437) presents data on the prevention, control and treatment of mastitis.

Removal of DDT by licking is most important factor causing removal of the insecticide, and the amount so ingested, reports Hackman (438), is not sufficient to produce toxic effects.

A symposium on bovine mastitis is reported in which adequate coverage is given the subject (439).

Kelly *et al.* (440) report some data that indicated a gain in control of mastitis by the use of a pen barn.

Bacteriology

Hussong *et al.* (58) give the methods of staining, the types of bacteria found in dairy products, and the microscopic appearance of these micro-organisms.

MacLean (59) states that laboratory pasteurization is the most reliable test for the pasteurizability of milk, and the plate count is to be regarded as an index rather than a standard for quality.

Mold, bacteria and other microorganisms can be controlled by use of selected ultra violet radiations, according to Morwick (60).

Quaternary ammonium and hypochlorite compounds for sanitizing dairy utensils and equipment are described by Johns (61).

The use of microlysine as a preservative in food products is reported on by Gibbons *et al.* (62). The reduction of

viable organisms is proportional to the concentration of microlysine.

Effect of variations in technique on plate count of milk powders is reported by White (63). Use of N/10 LiOH solution as diluent discussed.

Polypeptides containing a large proportion of d-amino acid residues are without appreciable antibacterial activity, according to Fox *et al.* (64).

It was shown by Drell *et al.* (65) that the growth of 23 strains of lactic acid bacteria which require pantothenic acid can be inhibited by certain analogs of pantothenic acid.

Based on a comparative study of the more commonly used staining procedures for the direct microscopic examination of milk, Levine *et al.* (66) believe that procedures for staining milk smears can be improved.

A rapid field test for quaternary ammonium solutions is described by Brooks and Hucker (67).

According to Abdel-Malek *et al.* (68), streptococci found in raw milk were mainly *Str. kefir, Str. lactis* and mastitis organisms. Pasteurized milk held till tainted yielded *Str. kefir, Str. faecalis, Str. bovis* and *Str. thermophilus*.

Crossley (69) developed a rough sorting test for bact. flora in relation to keeping quality of pasteurized liquid cream. Relation of colony count, coliform test, grading test, and keeping quality studied. Satisfactory operation described to insure min. bact. population. Studied effect of cold storage before and atmosphere temperature after distribution.

Anderson and Wilson (70) as a measure of mean keeping quality, found methylene-blue was slightly better than resazurin. Standard deviations show a wide scatter of keeping quality for specified standards by either dye test.

Higginbottom (71) found range of reduction times with methylene blue and resazurin after incubation at 22° gave poor correlation with plate count at 37° or 30° and with keeping quality after incubation at 55, 37 and 30° reduction times were too short, often showed delayed end-points and milks frequently clotted.

Higginbottom (72) investigated bacterial growth in reconstituted spray-dried milk. *Strept. faecalis* and *Micrococcus casei liquefaciens* were most commonly found. Aging 24 hours at 15.5° caused no change in mean count; at 22°, increase was 2000 fold and at 37° milk had clotted.

Kesler *et al.* (73) report no differences in bacterial count could be attributed to the use of hypochlorite or quaternary ammonium compounds as udder washes.

Hlynka and Hood (74) present data illustrating the properties of the starter quotient (varying between 47 and 76) and a comparative rating of 13 Canadian cheese starters.

Verhoeven (75) reports corn meal soaked with a suspension of *Penicillium glaucum, Mucor* sp., *Cladosporium herbarum*, and *Aspergillus glaucus* was packed in cellophane bags and a series treated for one hour in an atmosphere of ethylene oxide. Even after ten weeks' storage no growth was observed. All controls were moldy. Spices treated in the same way gave excellent results. The amount of ethylene glycol formed gave no cause for alarm from health standpoint.

Thomas *et al.* (76) studied bacterial counts in raw-to-plant and pasteurized milk samples using incubation temperature of 37°, 35° and 32° F.

Tomka (77) found more acetoin and biacetyl produced by propionic acid bacteria in milk than in whey or in a special broth medium.

It was shown by Cranfield (78) that overnight refrigeration of ice cream results in a decrease of coliform content and a slight increase in plate count while the coliform content frequently increased and the plate count always increased when ice cream was held at room temperature.

A collection of important papers dealing with the resazurin test from 1940–1948 is presented under five main headings by Watson (79).

Winter *et al.* (80) have shown that coliforms were destroyed in unfrozen liquid whole eggs more easily by pasteurization than those found in defrosted liquid whole eggs.

In comparing esters of vanillic acid as spore controlling agents, iso-butyl vanillate was found to be the most efficient preservative according to Evans *et al.* (81). Its action is primarily sporostatic.

Wilson and Tanner (82) frequently detected flat sour thermophiles in canned peas and corn (about 10% to 20%) whereas the presence of other thermophilic anaerobes was rarely demonstrated. The incidence in peas was generally higher than in corn.

Scarlett and Martin (83) state that break-point chlorination in food processing plants helps to eliminate bacterial slime in processing line, and plant odor, and to reduce cleaning time and bacteria counts of the product.

Bacteria on improperly cleaned equipment are usually in the rapid growth phase, reports Strumbo (84). When fresh food contacts such a source of contamination, instead of showing a lag in growth, these bacteria often continue to grow rapidly.

Bauer *et al.* (85) found that by dipping the paper used to wrap butter and other dairy products in a solution of an acetate containing combined but undissociated acetic acid, preferably Na diacetate, mold growth is inhibited.

Albert *et al.* (86) describe a technique for the isolation of *Bact. linens* from various dairy products. They also describe its cultural requirements and reactions in detail.

The biological properties and mouse virulence of 70 Lancefield's group B streptococcus cultures were studied and compared by Pomales-Lebron *et al.* (87).

Comparisons of the disinfecting properties of hypochlorites and quaternary ammonium compounds under varied conditions are described by Shere (88).

The degree of whey separation in cultures of *Strep. thermophilus* is discussed by Keilling *et al.* (89).

Galesloot (90) compared resazurin and methylene blue reduction times of raw milk. Resazurin colors were read after one hour in summer, two hours in winter. Body cells affected resazurin reduction to such a degree that the agreement with plate count was poorer than that between methylene blue count.

Speck (91) discusses the significance of certain bacteria in milk.

The attack of xerophilous microorganisms on dried foods was not dependent on the absolute moisture content but on the vapor tension, reports Stille (92).

Julius' roll tube method (I) for bacterial counts was compared by Galesloot (93) in 100 samples of pasteurized milk with the standard plate method (II).

An investigation by Thomas *et al.* (380) on the "rinse" and "swab" techniques of checking washed utensils on English dairy farms.

Rates of internal cooling of hams, chickens, broths and soft custards, and their effect on the bacterial growth, are presented by Black and Lewis (381).

The advantages and disadvantages of quaternary ammonium compounds are discussed by Hussong (382).

Lawrence (441) discusses quaternary ammonium compounds and their use in the dairy industry.

Johns (442) evaluates germicidal activity of hypochlorite solutions and quaternary ammonium compounds for sanitizing food handling equipment surfaces.

U. S. Public Health Service reports on 2 years study on quaternary ammonium compounds with advice and recommendations to health officers concerning their provisional approval under controlled conditions (443).

Foter and Finley (444) present the

results of a study on the germicidal activity of 6 alkaline and 1 acid can-washing compounds.

The recommended methods of procedure for the bacteriological examination of shellfish and shellfish waters (APHA 1943) are replaced by revisions included in this report (445).

Jamieson, Forster and Rey (446) discuss a simple method for detecting biological dirt.

To preclude post-blancher contamination of vegetables Vaughn and Stadtman (447) recommend several sanitizing agents for sanitizing handling equipment in processing plants.

Bashford (448) considers the present state of knowledge concerning microbiological problems in the canning industry and concludes that canned foods can be accepted as safe.

In a comparative study of the methylene-blue and resazurin tests, Revallier-Warffemius (449) concludes that the methylene-blue test is to be preferred as an indirect measure for keeping quality of milk and the resazurin test be restricted to testing cheese milk.

Mandel (450) offers an improved stain for the direct microscopic examination of coliform bacteria in milk.

Employing chloramine-T as a germicide for sanitizing hands in a poultry dressing establishment, Sotier and Conklin (451) report a reduction in transient bacteria on hands of operators.

Levowitz (452) discusses origin and control of thermoduric organisms.

Due to the lethal effect of blanching, Pederson (453) points out that high bacterial count prior to freezing vegetables is due to contamination from equipment and/or hands.

In a report on Microbiological Examination of Foods, the methods, though not complete, nevertheless form the basis for developing additional or improved methods (454).

Speck (455) reports on the resistance of a strain of micrococcus in laboratory high-temperature short-time pasteurization of milk and ice cream mix.

In a study of the thermoduric problem, Cordes (456) reaffirms the value of detecting and eliminating dirty milking machines and insanitary handling practices.

Hirschmann and Lightbody (457) show the results of studies of lyophilized eggs on resazurin reduction tests and bacterial plate counts.

From the incidence of certain bacteria in the product, the need for improving the handling of raw and pasteurized milk products is pointed out by Speck (458).

Bryan and Mason (459) describe a bacterial flare-up in finished product due to invasion of heat-resistant bacteria from an unclean milking machine.

Winter, Stewart and Wilkin (460) report on some bacteriological investigations involving pasteurization of liquid egg products as a means of destroying coliform organisms.

The advantageous and disadvantageous aspects of quaternary ammonium compounds are discussed by Hussong (461).

Banerjee (462) discusses hydrogen peroxide as a milk preservative with reservations regarding its acceptable use.

Smith and Iba (463) report on a study of the survival of food-poisoning staphylococci on nut meats.

Investigative data are presented by Hirschmann and Lightbody (464) in their studies of the effect of bacteria on the quality of stored lyophilized egg powders.

Gehrke and Weiser (465) report the results of comparative studies made on the growth and biochemical features of some organisms grown in cow's and soybean milk.

Some significant conclusions are offered by Shere (466) from a comparative study of the disinfecting properties of hypochlorites and quaternary ammonium compounds.

The germicidal properties of quaternary ammonium compounds and their use as dairy equipment sanitizers are evaluated by Mueller, Seely and Larkin (467).

Goresline (468) presents a discussion of microbiological, bacteriological and sanitary standards for dehydrated foods.

Increased contamination of boned chicken during processing operations and survival of organisms under refrigerated storage is discussed by Rose and Millard (469).

Gunderson and Rose (470) discuss the use of spot plate in judging the bacteriological condition of poultry.

Haynes and Mundt (471) report on the reduced bacterial content of frozen beans and elimination of slime from operating surfaces, floors and runways by use of low-pressure sprays of chlorinated water in processing operations.

From studies on conditions of oranges as affecting frozen juice, with emphasis on coliforms, Wolford and Berry (472) conclude that soundness of the fruit is of prime importance in producing frozen orange juice of low microbial count.

Sutton and McFarlane (473) report investigational results of incidence and degree of *E. coli* contamination as well as correlation between incidence of *E. coli* and Salmonella.

Keith and Reaves (474) make a comparative study of some quaternary ammonium and chlorine compounds used as pre-milking udder washes.

Careful technique is recommended by Courtney (475) as the means of reducing variability in counts of duplicate platings of raw milk.

Levine and Black (476) discuss the findings of a comparative study of commonly-used staining procedures for the direct microscopic examination of milk.

Using the direct microscopic count technique, Baker (477) reports the results of studies on stainability in milk prior to and after pasteurization.

Buchbinder and Alff (478) discuss studies on coliform organisms in dairy products.

In estimating the bacterial quality of raw and pasteurized milks, Watrous and Doan (479) offer the result of studies employing the direct microscopic clump count and plate count.

Stumbo, Gross and Vinton (480) study the influence of meat-curing agents upon the growth of a putrefactive anaerobe in heat-processed meat.

Gross, Vinton and Martin (481) describe the viability of spores of a putrefactive anaerobe in canned meat after prolonged incubation.

Gross, Vinton and Stumbo (482) present some characteristics of putrefactive anaerobes used in the series of thermal resistance studies.

A comparative study of effectiveness of hypochlorite and quaternary ammonium chloride solutions under similar environmental conditions as pre-milking udder-washes is reported upon by Kesler *et al.* (483).

Pendleton (484) offers data resulting from a comparative study of efficiency employing wetting agents in both brush and flush washings of milking machines.

Lind (485) discusses the inadequacy of utilizing the phenol coefficient in evaluating quaternary ammonium compounds.

Gross and Vinton (486) report some data on the thermal death time of a strain of staphylococcus in meat.

McFarlane *et al.* (487) present results of a 16 months' microbiological study of unpasteurized liquid whole eggs—to be used for production of spray-dried whole egg powder.

Vignolo reports on a quaternary ammonium compound of high anti-bacterial potency (488).

Eglinton (489) discusses findings of 14 approved and registered Connecticut laboratories surveyed to ascertain extent of compliance with state requirements for direct microscopic procedures and lists significance of deviations found.

Okulitch, Millard and Fleming (490) compare the resazurin test with methylene blue in selecting poor quality raw milk.

A study of the microbiology of over 100 types of frozen precooked foods, is reported by Proctor and Phillips (491) with suggestions for product standards and plant control procedures.

Stumbo, Gross and Vinton (492) determine the influence of meat-curing agents upon the thermal resistance of spores of a putrefactive anaerobe in meat.

Vinton, Martin and Gross (493) present bacteriological data on the effect of the substrate on the thermal resistance of spores.

Solowey (494) presents data on incidence of Salmonella found in high-moisture spray-dried whole-egg powder manufacture in the U. S. A. for export.

Ridenour and Armbruster (495) present a review of literature and laboratory study of sanitizing properties of several quaternary ammonium compounds.

Solowey, Sutton and Calesnick (496) report on heat resistance of Salmonella organisms isolated from spray-dried whole egg powder.

Vinton, Martin and Gross (497) present bacteriological data on the thermal resistance of spores normally present in meat.

McCulloch, Hauge and Migaki (498) recommend that before granting approval for a bactericide, reliable data should favorably answer 4 primary questions and 15 others.

Gross, Vinton and Stumbo (499) present bacteriological data on the thermal death time curve for spores of a test putrefactive anaerobe in meat.

Thomas, Levine and Blacks (500) bacteriological investigation of milk analysis reflect the recommended changes in the 9th edition of Standard Methods.

Delay (501) attests to the value of the coliform test in detecting faulty pasteurization.

Edward and Morris (502) report on studies of the effect of heat-resistant substances on dye reduction tests for estimating the hygienic quality of pasteurizing milk.

Hussemann and Tanner (503) present data from a study of thermal death-time temperatures of a strain of Staphaureus in cream filling and a comparison with temperatures accepted as cooking procedure.

Butter

Clayton (94) describes simple color test (titration with N/10 NaOH using crystal violet dye) as aid in grading farm-separated cream.

Remaley (95) reports dry milk fat can be stored at 40° F. for approximately six months with only insignificant analytical or organoleptic changes. It will keep indefinitely if stored at 0° F.

A description of how dry milk fat is produced, its use, and the U. S. Army Quartermaster standard is given by Remaley (96).

Obee (97) lists the factors to be considered in keeping losses down to a minimum in the butter industry.

Meuron (98) describes the method adopted as official for the preparation of butter samples for analysis.

Factors which affect production, and factors affecting butterfat loss were compared in studies on the Fritz butter machine by Pearce (99).

Remaley (100) describes the principle involved in the production of dry milk fat and states the standards of the U. S. Quartermaster Corps. for this product.

Mulder (101) found structure of butter to consist of two phases, fat and water, interwoven by formation of bridges between fat globules and canals between water droplets; confirmed by microscopical picture.

Mulder (102) concludes formation of yellow "skin" of butter not due to oxidation of natural coloring but to drying out of surface. Butter should be protected during storage against drying out as well as against air and light.

Apparatus and procedures are described by Mohr and Hennings (103) for the determination of the dielectric constant for butter. The dielectric constant remains within the range of 3.1 and 3.2. In the new Alfa and Fritz continuous process for butter manufacture frequent measurement of the dielectric constant provides information needed for the control of the emulsion state and ultimately the quality of the product.

The formation of the aroma of butter as a function of the type of starter used, the presence of O during the souring of the cream, and the method of churning and washing of the butter are examined by Pette (104) on the basis of former work.

Bakos (105) reports the method of Mohr and Mack (C.A. *38,* 3030) gave more reliable and exact results than did the Gerber tests.

Treatment of parchment paper with a 10–20% solution of Ca or Na propionate for two minutes diminishes the rate of growth of mold on butter but full prevention cannot be obtained, according to Csiszar and Tomka (106).

Mulder *et al.* (107) state the metallic oily flavor of butter is not caused by large amounts of metal salts but by oxidation of fat and fatlike substances in the boundary of the fat phase or in the water phase of the cream.

As skim milk after souring and churning did not show oxidation flavors, it is concluded by Mulder and Kleikamp (108) that milk plasma alone is not responsible for the defect but is one of its causes. The milk salts promote the fishy flavor.

Off-flavors of butter—their cause and prevention—are discussed by Reid (109a).

Precautions taken to overcome the tendency of winter butter to become hard and brittle at ordinary temperatures during manufacture are discussed by Adriani and Tamsma (109b).

Cox and McDowal (383) present iodine, Reichert and saponification values and softening point studies on New Zealand butters and butterfats.

As a result of his survey in Syracuse, Herrington reports (384) that the vitamin A content ranged from 9,300 units to 20,000 per pound of butter, the higher value being found in August, the lower in butter sold in April.

Grant *et al.* (385), after chemical and bacteriological studies on stored and salted butter, concluded that flavor scores showed a closer relation to chemical tests than to microbiological counts.

Van der Waarden (386) discusses the chemical processes underlying the deterioration of flavor in butter in cold storage.

Cheese

Streptococci isolated from starter and from sour milk found by Nichols *et al.* (3) to be suitable for cheesemaking. (*Str. cremoris* from starter and *Str. lactis* from sour milk.)

Emilsson *et al.* (110) showed the breakdown of citric acid in starter and cheese to be quicker with more starter at and below pH 5 at 60° Th (0.54% lactic). Addition of NaCl impeded the turnover of citric acid. The turnover in cheese is relatively fast. When Na citrate + $CaCl_2$ was added to rennet milk, all the added citric acid was recovered in cheese mass.

Study of the bound water of cheese and its determination from a formula based on the extent to which various indicator solutions changed in concentration when the curds were soaked in them for five hours at 10° C. was made by Mocquot (111).

"Blue" defect in cheese of the Camembert and Brie type, the causative agent and control measures are described by Keilling *et al.* (112).

The various research problems under study having to do with quality of cheddar cheese are given by Hood (113).

Horwitz *et al.* (114) give the methods of determining the moisture and fat contents of certain cheeses and the standard deviations.

Irvine *et al.* (115) show the difference in retention values of certain minerals and water soluble vitamins in cheese-making when using raw and pasteurized milk.

It was shown by McLeod *et al.* (116) that dichlorethyl ether could be used in the control of cheese mites.

It is possible to control extraneous matter in Cheddar cheese with the use of the "micro test" for sediment as stated by Julien *et al.* (117).

Extraneous matter in Canadian Cheddar cheese can be detected by a new modification of the citrate method according to Thibodeau (118).

Damrow (119) lists some rules for improving starters to make uniform cheese.

Reasons for openness in cheddar cheese were given by Hood *et al.* (120).

Bain (121) states how to overcome some defects found in Canadian cheese. These include fruity, not clean, open, rancid and extraneous matter.

Damrow (122) lists some of the factors to be considered in order to increase the yield in cheesemaking.

It was shown by Brown (123) that cheese made from pasteurized milk showed a betterment in the flavor score as compared to cheese made from raw milk.

Wilson (124) outlines a program for the manufacture of good quality cheese from pasteurized milk.

Salt and moisture content of cheddar cheese can be controlled by certain factors and conditions, according to Wilson (125).

According to Galesloot (126) cheese, manufactured with addition of 2 g. $KClO_3$ per 100 l. milk, showed occasionally an early gas defect, though it contained not more than 100 coliaerogenes bacteria per g. This gas defect, due to yeasts, is not so serious as that caused by coliaerogenes bacteria, but it cannot be prevented by addition of $KClO_3$ or KNO_3. Pasteurization of the milk is recommended to kill the yeast.

Roeder method for determination of fat in cheese studied by Bernaerts (127). Discussion of methods for fat determination in cheese used in the Netherlands.

Mogensen (128) reports on determination of degree of proteolytic decomposition in cheese. Highly theoretical discussion of method used and interpretation of results.

Sheuring and Tuckey (129) studied the effect of pasteurization, homogenization at low pressures of pasteurized milk, and the addition of organic acids to the milk on the fat constants of fat in Cheddar cheese.

Peters *et al.* (130) studied influence of *Mycotorula lipolytica* lipase on ripening blue cheese. Experiments of using cultures of this enzyme in making cheese from homogenized milk.

Peterson *et al.* (131) determined lipase activity during making and ripening of Cheddar cheese, and compared activity of this enzyme in cheese from raw and pasteurized milk.

A method for determination of proteinase activity in cheese was developed by Peterson *et al.* (132a).

Peterson *et al.* (132b) studied proteinase content of cheddar cheese during making and ripening. More proteinase activity in cheddar cheese made from raw than from pasteurized milk.

Peterson *et al.* (133) describe method for determination of lipase activity in cheese.

Csiszár and Bakos (134) report cheeses during ripening showed 3.92–7.92 mg. acetoin and 0.08–0.10 mg. biacetyl on 5th–45th day of ripening at 16-8°. The ratios of acetoin to biacetyl were: in the butter cultures 45:1, in cheese cultures 4:1, and in ripe cheeses 99:1.

Csiszár, Bakos and Tomka (135) found no connection between quality and content of acetoin and biacetyl in various cheeses.

Csiszár and Bakos (136) report aroma and quality were better in cheese made with cultures highly active in acetoin-biacetyl formation.

Csiszár (137) found a constant moisture content decrease of fat content of processed cheese increases the hardness. No correlation was found between acidity of processed cheeses and swelling or gas development. Swelling did not occur at moisture contents below 41%, even when butyric acid bacteria were present. Parchment paper or its substitutes are suitable for packing of processed cheeses for only 4–5 days' storage. For longer storage metal foil should be used.

Sterilized Trappist cheese was melted and poured into forms of Al foil, or mixed with Al powder and poured into Sn forms (Csiszár and Tomka) (138). After 6 days at 30°, cheese packed in lacquered Al foil was unchanged. In cheese packed in untreated Al foil gas developed under the foil, and cheese mixed with Al powder and packed in Sn swelled strongly. This is probably caused by a chemical action between processing salts contained in the cheese and metallic Al, with formation of H.

In cheese prepared from buttermilk, Csiszár and Bakos (139) found the contents of lecithin-phosphoric acid ranged between 0.094 and 0.135% (calculated to lecithin 1.04–1.48%) against 0.034% (calculated 0.37%) content of average Hungarian Trappist cheese.

Milk in the boiler should be ripened before inoculation, states Tomka (140). Best results were obtained at acidities between 4 and 6 Soxhlet-Henckel degrees. Boiler operation should be so conducted that the acidity increases not more than 0.8–1.2°. Acidity at the end of the boiler operation should be between 8.0 and 9.0°.

Ribeiro (141) describes the preparation of Minas cheese.

The manufacture of "Requeijao", Brazilian cheese specialty by spontaneous coagulation of skim milk is described by Ribeiro (142).

Mulder (143) reports the taste in cheese is caused by a great number of factors such as lactic acid, salt, amino acids and fatty acids.

Pasteurizing milk has an unfavorable effect on the cheese made thereof, states Pette (144).

A description of preparation of Emmentaler cheese and chemical studies on propionic acid fermentation and O/R potential during preparation and storing are given by Kiuru (145).

Kiuru (146) finds Emmentaler cheese prepared in Finland has essentially the same composition as similar cheese made elsewhere.

The tendency of cheese to blow is reduced by incorporating in the cheese a small quantity of soluble bromates or iodates (147). These salts restrain the activity of the microorganisms which give rise to blowing.

North *et al.* (148) describe the process in the preparation of cottage cheese.

Strezynski (149) describes a centrifuge for separating cheese from whey.

Brown discoloration in malted process cheese can be controlled by addition of sulfites or sulfur dioxide according to Hlynka *et al.* (150).

Recommendations are made by Hoyle and Nichols (387) for the exclusion of inhibitory strains of lactic streptococci from starters.

Whitehead (388) reports that milk fat helps to retain moisture in cheese curd and that the higher the fat content, the more drastic must be the treatment to reduce the moisture content of the finished cheese to the desired level.

Dahlberg and Kosikowsky (389) report on cheese made with a strain of *Streptococcus faecalis* which rapidly fermented lactose. Comparisons with cheese made with commercial starter and with cheese made from a combination of the two are made as to flavor, speed of ripening and general quality.

The growth and survival of *Streptococcus faecalis* in pasteurized milk American Cheddar cheese is reported by Kosikowsky and Dahlberg (390) and comparisons made between cheese made with 2% commercial lactic acid starter, 1% commercial lactic acid starter, plus 1% *S. faecalis* starter and 2% *S. faecalis* starter.

Dahlberg and Kosikowsky (391) report a direct semilogarithmic relationship between the amount of tyramine in cheese and the flavor intensity.

Wilson (504) emphasizes the importance of sanitation in cheese-making.

The various aspects of factors influencing the texture of cheddar cheese are discussed by Wilster (505).

Erekson (506) considers health, values, quality, and investment in proposing standards of identity for cheese.

Some common causes of off-flavor in cheese are given by Bain (507).

Horwitz (508) reports some advantages of a pasteurization test for soft cheeses.

A preliminary report is made of an investigation of characteristics of cheddar cheese made from pasteurized milk (509).

CONCENTRATED MILKS

Hetrick *et al.* (151) studied manometric measurement of gas desorbed from vacuumized whole-milk powder. Discussed as of value of study of source of gas entrapped in milk powder.

According to Miller *et al.* (152) the vacuum-distillation showed an advantage over steam distillation for evaporated milk when a consideration of total volatile acids in the distillate was desired.

Preliminary trials by D. V. Josephson and C. B. Reeves (153) suggest that the mineral-ion exchange method of stabilization may be very effective in the manufacture of British standard evaporated milk.

Four groups of crystals separated from evaporated milk were analyzed by Deysher and Webb (154) for CaO, MgO, P_2O_5, and citric acid.

Effect of conditions of storage on viscosity of sweetened condensed milk investigated by Webb *et al.* (155). Discussion of storage time and temperature.

Manufactured powdered cream for whipping by aeration is discussed by Tracy (156). Composition of product given with discussion of methods of packing viz., in inert gases and antioxidants.

Procedures used for the nutritional control of powdered milk, such as the determination of physical characteristics, moisture, butterfat, rancidity, acidity and bacterial content, are discussed by Zambrano (157).

According to Borrell (158) β-lactose is totally destroyed in skim powder during storage at 37° when moisture high. Finds practically no destruction at 2.7% moisture. Conversion to α-lactose slow and small below 3.5% moisture in 360 days.

Lawrence (159) states the Army needs an improved whole-milk powder, a readily dispersible dried cream, an improved butter spread, a stable evaporated milk, and improved palatability of all processed dairy products.

A discussion is given by Tretsven (160) on new dehydrated milk products for making soft types of cheese.

Webb and Hufnagel (161) report that the viscosity of sweetened condensed milk increased arithmetically with increases in storage time and logarithmically with increases in storage temperatures.

Chapman (162) reports on factors affecting the keeping quality of dried milk powder.

A thorough-going discussion of combination of casein and treatments for stability and prevention of creaming in condensed milk is given by Eiler (163).

Sediment depositing in evaporated milk cans was washed with water, EtOH, and diethyl ether. Upon analysis by A.O.A.C. methods, Gould and Leininger (164) found the average percentage composition of the sediment to be: Ca, 19.98; Mg, 0.94; citrate tetrahydrate, 60.30; PO_4---, 0.64; SiO_2, 1.11; protein, 3.73; and water, 12.52%.

Sharp (165) found that by subjecting dried milk powder to a high vacuum while still hot, further reduction in H_2O results along with rapid cooling and removal of free O_2.

Effect of temperature of preheating, clarification, and bacteriological quality of raw milk on keeping qualities of whole milk powder dried by the Kestner spray process is described by Mattick *et al.* (166).

Henry *et al.* (167) recommend package dried skim milk of low moisture (5%) in N. at low temperature for long storage.

Nelson (392) reports a good means of establishing the color of evaporated milk by combining the data obtained by the use of the Beckman spectrophotometer with standard colorimetric data.

Lea (393) reports a simplification of the Van Slyke method can be utilized to determine the deterioration of the protein of separated milk powder during storage.

The results of a study covering the reaction between milk protein, and reducing sugar in the dry state, are presented by Lea (394).

The uses of pasteurized, concentrated, and fermented products of whey are reviewed by Webb (395).

Kriger (396) reports that a commercial concentrated milk serum is excellent for imparting an agreeable flavor to drinks but is not recommended for cooking as alimentary pastes.

The browning of dry milk and ice cream mix is prevented when the moisture content is below 4% and the temperature held at 40° F. or lower, report Tarassuk and Jack (397).

George (510) presents a discussion on production and marketing quality milk powders.

O'Dea (511) presents some aspects of the future of dry milk.

Scofield (512) discusses the sanitation procedures involved in processing frozen food and the role of the Health Department under the laws of New Jersey.

According to Dodson (513) the human element is responsible for the present status of sanitation in the food industry.

Fisher (514) discusses trawler sanitation problems involving gutting, washing, refrigeration, care in handling fish organs for special purposes, crew's quarters, landing inspections on sale of fish.

Water supplies, bacteriological handling of the catch and proper waste disposal facilities are discussed by Sandholzer (515) in a study of fishery sanitation.

Pottinger, Kerr and Lanham (516) report the results of tests conducted on packaging materials for quick-frozen oysters.

Abstracts of papers presented at the 7th Annual Conference of the Institute of Food Technologists are given (517).

Buckley and Whinery (518) offer a spot test for identification of rodent urine on packaged commodities.

A report on the aspects of food values of dairy products as affected by handling, production, distribution, and use (519).

Martin (520) describes a combined process of high-temperature, short-time sterilization and aseptic technique in canning.

A summary report of the Shellfish Committee Engineering Section held in Asbury Park, June 21, 1947 is given (521).

Ash (522) discusses mechanical problems involved in the sanitation of meat transportation and personal hygiene problems resulting from rationing and offers preventive measures needed.

The problem of frozen food locker plant control is reviewed in a subcommittee report (523).

Hallsworth (524) discusses problem, and outlines control measures for producing high grade product; offers bacteriological data on the finished product and recognizes importance of informing personnel of reasons for enforcement requirements.

Stumbo, Gross and Vinton (525) provide detailed description of laboratory methods used in studies relating to thermal processing of canned meats.

Baron (526) discusses some aspects of an insect and rodent-control program in a modern bakery.

FOOD INDUSTRIES

Clarke (168) delivered an address on the detection and estimation of filth and

decomposition in foods, with mention of fields where methods are needed.

Chari *et al.* (169) report that prunes partially dehydrated and then blanched to inactivate the enzymes and packaged when dehydrated to a moisture content of 30%, showed no noticeable change in flavor or color if stored at 40° F. Unblanched samples developed a marked-off flavor and discoloration.

Barger *et al.* (170) found all common causes of damage to dried fruit in storage — browning, sugaring, mold growth, insect infestation, loss of sulfur dioxide, and loss of flavor and vitamins — are accelerated by high temperature and high humidity. They recommended cold storage at 32° F. with low humidity.

According to Ziegler (171), oxidative rancidity causes most spoilage of meats in freezing storage but may be largely prevented by good wrapping materials properly applied to exclude air. Foil and cellophane are best for preventing desiccation and rancidity. The highest safe temperature for storing frozen meat was 0° F.

The volatile oil fraction was found by Henry and Clifcorn (172) to be the major contributor to off-flavor development in canned orange juice. The identity of the responsible constituents was not established except that they were unsaturated, easily oxidized hydrocarbons or alcohols. It appeared that d-limonene was associated with the flavor deterioration.

Wolford and Berry (173) studied the influence of soft rot fruit on numbers and types of bacteria in frozen orange juice. They found elimination of unsound fruits was of prime importance in the production of frozen orange juice of low total and coliform count.

According to Tressler (174) covering fruit with a sirup prevents contact of fruit with the air thus retarding oxidation and resultant discoloration and change of flavor. Extra-sweet corn sirup not only shuts out the air but penetrates the fruit and retards enzyme action.

Hall (175) states that the principles of controlling and protecting the quality of frozen foods are: (1) growing and harvesting under controlled conditions; (2) preparing, freezing and packing the produce by the best known methods; (3) shipping, storing, distributing and retailing under uniform temperature of 0° F. or lower to prevent flavor loss, dehydration and spoilage.

Fabian (176) states all present methods of processing foods reduce quality in some way. The ideal one would retain all the natural goodness while destroying all the deteriorating agents. Quality control usually emphasizes plant sanitation but it should include much more than that.

Problems of precooked frozen foods are both physical and chemical, state Hutchings and Evers (177). Rancidity of fats, denaturation of proteins, and syneresis of starch sauces and gravies are examples of changes that must be controlled. Plant sanitation and bacterial control are exceedingly important considerations in maintenance of high quality.

Kiess *et al.* (178) observed that margarines stored at −10° F. increased in firmness during storage, those stored at 5 and 28° F. remained about constant, while those stored at 45° F. lost firmness.

Niven (179) concluded surface greening of sausage caused by bacteria could be eliminated by sanitary precautions in the packing plant, avoidance of wet surface on the sausage and holding the sausage cooler at as low temperature as practical.

Balls (180) indicates enzymes progressively deteriorate most food products in which they are active by hydrolyzing fats, proteins and especially carbohydrates. Their activity is measured by the amount of oxygen taken up and the amount of carbon dioxide given off. This ratio is greatly reduced by refrigeration and increased by raising the temperature to approximately 180° F., at which temperature they are inactivated.

Dunn (181) states antioxidants, particularly dihydroguarueretic acid, ethyl gallate, ascorbic acid, and sodium ascorbate at pH_6, have produced good results in retarding the development of rancidity in the flesh of fatty fish.

Sognefeot *et al.* (182) ascertained that the pH has a great influence on thermal process requirements of canned foods; there seems to be a decided rise in the sterilizing value at a pH of around 5.5.

Erickson and Colmer (183) recommend pasteurization at temperatures of 160° to 170° F. and respectively 80 to 70 percent relative humidity for 30 minutes as less deleterious for flavor and texture of black walnut meats.

A method for determining drip of frozen products is described by Kaloyereas (184). This method is used as a quality control tool since a definite relation was shown to exist between the drip of various products and their bound-water contents, which in turn is a measure of quality.

Urbain and Ramsbottom (185) discuss the selection of packages on a logical basis for sliced bacon, sliced dried beef, and sliced ham, as a means of controlling quality changes between production and consumption. The principle of the method may be extended to any other cured meat.

Holmquist *et al.* (186) have shown that sodium metaphosphate in the blanch water for peas softens the skins. A careful control is necessary for satisfactory results.

If the icing is not liberal with asparagus, Speies *et al.* (187) report, there is a large and rapid drop in ascorbic acid content. No important difference was observed in the effects of keeping on the ascorbic acid between samples moderately iced and those exposed during the day and stored at night.

Hert (188) reports data on B.O.D., total, suspended and dissolved solids content of screened tomato waste. Only 36% of tonnage of tomatoes received was shipped as final product. Data are also given on treatment of the waste.

A new type of brine tank for making frozen foods is described by Reagin (189).

Bloemer (190) recommends extraction of carotene from carrots and suitable leaves to add to edible fats.

Ohler (191) discusses use of whey and of spice acid (2.6% lactic acid) in preserving various vegetables to retain natural fresh color.

The alcoholic fermentation of powdered milk serums, varying in age, was studied by Keilling *et al.* (192).

The biology, physics, and chemistry involved in the development of butter-flavor products for use in confectionery manufacture are discussed by Sweet (193).

The composition and manufacture of margarine in France are described by Féron (194).

The quality control of frozen foods is reviewed by Fitzgerald (195).

Robinson *et al.* (196) found tomato plants sprayed with copper-containing fungicides retained appreciable amounts of copper in the fruit, even after washing, peeling, or preparation into juice. Tomata juice prepared from the treated lots showed a loss of ascorbic acid in direct relation to the amounts of retained copper.

The influence of P fertilizer and the use of phosphates in cooking water has proved to be very beneficial to the quality of legumes, Lammers (197) reports.

Lakritz (198) gives a brief discussion of the merits and drawbacks of propylene glycol as a flavor solvent.

The literature is reviewed and the results of experiments on the use of ascorbic acid to retard rancidity in frozen fish are mentioned briefly by Bauernfeind *et al.* (199).

Miller (200) describes how waste solids from a tomato cannery are separated from the transporting water at

a rotary screen, dried in a rotary drier, and packed for sale as stock food. The waste water is transported to large lagoons for disposal.

Groen and Krizkovsky (201) describe a dry product to be mixed with H_2O and whipped, consisting of skim milk that may be thickened and made acid, is mixed with 25% potato starch. It is then dried on hot rolls and milled.

By Nelson's (202) process an oleomargarine of standard composition is prepared by heating a fat to about 100° F., adding skim milk, salt, and other constituents at about 95° F., and stirring. The temperature is lowered to 75°–85° F. for from 5 to 15 minutes to develop a grainy condition and the mixture viscolized at a pressure of from 100 to 1500 pounds per square inch at essentially this same temperature. The material is then charged into shipping receptacles while still fluid.

North *et al.* (203) reports that close-textured baked goods result when a granular, free-flowing shortening composition containing 0.2–6.0% of the mono- or diglyceride of a higher fatty acid, and a partial ester of sorbitol and stearic acid.

North *et al.* (204) describe a non-greasy, free-flowing shortening composition, readily dispersed in water, that can be roller-dried.

Marshall (398) reviews the effects of chemical composition, handling, pasteurization, cooling and storage on processed apple juice.

Food Poisoning

It is possible to reproduce enterococcal food poisoning in man by *Strept. faecalis* according to Osler *et al.* (205).

Food poisoning caused by cheese is reviewed by Vergne (206).

Dewberry (527) presents a collection of fundamental facts relative to the many kinds of human food-poisoning, chemical and bacteriological.

Petryaev (528) cites an outbreak of food-poisoning the causative agent of which was Proteus vulgaris.

From studies on the survival of salmonella in reconstituted egg powder, Solowey and Calesnick (529) indicate the desirability of using egg powder immediately after reconstituting.

Husseman and Tanner (530) illustrate various aspects of the food-poisoning problem with examples and discussion.

Four sets of investigations into the bacteriology of spray-dried egg powder, with particular reference to food-poisoning outbreaks, are reported (531).

Pond and Hathaway (532) describe an epidemic of milk gastroenteritis presumably spread by contaminated eating utensils.

Botulism toxin is implicated in a single death from ingestion of home-canned figs (533).

Buchbinder, Osler and Steffen (534) offer some evidence from investigations of several outbreaks of food-poisoning, in which the enterococcus, *Strept. faecalis*, is implicated.

In a review of work done on growth of toxigenic and pathogenic organisms under various temperature conditions, Fitzgerald (535) reports no known outbreaks of botulism, staphylococcus or salmonella food-poisoning due to frozen foods.

Ozeryanova *et al.* (536) describe an outbreak of food poisoning involving 20 persons using a hospital dining room.

An outbreak of food-poisoning in Wenatchee, Wash., involving 350 persons, is discussed (537).

Ross (538) discusses the problem of poisoning resulting from ingestion of some migratory and non-migratory fish at Fanning Island in the Central Pacific.

An outbreak of food-poisoning traceable to milk from an infected dairy cow is reported (539).

Dangler and Steffen (540) presents observations from a study of the comparative frequency of enterococci in food and food-poisoning outbreaks.

Ritchie, Murray and Holgate (541) report on an outbreak of Staphylococcal food-poisoning involving 171 cases.

A rapid bacteriological procedure for routine testing of food-poisoning complaints is described by Chapmen (542).

Haynes and Hucker (543) present a summary of information on food-poisoning outbreaks and gastroenteritis caused by certain varieties of micrococci.

Human Health

Increase in food freezing units is increasing home butchering. Reference to cases of brucellosis, ularemia and erysipeloid infection due to handling infected beef and porcine animals (207).

Riley (208) discusses responsibility of health departments in relation to "the food of the people."

Spencer (209) lists methods and means of control of bovine brucellosis. The ring or Fleisehauer test promises unusual possibility in detecting brucellosis infected milk at the receiving platform.

Shelanski *et al.* (210) corroborate studies showing that sodium carboxymethyl cellulose (CMC) is harmless physiologically when ingested by animals and humans.

Tureman (211) discusses the therapy, diagnosis, and methods of prevention of brucellosis.

Jordan (212) discusses the subject of brucellosis in industry, its prevention, eradication and control.

A new and rapid method for the preparation and standardization of brucella ring test antigen was proposed by Wood (213). It was as sensitive and had fewer sources of error than the whey titration method for detecting brucella agglutinins in milk.

R. burneti, the causative agent of Q fever, was recovered by Huebner *et al.* (214) from the raw milk of four dairies in Southern California.

An editorial review of the USPHS report of disease outbreak reports for 1944 is presented (544).

In considering cow-shed hygiene in transmission of milk-borne diseases, Watts (545) advocates 2 grades of milk for acceptance and divides milk-borne diseases into those controllable by administrative procedures and those controllable by hygienic measures.

Nelson (546) reports an outbreak of 37 known clinical cases of trichinosis in Minnesota and calls the attention of physicians to the seriousness of the problem.

Steel and Hastings (547) present results of an investigation of an outbreak of brucellosis in which 28 cases were reported.

Sandweiss and Sugarman (548) review history and infestation by the fish tapeworm, cite case of infestation due to sampling "Gefulte" fish before adequate cooking, and offer preventive control measures.

Hangarter (549) reports on an investigation of 14 cases of Glycol poisoning that resulted from drinking tea made from water taken from containers previously used for glycol.

From numerous selected articles, Lee (550) cites the effect of ingesting aluminum in foods.

Amador, Neghme R. (551) renders an account of a trichinosis outbreak in Chile (414 cases) that was traced to consumption of insufficiently cooked pork sausages.

Seattle's ordinance requiring inspection of all meat being sold to the consumer public is reported on (552).

Wilson (553) reports on the effects of storage time and temperature on Salmonella organisms in egg powder.

Evans (554) renders an account of an outbreak of typhoid fever due to infected ice-cream.

The recovery from raw milk of *R. burneti*, the causative agent of Q fever, is discussed by Huebner (555).

Schmidt (556) discusses the difficulty of diagnosing brucellosis because of the constantly changing picture and presents data regarding its widespread occurrence.

From bacteriological studies of oyster beds, Wise, Winston and Culli (557) indicate a seasonal variation in pollution by faecal matter. The same authors also reported that oysters in Galveston Bay, Texas, run low in coliform content from spring to December, but high in percentage of *E. coli* to coliforms (557a).

The effect of cholera vaccination on the diagnosis of brucellosis in man is emphasized by Eisele, McCullough and Beal (558).

The sharp increase in brucellosis incidence between 1940–44 is attributed to consumption of raw milk and handling of infected meat (559).

The use of commercial virus preparations for rodent eradication is discouraged because of the public health hazard resulting therefrom (560).

An editorial regarding the control measures employed in Cape Town, South Africa, insofar as milk-borne infections are concerned (561).

After a two-year study of pasteurization by the high-temperature short-time method, it was concluded that in properly designed and operated plants of the H.T.S.T. pattern, there is little risk of tubercle bacilli surviving heat treatment (562).

Spencer (563) discusses effects of brucellosis on milk production, incidence among packing house workers, veterinarians and farmers and elimination of spread through milk by pasteurization.

Sheriff (564) reports on a brucellosis testing program of family dairies in Monterey County, California.

A report is presented on finding the rickettsia of Q fever in some raw milk in California (565).

Dathan *et al.* (566) report an outbreak of *S. enteritidis var. jena,* involving 4 children. The probable source of the infecting organism was an anti-rodent preparation (containing the identical organism) that was in use at the home at the time of the outbreak.

From investigational evidence uncovered, Gibbard and Naubert (567) indicate records do not show widespread incidence of shellfish poisoning. This investigation was prompted by an outbreak that involved 5 cases of illness and 2 deaths in 1936.

Wallace and Mackenzie (568) implicate contaminated milk as the probable cause of a paratyphoid B fever outbreak at Wooton, Isle of Wight.

The indispensability of milk as a food and the concern of public health officials regarding its potential hazard to health is discussed by Stebbins (569).

Report by U. S. Public Health Service of disease outbreaks in 1945 (570).

Dildine (571) presents a review of inspectional activities of the Army Veterinary Corps and lists the factors considered in inspections.

Bay waters of New York City Harbor condemned for shellfish digging and bathing because of sewage pollution (572).

Howell *et al.* (573) present evidence of prolonged excretions of DDT in milk after spraying cows with varying concentration of this insecticide.

Report of an Act regulating and providing for inspection of ice manufactured for human consumption (574).

Studies on the risk of infection with bovine tuberculosis to rural population, with special reference to pulmonary tuberculosis, are discussed (575).

Laboratory and epidemiological investigations indicate college cafeteria employee as probable source of typhoid outbreak at Stockton Campus of the College of the Pacific (576).

Ingestion of raw hamburger ground in machine used for grinding pork and sausage responsible for trichinosis case reported in Los Angeles County (577).

Monnet and Sabon (578) report on the poisoning of 300 persons by wine kept in cadmium-plated containers.

A report on the results of tests given food handlers in checking for communicable disease (579).

Wolff (580) reports on significance of increasing Salmonella types that are pathogenic to humans.

Fabian (581) presents outline of typhoid and food poisoning epidemics in U. S. and Canada (1883–1946) that were traced to cheese made from raw milk or from cheese insufficiently pasteurized.

Some aspects of preventing infections through food and drink are proposed by Martine (582).

Franz and Mason (583) report on a typhoid outbreak that caused one death and 15 cases of illness at Niles, California, in June, 1946.

The value and limitations of vaccination against brucellosis as well as the need for improvement are discussed by Haring, Traum and Maderious (584).

Ranta and Dolman (585) report on 27 mo. studies on Salmonella typing in Canada.

Ice Cream

A discussion of mix stabilizers and whipping agents such as gelatin, Irish moss, carob bean, pectin, etc. in making ice cream is given by Tracy (215).

Walker (216) states that as high a quality of ice cream can be made with low fat content as with high fat content.

A new method for hardening ice cream, and its disadvantages, are reported by Bitters (217).

Descriptions of the types and ways of making fruit purees for ices and ice cream given by Wiegand (218).

Improvement of tasting technics in evaluating ice cream flavor is suggested by Josephson (219).

Trends in the manufacture and sale of ice cream are discussed by Dolphin (220).

Munroe (221) states that in order to produce stick novelties in ice cream, it is necessary to have proper equipment such as filling molds, chill or drying tunnel and dipping, bagging, etc.

Concentrated and dry ice cream mixes have an excellent future according to Remaley (222).

The preparation and use of muscadine and peanut butter as flavors for ice cream is described by Bennett (223).

New sanitary practices and controls in order to eliminate sediment in ice cream plants are discussed by Pederson (224).

Little (225) describes fully the role of the basic stabilizers, such as gelatin, sodium alginate, vegetable gums and cellulose gum as well as emulsifying agents in ice cream.

Proposed grading of ice cream by a methylene blue test to determine adequacy of heat treatment and success of prevention of contamination was pronounced inadequate and inaccurate by Clayson *et al.* (226).

Dahlberg and Loosli (227) report that three batches of vanilla ice cream made from the usual constituents in average amounts contained the following nutrients per 100 g. of ice cream: protein 3.85 g., fat 12.06 g., carbohydrate 21.31 g., total minerals 0.81 g., Ca 0.122 g., P 0.105 g., Fe 0.120 mg., thiamine 0.038 mg., riboflavin 0.236 mg., niacin 0.098 mg., vitamin A 548 I.U., and ascorbic acid 0 mg. Energy value per 100 g. was 206 cal.

According to Bendixen (228) ice cream shrinkage may largely be avoided by observing the following precautions: (1) do not freeze the ice cream too stiff in a continuous freezer; (2) do not subject ice cream to extreme temperature changes; (3) use only high quality, low acid dairy products in the mix; (4) do not use an excessively high sugar content mix; (5) do not use unparaffined cartons or cans.

Simonet (229) describes the ideal combination for flavoring chocolate ice cream which is a mixture of equal parts of chocolate liquor and cocoa. Caution is urged against the use of a chocolate product which is too acid or alkaline.

In experiments with cotton rats, it was found that sugar, when combined

with milk in ice cream, is not a contributing cause to dental caries. Anonymous (230).

Thom (231) describes the production line method of producing the carry-out sundae.

Casler (232) describes emulsifying agents and how they improve ice cream.

Reasons advanced by New Jersey ice cream men against the sale of ice cream by weight are given (233).

Thom (234) describes the selling of ice cream through a selected group of franchise dealers in Minneapolis and St. Paul.

An educational program for dealers is suggested as the best method to combat overpricing at the ice cream soda fountain (235).

A survey was made by the Chicago Tribune in which consumer buying habits on ice cream were disclosed (236).

Ghormley (237) shows the breakdown of retail ice cream sales to various groups of people (e.g.: minors, women, persons over 50 years of age, etc.).

The composition of commercial ice cream was analyzed for its nutritive value by Dahlberg *et al.* (238).

Anonymous (239) states that a consumer taste panel for ice cream can provide a guide for the manufacturer.

A description of the high temperature short-time pasteurization of ice cream mix is given by Minthorn (240).

Price trends concerning ice cream manufacture are given by Anonymous (241).

Rabuffo (242) discloses the huge profits made by dealers in dipping bulk ice cream.

The Texas State Board of Health has set standards for the percentage of foreign fats allowable in ice cream. Anonymous (243).

Griffith (244) suggests ways for increasing ice cream sales.

Data on a brochure entitled "How to Price Ice Cream" put out by the Borden Company are given (245).

A new transparent plastic container for packaging ice cream is described (246).

Ghormley (247) discusses the economic justification for the specialized ice cream store.

Ghormley (248) describes the location and construction of the future retail ice cream store.

Alheit (249) describes a new scoop device for ice cream cutting and discharging.

LeGloahee (250) has shown that desirable stabilizer for ice cream and other dairy products is formed when the acid radical of algin is partially satisfied with calcium and an alkali metal.

Berch (251) describes a new type of container for ice cream and other frozen foods.

According to Pyenson and Tracy (399), the additives (flavours and stabilizers) of ice cream contain sufficient amounts of iron and copper to be significant in fat oxidation and the development of off-flavors.

Machines for automatically packaging ice-cream are now in operation and should contribute significantly to increased packaging, lowering the per unit cost and better sanitary handling (586).

Advantages of dry ice-cream are discussed by Coulter (587).

Fast (588) reports on increased ice-cream sales from introduction of self-service glass-topped cabinets.

Leighton (589) presents an annual review of ice-cream literature with a classified bibliography.

Hennerich (590) discusses the public's demand for more sanitary operations in soda fountains and ice-cream stores.

Some basic plans and rules are offered by Mack (591) for planning successful ice-cream stores.

A new text-book on the manufacture of ice-cream was published by Turnbow, Tracy and Raffeto (592).

Carefully controlled laboratory procedures for freezing certain foods including custard-base ice-cream are reported by Fenton (593).

Bitter and Neilson (594) describe fast freezing tunnels in which —40° F. temperatures are maintained for hardening ice-cream.

Wilster and Lu (595) discuss the process of condensing whole milk for ice-cream mix by the Vacreation method.

Hagen (596) offers some advantages and disadvantages of processing ice-cream by the high-temperature vacuum method.

A cross-sectional view of what is going on in the field of frozen desserts in U. S. and Canada is contained in a series of reports by various members of the 1947 Frozen Desserts Committee (597).

An outline of the ice-cream industry's program and a report of the Committee on frozen dessert sanitation are given (598).

Metcalf *et al.* (599) report some standards of weights, ingredients, and types of sweetenings for ice-cream, frozen custards and sherbets for which adoption is proposed by the Food and Drug Administration.

An evaluation of blower-type evaporators in ice-cream plants by Minster (600).

Bendixen (601) reports various causes to which shrinkage in ice-cream is attributed.

MILK

Crowe *et al.* (252) studied reducing capacity of milk and milk products as measured by a modified ferricyanide method. They discuss factors affecting reducing power of milk and calibration in terms of ferricyanide reduced and crystalline or ascorbic acid oxidized.

Burgwald *et al.* (253) studied effect of refrigerator storage on keeping qualities of pasteurized milk. Riboflavin in milk was not affected by refrigerator storage and periodic exposure to room daylight, but ascorbic acid was rapidly depleted under same conditions.

Suggestions were given by Robertson (254) for improving the laboratory procedures of Plan A (U. S. Public Health Service Ordinance and Code) and Plan B (Connecticut State Department of Health Program) in sanitary milk control.

Levine *et al.* (255) report on newly proposed staining formulas for direct microscopic examination of milk. Theoretical discussion and experiments consisting in dissolving methylene blue in different solvents free from water and acid.

The effect of thiouracil and estrogen on lactogenic hormone and weight pituitaries of rats was shown by Meites *et al.* (256).

Different gonadotrophic hormones have different effect on lactation in albino rats as shown by Masson (257). The administration of pregnant mare serum resulted in a high level of estrogen and progesterone.

Csiszár (258) reports addition to 1 c. of milk of 0.5g. of a preparation of CaO_2 containing 71.3% active substance decreased the acid number of the milk by 0.8–1.6° Soxhlet-Henkel and increased the reduction test but gave an objectionable taste.

Wettstein (259) states that goats give about 7–8 times their weight of milk annually. In chemical composition goat milk is very similar to cow milk, although the fat content is lower (average 3.33%).

During aging of milk Varga-Kiss (260) finds the dry matter steadily diminishes. At 10–15° this decrease may reach in 48 hours 0.2–0.3% at 19–21° in 48 hours 0.7–0.8%, and at 19–21° in 96 hours 1.0–1.9%. Also the serum refraction according to Ackermann increases by about 0.5.

Three aspects of the problem concerning efficient mechanical milking are discussed by Whittleston (261).

Hazelwood (262) found that milk production of cows receiving no grain during all year pasteuring was seventy six percent of that of grain-fed cows.

Mundinger (263) reported on control of milk quality by acidity. Correlation of milk sourness with pH is given.

Gonzalex-Diaz and Cravioto (264) report average data for donkey milk were pH 7.28, density (15°) 1.0318, solids 10.97%, nonfat solids 8.44%, N. 0.315%, lactose 6.07%, ash 0.41%, Ca 81.7 mg.%, P 47.3, mg.% Fe 0.94 mg.%, carotene 0.005 mg.%, thiamine 0.06 mg.%, riboflavin 0.03% and niacin 0.09 mg.%.

Wide variations were found in composition of Egyptian buffalo milk even in day-to-day samples from the same animal, report Ghoneim, ElKatib, and El-Maghrabi (265).

A study of the variations in the nonfat solids by Eyrard, Hurel and Boisseau (266) revealed a progressive impoverishment of French milks from 1942 to 1946 (independent of seasonal variations) and the urgency of supplying the livestock with the dietary supplement it requires. The findings are important from the standpoint of interpretation of regulatory analyses. The production of milk powder is inadvisable during a period of fluctuations owing to the reduction in yield it involves.

The rapid decrease of detectable CH_2O in preserved milk is due to the action of microorganisms, particularly lactic acid-producing bacteria and yeast, reports Vas (267).

According to Romani (268), when held at 5°, milk can be kept up to 100–110 days by the addition of 3% solution of H_2O_2; with 2% H_2O_2 it can be kept 32–40 days; and with 1% H_2O_2, from 24 to 35 days.

Rangappa (269) found processing, feed and calving elevate the index of refraction and processing, calving, strippings increase refractive constant of milk.

The average concentrations of fat, S.N.F., ash, protein and lactose for milk in Pretoria were lower than those reported in Great Britain and the United States (Bakalor and DeKock) (270).

Samples of sow milk were obtained by Braude *et al.* (271) by manual expression following intravenous (ear vein) injection of the oxytoxic extract of the pituitary (0.5 ml. Pitocin). The milk contains solids 19.9, fat 8.2, protein 5.8, lactose 4.8, ash 0.94, Ca 0.25, P 0.17%; 1100 I.U. vitamin A, 13 mg. vitamin C, 68γ total thiamine, 14γ free thiamine, and 46γ riboflavin (per 100 ml.). Data on colostrum and late milk are also included.

The time factor in high temperature short-time pasteurizing is described by Robinson *et al.* (272).

Anantakreshnan *et al.* (273) discuss experiments in India of supplements of cottonseed, sesame and hydrogenated peanut oil in diet of cows re effect on composition of butterfat.

Manufacturing of phosphatase concentrate from milk and exp. on effect of dilution on phosphatase test were carried out by Hansson *et al.* (274) on cream showing high activity with Scharer's rapid test.

The basis and need for the practice of thoroughly cooling milk and cream at time of production on the farm are emphasized by Graham (275).

Andrews and Fuchs (276) prepared a statement on pasteurization of milk at request of A. M. A. Council on Foods and Nutrition. American physicians and health authorities are justified in recommending that all milk be pasteurized.

Izmen (277) reports a study of the yield and the composition of red cows from eastern Anatolia and a comparison with the milk of other Turkish cows and buffalos.

Eilers *et al.* (278) give a detailed colloidal chemical study on skim milk. They also investigated the viscosity of skim milk.

Saal *et al.* (279) report that milk was subjected to various factors which influence the keeping quality and the oxidation-reduction potential to ascertain whether there is any connection between taste and oxidative processes.

Schmidt-Nielsen *et al.* (280) report the study of milk from red Tronder breed of cows one month after calving showed that it was low in fat, abnormal in appearance and rennet coagulation failed. The cause of abnormality was not revealed.

A butyrometric determination of butterfat of milk from a large number of cows in Argentina showed seasonal variations in fat content in some regions of Argentina reports Labarthe (281).

Guyot (282) reports certain chemical agents bring about oxidation of the fat in milk thus causing it to acquire a tallowy odor and flavor.

Factors affecting the quality of milk and the quality factors emphasized by various groups are given by Trout (283).

Despite the expansion in consumption of milk, little has been done to improve the sanitary quality of the raw product, according to Stanley (284).

A study was made by Campbell (285) of prospective trends based on dairy, agricultural and business statistics with their interpretation.

A simple standard of milk quality is advocated by Trout (286) in view of recent advances in production, distribution, and public health.

Problems relating to high quality milk may be divided into those dealing with disease, management, breeding and feeding according to MacKenzie (287).

Berry (288) discusses farm inspection for better milk supply.

A discussion of the "Base and Surplus Plan" as a means of levelling the production of milk by farmers is given by Simmons (289).

Stamberg (290) in discussing the production of recombined and reconstituted milk states that the recombined milk is superior in quality to most products from whole milk powder.

In attempts to increase milk fat by administration of the B group of vitamins, it was found by Giannotti (291) that neither the content of the milk nor milk production were affected.

Heald (292) states a quality-control program for dairy plants can be divided into field control, plant control, and laboratory control. Laboratory control involves tests for the following: butterfat, bacteria, phospatase, acidity, coliform, bottle sterility, homogenization efficiency, and physical examination of product.

How homogenized milk problems can be overcome is indicated by Tracy (293).

Bonnier *et al.* (400) present statistical study on 2000 samples of milk which had been analyzed to determine percentage of fat, protein, lactose and calories.

Stull *et al.* (401) state concentrations of 0.00125 to 0.0075% nordihydroguaiaretic acid will prevent, during a five day storage period at 40° F. the development of the oxidized flavor in milk to which 0.3 p.p.m. of copper has been added.

Experiments reveal a marked similarity of the mechanisms involved in the clustering of fat globules in milk and the agglutination of bacteria state Dunkley and Sommer (402). Globulin is essential to both phenomenon; heat denaturation of the globulin prevents both. Suggested that homogenization acts by denaturation of euglobin rather than subdivision of the fat globules.

Perrin (403) states that pistachio gum or tragacanth 0.2–1.0 g. may be dissolved in one litre of milk, preferably between 60°–70°, if preservation is desired.

Heinemann (404) reports that in the Springfield, Mo., area there is usually a definite relationship between the fat test of whole milk, the total solids of the separated milk and the air temperature.

Experiments by Knobloch (405) reveal that the ability of milk to oxidize

hypoxanthine and aldehydes resides in more than one enzyme.

Fabian (602) discusses some tests for determining the sanitary quality production of milk.

Data are presented in the excerpts from Chief of the Bureau of Dairy Industry's Annual Report of 1946 on increased milk and butterfat per cow production, DDT in fly control, and the importance of housing and feeding properly (603).

Langslet (604) discusses some factors affecting viscosity, whipping, sanitary treatment, and packing of cream for sale.

The effect of refrigerator storage on the keeping qualities of pasteurized milk is discussed by Burgwald and Josephson (605).

Lindquist, Mahoney, and Cotter (606) present comparative data on the quality of milk before and after requiring farm producers to use mechanical coolers.

In a study of the effect on the quality of milk by clipping udders of cows, Hird *et al.* (607) conclude that this practice made no measurable difference in the amount of entraneous matter obtained from machine or hand milking.

Pierce (608) offers some considerations for rounding out milk production program.

Remedies for off-flavored milk due to production methods are discussed by England (609).

Kay (610) discusses the decline of compositional quality of milk and suggests some methods for improving the nutritional quality.

A report on the use of hydrogen peroxide for the purpose of preserving milk (611).

Smith (612) reviews the roll of immune proteins of bovine milk and colostrum, their isolation and properties.

Cost of improvements, amount of marketable pasteurized milk, and status of plants and producer farms are given in a progress report of Louisiana's milk control program, by Downs (613).

Vincent (614) points out sources of contamination on farm and in the pasteurizing plant and foresees 2 grades of milk—one for human consumption, the other for animal feed.

Protection of milk and milk products in handling operations is given comprehensive coverage in a discussion of planned dairy plant sanitation by Baker (615).

Josephson (616) offers some essential considerations in a quality control program, the design of which is intended to insure a high quality product.

The influence of pastures and cattle feeds on flavors in milk are discussed by Bailey (617).

Romani (618) presents further data on the use of hydrogen peroxide and oxygen as preservatives of milk.

Use of several chemical substances as milk preservatives is discouraged by Murguia (619) as a backward step in milk sanitation.

Knodt *et al.* (620) presents a study of the effects of the interval between washing the udder and attachment of the milking machine on the overall production of milk.

The position of the private quality control laboratory and the various services it has to offer are discussed by Collins (621).

Guthrie (622) discusses the effects of dairy utensils, feeds, lipase, copper, and sunlight on the quality of milk.

An editorial encourages compulsory pasteurization of milk (623).

Hadley *et al.* (624) discusses the obligatory responsibility of industry and health officials in providing the public with a high quality sanitary milk supply and the need for broader training of milk sanitarians for application of public health measures.

The sources of sediment in milk are discussed by Bryant (625) from observations on farms all over the United States.

Schock and Breazeale (626) deal with off flavors in milk and classification of causative agents.

The use of hydrogen peroxide and oxygen as milk preservatives are discussed by Romani (627).

Ball (628) summarizes a 10-year period of the milk control department's activities and accomplishments in Newport, Kentucky.

The regulations of some cities and states for control and supervision of Vitamin D milk are reviewed by Weckel (629).

Tiedeman (630) reports on a cooperative improvement program, started by N. Y. State Milk Distributors, Inc., in conjunction with producers, local and State Health Departments, and N. Y. State College of Agriculture.

A report on the distribution of milk from the farm to the consumer, with attendant problems of utilization, marketing, sanitation, and handling (631).

Corash (632) discusses some administrative procedures employed in combating the fraudulent practice of watering milk.

The 2nd edition of Tobey's (633) Legal Aspects of Milk Sanitation provides a source of information concerning the extent and limitations of responsibilities of handlers of dairy products as they relate to public health.

Searing (634) outlines the features of a 5-point quality control program utilizing the USPHS Standard Milk Ordinance.

The principles and relative value of several platform tests is discussed by Trout (635) regarding inexpensiveness of such examinations.

Standards for composition of milk and manufactured products are compiled and tabulated alphabetically by states (636).

Thomas and Jones-Evans (637) study the efficiency of 3 types of farm sterilizers and include some comparative data.

Relationships between boiled or cooked flavors and chemical changes in milk are pointed out by Gould (638) in a review of 12 years research in this field.

Milk Processing

Fat rising, curd tension, testing for fat and flavor defects in homogenized milk discussed by Tracy (294).

Answer to query: Milk for feeding of infants up to 9 months of age, even though pasteurized, should be boiled (295).

Southerwick (296) describes a continuous flow pasteurizer for milk.

A description of apparatus for homogenizing mixed liquid ingredients is given by McFadden (297).

The six desirable characteristics of chocolate milk or chocolate drink are listed by Thacker (298).

The causes of settling and thickening of the cocoa powder used in the manufacture of a high quality milk drink are discussed by Forbes (299).

Potentialities of some new products developments leading to greater milk sales and distribution are given by Weckel (300).

Several suggestions are given by Thomsen (301) for the most efficient means of fluid milk plant operation.

Frozen storage of milk is discussed as a method of preservation by Doan (302).

Hanrahan (303) discusses the advantages of a heat exchanger for heating milk and other fluids.

A description of the process for manufacture of milk sugar is given by Pebbles *et al.* (304).

Steffen (305) discusses control of operating procedures to keep down milk wastes.

Bloodgood (306) surveys problem of milk waste disposal by biological methods.

Oeming (307) reports on milk waste treatment at Detroit Creamery Company condensery at Avid, Michigan. Describes steps but no flow or loading data according to abstractor.

Great fluctuations may occur in the acetoin-biacetyl content of cultured milk from day to day without change in flavor quality, according to Rodenkirchen (308).

According to Storen and Snersrud

(309) the concentration of goat whey was formerly carried out in open pans, involving a high fuel consumption. In recent years concentration was completed by means of vacuum evaporation. Tests carried out on cheese made from a mixture of goat and cow-milk wheys gave a product of excellent quality with reduction of 35–40% in cost as compared with open-pan evaporation.

Rosati (310) states milk treated with 130-vol. H_2O_2 remains fit for food purposes longer than untreated milk. The bacteria studied (and more particularly *Brucella*) are merely inhibited. The treatment cannot replace pasteurization.

The pancreatic enzyme treatment recommended for making a milk of low curd tension induces a weakening of the internal structure of the casein, report Keil and Roundy (311). In this condition the molecules are rendered susceptible to dissociation by heat. This unstabilizing action is referred to as "conditioning". Physical measurements rather than chemical methods seem to have greater possibilities for measuring this effect.

Discussing the instability of the protein phase of frozen concentrated milk, Doan and Warren (312) describe the preparation procedure. The results emphasize the importance of avoiding bacterial action in milk to be frozen and stored commercially.

Discussing homogenized milk, Spur (313) suggests that "soft curd" milk be defined as milk with a curd tension of 15 g. or below.

Examination of milk plant wastes indicates a direct waste of milk and an excessive use of process water, report Davy and Noth (314). One plant, handling 375,000 lb. of milk per day, discharged a total waste of 283,000 gal. per day, with a B.O.D. of 1717 p.p.m.; this makes a total B.O.D. load of 4049 lb. Since one lb. in milk waste is roughly equivalent to 10 lb. of milk, the loss is approximately $800/day.

The adequacy of pasteurization of consumer's milk may be detected by Anderson's (406) modification of the Scharer method.

The results of some studies on the time factor in high-temperature short-time pasteurizing are reported on by Robinson and Moss (639).

Mann (640) presents a brief review of literature on dairy culture development and facts on developing high quality cultured buttermilk.

Check tests of H.T.S.T. pasteurizing equipment are discussed by Rishoi (641).

Weber (642) offers some predictions on the future aspects of high-temperature short-time pasteurization.

Activities and accomplishment of Committee on Sanitary Procedures for 1947 are reported (643).

Hauser and King (644) present several aspects of the problems of reconstituting milk and cream and conclude that more study is needed to establish better standards.

Drawing upon the experience of employing high-temperature pasteurization of high-viscosity milk products, Minthorn (645) offers a detailed H.T.S.T. installation in which a 2-stage heating operation is employed.

Speirs (646) discusses the product, Plastic Cream, its production and uses.

The pros and cons of short-time high-temperature pasteurization are discussed by Winning (647).

Adams (648) suggests use of several small electric pasteurizers for obtaining capacity and considers problems of installation no greater than installing other type systems.

Concise directions for handling KEFIR grains, for preparation of the milk and for handling of the product are given by Burkey (649).

Doan (650) offers a method for increasing homogenizer capacity in processing homogenized bottled milk.

In a discussion of the principles of pasteurization, Baker (651) points out some commonly-found defects and stresses the importance of avoiding post-pasteurization contamination.

Babcock *et al.* (652) present experimental data on the effects of freezing and storage temperatures on the chemical and bacteriological properties of homogenized milk.

Experimental data are presented by Krienke (653) on the methods of preparing frozen, condensed, and fluid milk, with instructions for its restoration.

Spur (654) reports on a study of curd tension and curd number as applying to market homogenized milk in Philadelphia.

In a study of the treatment of milk for food purposes, with 130-Vol. hydrogen peroxide, Rosati (655) concludes that this method cannot replace pasteurization.

Quigley and Cordes (656) report some results from studies of a more economical system of homogenizing milk.

Municipalities that have been sustained for instituting disease control measures are cited by Tobey (657) in estimating the country's pasteurized milk supply.

Zamzow, Fry, *et al.* (658) give serious consideration to the production engineer, in a program designed to bring about increased production and reduced costs.

Wilster (659) illustrates and fully describes the various steps in the operation of a vacreator in vacreation of cream, milk, ice cream mix, and condensed milk.

Pattison (660) emphasizes the desirability characteristics of high-nickel alloys for dairy equipment.

Blackburn (661) points out some economic advantages from streamlining plant operations and distribution.

Miscellaneous

It was shown by Meites *et al.* (315) that pigeon pituitary, unlike the mammalian, is refractory to the administration of gonadal hormones.

Charts are presented and discussed by Brightman (316) showing that prices of dairy products have kept ahead and will return more in the future as compared to other types of farm products.

Shannon (317) discusses advertising under several different headings.

Erb (318) recommends a housekeeping committee in the dairy plant to insure rapid and proper attention to housekeeping details.

A milk bottle utility device attached to the top of a standard milk bottle is described by Stransky (319).

Speers (320) states that the consumption of dairy products depends on certain definite factors such as national income, educational efforts, food expenditure, etc.

A survey made in certain parts of this country indicates that most ice cream firms are already using or are contemplating using oil and gas instead of coal and the reasons for this change are given (321).

Cook (322) discusses various aspects of research in the dairy industry.

Service testing equipment that can be used readily to aid efficient sanitation is given by Minor (323).

Bryant (324) describes problems connected with the water supply in creameries and their solution.

The trend toward conversion to oil from coal as a fuel continues because of its cleanliness and labor saving (325).

Economic aspects of the open and closed market policies for cream are given by Spencer (326).

Methods to be considered in bettering employer-employee relationship are given by Post (327).

Bailey (328) describes the essential characteristics and how to select a good cleaning compound for use in the dairy and ice cream processing plants.

Bordens announces the introduction of a new oblong two quart glass milk bottle (329).

Apparatus for washing milking machines is described by Herman (330).

Fair (331) describes a device for

maintaining the rubber teat cups of milking machines full of sterilizing solution when not in use.

A combination cover and filter for milk pails is described by Pfetcher (332).

A new closure for milk bottles is described by Alexander (333).

Thompson *et al.* (334) discuss the browning reaction of some proteins with compounds containing an ethylene group within a ring structure.

A supporting rack for holding strainers in place in a separator bowl is described by Murdock (335).

A procedure based on the proposals of Bengen (C. A. *16,* 596) and Goy and Janisch (C. A. *20,* 3197) is worked out for the recovery of amyl alcohol from waste liquid accumulation in Gerber tests, in about 90% yield, reports Pandur (336).

DDT was added to paints and enamels to determine their effectiveness against flies by Gilmour (407).

Baker (408) discusses dairy plant sanitation.

Balavoine (409) presents experimental data on the influence of sea water on the Cl. content of cereals, almonds, green coffee, tea, dates and figs.

Mitchell (662) discusses the historical development of Richmond, Virginia's public health activity.

Arkansas reports on the accomplishments of its food and drug program in 1946 (663).

Gerlack (664) in discussing aspects of dairy sanitation upon resulting dairy product, concludes DDT is both an aid and a profitable investment.

1946 Food and sanitary technology literature abstracted by Levine (665).

Webb and Whittier (666) review the utilization of whey in the United States.

The first meeting of the Dairy Products Improvement Institute Incorporated is reported (667).

Spencer (668) discusses the economic aspects of open and closed cream markets, and recommends a thorough study of facts in correcting the disadvantages.

A practical rodent-control program for dairy plants is offered by Searls (669).

Johns (670) presents abstracts of literature on food and milk as published in several journals during 1947.

A manual of Sanitation Standards for certain products of paper, paper board, or molded pulp is presented (671).

Kirkpatrick (672) indicates the trend toward truck refrigeration of the package type unit, gasoline propelled and utilizing the heat pump principle.

Satisfying qualifications established by law and passing of written and oral examinations, in program to license butter and cheese makers and pasteurizer operators is discussed in detail by Wilster (673).

NUTRITION

Epithelial keratinization as evidence of fetal vitamin A deficiency was reported by Wilson *et al.* (337). Epithelia in other parts of the body are not affected.

A calcium enriched meat diet was found to be equally as good as a milk diet as a source of calcium, phosphorus, and protein according to McQuarrie *et al.* (338).

It was found by Daniel (339) that certain fractions of whole milk, skim milk, and whey could be utilized in culture media or by those persons suffering from diabetes.

Nutritive value of peanut milk reported by Desikachar *et al.* (340). This product is deficient in calcium and riboflavin.

Statement of A. M. A. Council on Foods and Nutrition (341). Council does not favor fortification of milk with vitamins other than D.

Statement of A. M. A. Council on Foods and Nutrition (342). Council does not accept fortification of milk with vitamin A but no objection to its presence when contained, in natural association, in preparations used for adding vitamin D.

Leichenger *et al.* (343) report food value of margarine equal to that of butter.

In evaluation of growth curves, Weil (344) suggests the use of the chi square test.

Davies (345) discusses statistical evaluation of growth curves.

Rats fed liquid milk alone gave zero scores for dental caries as compared to rats fed milk to which sucrose, glucose or dextri-maltose had been added, according to Anderson *et al.* (346).

According to Turner *et al.* (347) the growth and fattening rate of livestock and poultry can be controlled by specialized feeding without affecting milk or egg production.

Blocks of salt containing potassium iodide were stored under different conditions to determine the loss of iodine by Davidson *et al.* (348).

It was shown by Watson *et al.* (349) that the nutritive ratio of a mixed ration for cattle did not influence its digestibility.

It was found by Bowstead *et al.* (350) that addition of urea to cow feed mixtures caused an alteration in the bacterial flora of the rumen, resulting in lack of palatability of the feed.

Hilditch (351) reviews the recent developments in the structure and occurrence of the natural unsaturated higher fatty acids.

The nutritional value of cheese to the consumer as compared with the price of milk is given by Gibson (352).

Reid *et al.* (353) describe the intake, retention and elimination of manganese in the lactating bovine.

Anantakrishnan *et al.* (354) describe an increase in the oleoglycerides of the milk fat of Sindhi cows fed a supplemented ration.

Test feedings with skim milk acidified with H Acetic or H Formic gave good results, according to Platon, Orborn, and Thome (355).

Boer *et al.* (410) confirm their earlier reports that the growth promoting factor in summer butter is contained in the fatty acid fraction and can be removed, probably by absorption, with Fuller's earth.

The public health aspects of the effects of dehydration on nutritive elements of foods and microbiology of dehydration are discussed (674).

REGULATIONS

Hubble (675) points out the significant differences between Federal Food, Drug, and Cosmetic Act of 1938 and the Act of 1906, general aims, and the legal provision for coping with violations.

The need for uniformity among milk inspection and enforcement agencies is pointed out by Babcock (676) in his discussion of the Developments in the Market-Milk Industry during World War II.

Tracy (677) recommends greater uniformity of regulations to avoid expense and confusion, strict adherence to such measures by industry, and prices that will have sound economic footing.

Regulations promulgated by the Bureau of Dairy Industry, U.S.D.A., authorize condemnation of materials intended for use in process or renovated butter when unfit for human consumption (678).

Ruehe (679) presents some discussion on Grade A milk and lack of clarification as to its requirements in some localities.

In a survey made of 55 cities in 34 states, requirements for cooling milk indicate a trend toward employing mechanical coolers (680).

Sommer (681) compares the sanitary standards for market milk and ice-cream mix ingredients and discusses some of the associated problems involved.

Problems of adulteration and contamination of foods, control of permitted colors, methods of enforcement and prosecution from the standpoint of the Federal Food, Drug, and Cosmetic Act are dealt with in Volume II, "Food Regulation and Compliance" by Herrick (682).

Current commentary on the control of vitamin D milk with reference to requirements for acceptance, and states and cities having control regulations in effect is outlined in this article (683).

A résumé is given of milk regulation changes in some states as a result of legislative action (684).

An editorial review of laboratory tests (Plan A—Connecticut State Health Department and Plan B—USPHS Ordinance and Code) employed in the control of milk supplies is given (685).

Regulations pertaining to and actual temperatures of milk encountered are contained in this report of a survey involving 37 cities in 17 states (686).

The major purposes and the development of Federal Meat Inspection are listed in this article (687).

RESTAURANT SANITATION

A report is given of New York State Restaurant Association's self-inspection service and defects most commonly observed (688).

Nisbet (689) reveals the almost universal acceptance of the grading type Restaurant Ordinance and the protective benefits offered the public and operators.

A presentation of the essentials of kitchen design and the background of some kitchen equipment (690).

Sherman Noonan (691) discuss the role of the health inspector in food establishment sanitation.

A general account of chemical reagents employed in sanitizing eating utensils is given by Lesser (692).

Lorain County reports on its eating and drinking utensil sanitization program (693).

Knox and Walker (694) present bacteriological data on eating utensils from an investigation of conditions in central meal kitchens.

Various phases of success in the restaurant business are discussed by Wilson (695), who emphasizes the need for improved sanitation.

Beaumont (696) emphasizes the need for increased education of the public and food handler in effecting control of food-borne diseases.

"Seeing is believing" kit is used by Anderson, Anderson, and Gunderson (697) in measuring sanitary practices of public eating establishments.

Weinstein (698) presents a summary of a program to eliminate unsafe restaurant practices.

Allen (699) reports on Florida's food handler education program sponsored by State Board of Health, Restaurant Association, and Hotel Commission.

A report is given on the Massachusetts Department of Public Health's 2-year restaurant survey (700).

Tanimoto (701) presents some data from swab-rinse investigations of eating and drinking utensils in use at various Honolulu establishments.

In a study conducted to determine the efficiency of a simple glass-washing process, employing a sanitizer detergent, Bunker (702) concludes that though results obtained are promising, they would not meet U. S. Standards.

Mann (703) offers several suggestions for improvement of disinfection of crockery and cutlery in civilian and military life.

Haskell (704) outlines a program that is designed to improve sanitation of food-handling establishments by practical on-the-job action.

The more important developments of food inspection and legislation are incorporated in this 2nd volume of the third edition by Martin (705).

Hanson (706) reports on a food handlers' training course given during Restaurant Sanitation Week in New Brunswick, New Jersey.

In an investigation on the transmission of E. histolytica, Schneider and Shields (707) conclude that food and utensils can be contaminated from cockroach faeces, and the common cockroach can be incriminated as a carrier of E. histolytica.

Mallmann reports on the results of studies made on single-tank hand-operated dishwashing machines, using a test organism and a "standard soil" (708).

Detailed technique for bacteriological examination of food utensils is given in a report of the Subcommittee on Food Utensil Sanitation (709).

Guiteras and Shapiro (710) present experimental data on a bactericidal detergent for eating utensils.

Plans and observations made at food-handler instruction schools conducted by Territorial Health Department are presented by McMorrow and Schramm (711).

Diefenbacher (712) reports on the incorporation of the Restaurant Sanitation Act in the health and safety code of California.

Tiedemann (713) points out the advisability of food service equipment manufacturers obtaining consulting services of sanitarians in designing new equipment.

Mallmann (714) presents results of studies on dishwashing by National Sanitation Foundation.

Gilcreas (715) discusses the function and practical application of detergents.

California State Health Department's interpretation of drinking straws in the California Restaurant Act is discussed (716).

Male (717) presents a discussion on pros and cons of the degrading versus permit revocation features of PHS Standard Food Ordinance.

With the cooperation of the State Restaurant Association and Union Leaders, Seattle's Sanitation Division of Health has required attendance of food handlers at training schools (718).

The manifold problems involved in setting up and continuing food-handlers sanitation programs are discussed by Dodson (719).

A cafeteria workers' institute sponsored by San Francisco's public health and welfare group is reported (720).

TECHNOLOGY

Evans (356) describes a method for radio-autographs of tissue sections containing radioactive material.

Vaughn *et al.* (357) devised an immersion-type belt washer for continuous sanitation in the dried fruit industries. Rinsing the handcloths with antiseptic solutions also controls contamination.

Different designs of the swing check valves and lift check valves are described by Bartlett (358).

Schwarzkopf (359) lists the various factors which will influence good milk can washing.

Important points in the operation of refrigeration equipment are given by Martin (360).

A discussion of old and new cleaning materials used for dairy equipment is given by George (361).

Methods of cleaning mechanical washers of milk and cream cans are given by Bogaerts (362).

Problems in soaker bottle washing are given by Jacobson (363).

Swain *et al.* (364) show the effects of concentrations of formaldehyde, pH, time and temperature on the amount of recoverable formaldehyde remaining in combination with casein after washing of the reaction product with distilled water.

The advantages and disadvantages of three types of refrigeration mediums for cooling milk products is described by Geiger (365).

Pressure filling of cream, ice cream and salad dressings in containers under gas pressure is described by Getz (366). When opening a valve, aerated cream is discharged.

The Al alloy "AMTs", is recommended by Kozharin (367) for the manufacture of industrial containers for milk. For bodies of centrifugal pumps for milk, the Al alloy "AL-9", is authorized.

Good milk utensil care is summarized by Keenan (411).

Foter and Finley (412) suggest that careful consideration be given to the cleansing and germicidal efficiency of

washing compounds in addition to the other major factors considered.

A corrosive inhibitor should be added to alkaline can washing compounds state Finley and Foter (413).

Moore (414) discusses the procedure in cleaning heavily contaminated bottles and precautions to take.

Some aspects of detergency involving surface chemistry and physics are discussed by Resuggan (415).

The literature by Little (416) pertaining to the chemistry of can washings is reviewed.

Armstrong and Burgwald (417) compared the cleaning of square and round milk bottles under regular commercial conditions.

Peebles and Marquis (418) describe a process for manufacture of relatively pure lactose by crystallization from whey without previously removing coagulated proteins.

Morrison *et al.* (721) evaluate the scrub and flush cleaning methods for milking machines using trisodium phosphate and an alkyl sulfate type detergent.

Kinyon (722) describes a portable sediment tester, using vacuum and compressed air for actuating a reciprocal barrel plunger.

Parfitt (723) reports on sanitary standards for dairy equipment now being formulated.

Mechanical and hand cleaning procedures are considered in bacteriological aspects of can washing by Scarlett (724).

Jacobson (725) discusses labor-saving methods and materials for dairy plant cleaning.

Sanitary Standards are given in a report for centrifugal and positive rotary type pumps to be used in the dairy industry (726).

Christensen (727) explains some refrigeration principles and their significance as they apply to storage space.

From investigations of milk plants that included flow measurement tests for B.O.D. and suspended solids, Davy and Noth (728) point out the financial losses and increasingly difficult problem of waste treatment.

Little (729) presents a review of literature pertaining to the chemistry of can washing.

The mechanical aspects of rotary and straight-away can washers are discussed by Briscoe (730).

Perry (731) describes several newly developed cleaning aids for the dairy industry.

3A Standards are proposed for weigh cans and receiving tank for raw milk use (732).

Moore (733) distinguishes bottle-cleaning operations in the mechanical and chemical phase and discusses some operations in each of the procedures.

An outline of the procedure used by the dairy industry to standardize design of dairy equipment is rendered by Parfitt (734).

Roadhouse (735) offers a brief review of a survey made to ascertain the condition of milk cans that were passed through mechanical washers and driers.

Some significant recommendations are offered by Brence (736), who discusses the subject of cleaning dairy equipment.

Rink (737) recommends procedures and care necessary for obtaining clean Babcock test bottles.

Some common factors that influence the proper cleaning of milk cans are presented by Schwarzkopf (738).

Blickman (739) describes the detailed responsibilities of food equipment engineers and emphasizes the importance of incorporating desirable sanitary features.

Control operations by the Sealtest system are described in detail by Heald (740).

Wilster (741) lists some recent developments in dairy manufacturing through research.

A plumbing defect that was responsible for bacterial contamination in a bottle washing machine is discussed by Bryan, Bortree, and Lucas (742).

Searls (743) emphasizes the importance of sanitation in considering new chemicals for use in an insect control program.

Some basic principles for "building out" bacteria and vermin in designing equipment are offered by Tiedeman (744).

Korff (745) directs attention to housekeeping methods for effectiveness in dairy plant insect and rodent control programs.

The surface chemistry of chemical cleaners is discussed by Lehn (746).

McAirty (747) reports on reduced breakage, loss, and expense of sorting and exchange in using the universal bottle.

Decker (748) discusses preventive and remedial measures to be considered in an insect and rodent control program in dairy plants.

The importance of sanitation in the control of insects on the dairy farm and at the dairy plant is discussed by Gould (749).

Haskell (750) considers various factors in cleaning high-temperature short-time pasteurizers.

Minor (751) emphasizes the indispensability of using efficient testing equipment in rendering assistance to food processors who are desirous of obtaining physically clean and bacteriologically safe food processing equipment and containers.

Herreid *et al.* (752) report that a newly designed bowl of a separator can be properly washed by centrifugal flushing.

Walter (753) suggests that a "standard soil" and photo-electric estimation be utilized in performance tests of detergents. In effect, this is a modification described by Mann and Ruchhoft.

Olson (754) describes a method and apparatus to provide for raising the temperature of the heating fluid in response to diversion, when maintenance of the prescribed temperature fails.

Finley and Foter (755) report on a study of can-washing compounds and their corrosive effects on tin plate.

Eliminating recontamination of milk bottles by instituting mechanical changes is covered in this article on washing and sterilizing by Josephson (756).

Schwarzkopf (757) discusses the advantages and disadvantages of conventional methods of can washing using alkali detergents and the conservation method using acid cleaner.

Norris and Ruchhoft (758) suggest a detailed improved test procedure for rating detergents.

Jensen and Bortree (759) report on the results of studies under farm conditions involving storage and treatment of milking machine inflations.

Vitamins

Boisselot *et al.* (368) have shown that Vitamin A content of Milk is not destroyed during irradiation by the Carr-Price method.

Heilbron (369) reviews the recent developments in the field of Vitamin A.

Parrish *et al.* (370) compared four chemical methods for the determination of vitamin A and carotenoids in the blood serum of dairy cattle.

Boiled Cuban cow milk contained greater quantity of Vitamin A and carotene than raw milk or pasteurized milk due to loss of water on boiling, according to Angulo *et al.* (371).

Four types of steel were tested for their effect on the Vitamin C content of milk by Reif and Schormuller (372). A Cr-Ni steel and a so-called pure Cr steel were without effect. A steel containing 8% Mn had a strong oxidizing effect, and a Ti steel a very pronounced effect, increasing with storage temperature. The effect was especially pronounced in milk in which oxidation had already started because of standing in light.

Swartling (373) found conditions of production and fodder changes affect the Vitamin A and carotene contents of butter and milk.

Kothavalla and Gill (374) report the Vitamin C (I) content of milk and

colostrum from Sindhi cows was higher than Gir. Crossbred, and Ayrshire cows. Milk and colostrum of Murrah buffaloes contain more (I) than that from other breeds of cows. The "holding" method of pasteurization resulted in a greater destruction of (I) than the "Flash" method. Storage of milk at room temperature resulted in a greater reduction of (I) (24% in 11 hours) than cold storage (26% in 4 days). (I) was completely destroyed by direct exposure to the sun for 45 minutes, but only 5% of (I) was lost when the milk was stored in the dark for the same period.

By use of the standards recommended by Willstädt and the Carr-Price technique, the average carotene content was determined by Rogick and Rogick (375) during the rainy season. Milk of the Guernsey breed was the richest. The dry-season milk shows a deficit of Vitamin A.

The seasonal variations in Vitamin A potency of butterfat and other constituents in herd milk of Hariana cows were investigated by Sarkar (376). The Vitamin A potency varied with the level of carotene intake.

For the detection of Vitamin A in milk, Hochberg (419), recommends and gives the details of an improved test.

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NEW BOOKS AND OTHER PUBLICATIONS

Introductory Foods, by Osee Hughes. Revised edition. Published by the Macmillan Co., New York. 1949. 575 pages. $4.25.

This is a textbook on foods presented for college freshmen or sophomores who have had very little chemistry. All the common foods are grouped into their respective classes (much as Fruits and Fruit Preparation) and discussed with respect to their production, composition, nutritional value, grades, preparation for eating, recipes, menus, table service, table deportment, useful tables of cooking measures and temperatures, glossary of terms used in food preparation, and canning directions. The author succeeds in packing a great deal of practical information into short pithy sentences. In spite of this encyclopedic treatment, the text is easily and interestingly readable.

There are a few places where the statements are a little misleading, possibly because of the effort to be concise. On page 92, the author's discussion of fermented milks seems to imply that acidophilus milk "commonly used in some countries" constitutes the only fermented milk used here whereas various types of "buttermilk" are marketed and these latter are not known to affect the intestinal flora one way or another. On page 156, the health hazard from trichina in pork is not confined to eating uncooked pork but also pork that is inadequately cooked. The discussion of the use of artificial color in butter and margarine (on page 308) states that legislation to permit such practise has failed, although on the preceding page appears the statement that "a coal-tar dye or a vegetable product such as annatto may be used and is used extensively and legally in butter." The use of benzoate of soda in food preservation "is now prohibited" (page 442) whereas use with declaration is allowable.

Experimental Immunochemistry, by E. A. Kabat and M. M. Mayer, with foreword by M. Heidelbirger. Published by Charles C. Thomas, Springfield, Ill., November, 1948. 567 pages. $8.75.

The authors have assembled for the first time (according to the authoritative preview) "the scattered techniques which have been developed to fill the needs of immunochemical problems as they unfolded. . . . Those methods, drawn from physics, physical chemistry, analytical chemistry, and organic chemistry, and from the biological sciences as well, are described in their working details and discussed as to their applicability and limitations".

Part I (pages 5–185) deals in some detail with the fundamental immunological and immunochemical principles. Part II (pages 188–279), a detailed account of the application of quantitative immunochemical procedures in laboratory work. Part III (pages 282–446), on a variety of chemical and physical methods, especially on electrophoretic and ultracentrifugal analysis and diffusion. Part IV (pages 448–551), on detailed procedures for preparing substances used in immunochemical work.

The text is illustrated with 88 figures of apparatus, crystals, and patterns of experimental data, and is supported with over one thousand references to the literature. The discussions and descriptions and directions are clearly presented.

The book is valuable to workers in the related fields of biological and conventional colloid chemistry, and therefore provides techniques for investigations in food chemistry.

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ASSOCIATION NEWS

Massachusetts Milk Inspector's Association

Milk and related products were discussed at the forty-third annual spring meeting of the Massachusetts Milk Inspectors' Association on April 6th, at their first meeting ever held in Quincy. President John J. Curtin, Quincy milk inspector, presided. A panel discussion was led by Professor H. H. Lindquist of the department of dairy industry, University of Massachusetts. Dr. C. E. Safford, bacteriologist of the New York State Department of Agriculture and Markets, talked on maintaining satisfactory commercial bacteriological laboratories. "Business Relationships and the Food Laboratory" was the topic of Dr. Carl R. Fellers, head of the Department of Food Technology at the University of Massachusetts.

MILK INSPECTORS of Massachusetts held a forty-third annual spring meeting at the Furnace Brook Golf club, Wollaston. Shown left to right at the session are Dr. Clair F Safford, senior bacteriologist, Albany, N. Y.; Denzel J. Hankinson, University of Mass.; Mayor Charles A. Ross,; President John J. Curtin of the Massachusetts Milk Inspectors Association and Quincy milk inspector, the toastmaster; Prof. Harry G. Lindquist, University of Mass., Dr. Richard M. Ash, Quincy health commissioner, and Dr. Carl R. Fellers, food technologist from the University of Massachusetts.

Massachusetts Institute of Technology Announces Summer Program in Food Technology

The Department of Food Technology of the Massachusetts Institute of Technology will hold a session in food technology, June 13 to July 1, inclusive, running from 9:00 A.M. to 4:00 P.M. daily except Saturdays. This short intensive course (listed as Food Technology 20.82) is intended particularly for persons who wish to broaden their perspective in food fields or to increase their technical abilities but who have at their disposal limited time for study. Emphasis will be placed on recent developments in food manufacture and control. It serves as a refresher course for those in food operations and production, and also will familiarize advanced students in engineering or chemistry with the possibilities open to them in the great food industries. It should prove helpful also to administrative officers in food industries. The tuition fee for the course is $90.

Fundament material of the course will cover:

Economics and Statistics of Food Supplies
Equipment Used in New Processes
Flavor and Food Acceptance
Food Bacteriology, Sanitation, and Fermentation
Food Chemistry and Nutrition
Food Cost Accounting and Business Law
Food Electronics
Food Nutrients as Affected by Processing Methods
Food Packaging
Labor Relations
Materials Handling
Unit Processes in Food Engineering

as well as food processing in

Baking	Fisheries
Brewing	Freezing
Canning	Meat Packing
Dairying	Milling
Dehydration	Refrigeration

In addition to lectures, demonstrations, conferences, and reports relating to the subject matter, opportunity for group visits to representative food industries of certain types in Metropolitan Boston will be presented. Investigative problems requiring specialized equipment may be assigned to competent workers in fields of their particular interest.

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Croone, Wenzel, Scandia, Minn.
Cox, Wm., Cedar, Minn.
Dahms, Earl J., West Concord, Minn.
Davis, Charles A., 416½ State St., Beloit, Wis.
Drake, Glen C., Unit 86-F, Badger, Wis.
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Evensen, Verney, Thief River Falls, Minn.
Fanning, Edw., Babson Bros., Sandwich, Ill.
Fernstrom, R. C., 3815 Glenhurst St., Louis Park, Minn.
Flanary, Dr. W. F., St. Charles, Minn.
Fluegel, Roy I., Melrose, Minn.
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Hesse, Kenneth T., 401 N. Murray St., Madison 5, Wis.
Hill, Milo, Farmington, Minn.
Hilliard, Milton E., Rochester Dairy Co-op., Rochester, Minn.
Huggett, R. W., Dairy Div., University Farm, St. Paul 1, Minn.
Inman, H. D., Kelliher, Minn.
Jedlicke, Glenn, Browerville, Minn.
Jennings, Dr. C. G., Morris, Minn.
Johnson, N. Thomas, Pine City, Minn.
Johnson, Philip, Box 284, Detroit Lakes, Minn.
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Kelly, Jack, 52 East St. Charles Road, Villa Park, Ill.
Lasch, Kermit, 236 Randall Place, Elkhorn, Wis.
Kreier, Lester H., Kraft Food Co., Albert Lea, Minn.
Kruse, Lloyd R., Trempealeau, Minn.
Lerford, Russell A., Clarissa, Minn.
Maack, Arthur C., Swift & Co., Union Stock Yds., Chicago 9, Ill.
Maderer, Geo. A., Hampshire Milk Co., Hampshire, Ill.
Mahoney, John C., 334 North 1st St., Minneapolis, Minn.
Manwaring, Frank, Beatrice Foods Co., Tuscola, Ill.
Miller, Earl P., Fertile, Minn.
Mittag, Roy, Hinckley, Minn.
Moulton, C. J., Route 1, Stillwater, Minn.
Moulton, Frank, Rush City, Minn.
Munns, Hugh C., Route 2, Wayzata, Minn.
Nelson, Everett, Milaca, Minn.
Nelson, Joseph, Monticello, Minn.
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Newcombe, Glen W., Hinckley, Minn.
Nohner, Thabian P., Watkins, Minn.
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Olson, George Wm., 1850 Chelton Ave., St. Paul 4, Minn.
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Papp, Grover C., 222½ South Fourth St., Springfield, Ill.

Peterson, M. C., Dairy Div., University Farm, St. Paul 1, Minn.
Pfaff, Norman, Rochester Dairy Co-op., Rochester, Minn.
Racz, Stephen J., Cooklyn Dairies, Inc., Goldsboro, Maryland
Robinson, V. R., The Diversey Corp., 2331 Niskayuna Drive, Schenectady, N. Y.
Royle, Richard S., 30 Maple Terr., West Springfield, Mass.
Schaff, Chas. A., 3444 44th Ave. S., Minneapolis, Minn.
Schlicht, Walter C., 527 South 2nd St., Delavan, Wis.
Seymour, Fred, 2342 Cleveland St., N.E., Minneapolis, Minn.
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Swanson, Curtis, Lindstrom, Minn.
Thomas, Richard G., 123 East First St., Dixon, Ill.
Thompson, R. E., Lengby, Minn.
Tjosvold, Dale, 801 E. Old Shakopee Rd., Minneapolis, Minn.
Trevallee, Charles T., 221 Cavin, Schlichter Hall, Madison 6, Wis.
Turnbull, C. H., Box 750, Fairbanks, Alaska
Underhill, Floyd, 4200 Minnetonka Blvd., Minneapolis, Minn.
Walters, George H., United Milk Products Co., Osseo, Wis.
Weimer, A. C., Wyandotte Chemicals Corp., 1081 N. W. Bank Bldg., Minneapolis, Minn.
Welch, Willard D., 119 S. Washington St., Elkhorn, Wis.
Wheeler, Robert R., 65 Canal St., Port Jervis, N. Y.
Zerahn, Dr. A. W., Box 141, Ely, Minn.
Ziegler, Fred F., 3717 West 67th St., Chicago 29, Ill.

Iowa Association of Milk Sanitarians

The "Iowa Association of Milk Sanitarians" held its annual meeting March 23rd and 24th at Ames, Iowa. The following subjects were on the first day's program.

1. Quaternaries or Chlorine—D. H. Jacobson, Cherry Burrell Corp., Chicago, Illinois.
2. Production of Grade A Milk—H. C. Wiley, Borden Company, Chicago, Illinois.
3. Short-Time High Temperature Pasteurization—R. A. Weir, Cherry Burrell, Cedar Rapids, Iowa.
4. Frozen Desserts Ordinance—R. W. Hart, U. S. Public Health Service, Kansas City, Missouri.
5. Milk Plant Cleaning Programs—E. M. Fults, Bonewitz Chemical Company, Burlington, Iowa.
6. Panel on Paper Versus Glass Bottles for Iowa Plants.

The second day's program included a general panel discussion of ideas and problems as encountered by the milk sanitarian. Dr. Austin Getz, Ames Sanitarian, gave a report on the status of the cattle T.B. and Bangs testing program in Iowa, and R. W. Hart, U.S.P.H.S. spoke on the local aspects of public health programs. This was followed by the annual meeting.

Chicago Dairy Technology Society

The annual meeting of the Chicago Dairy Technology Society was held on April 25th, with an attendance of 245 persons. A "delicious steak dinner" was topped by large donations of cream cheese by Western United Dairy, butter by H. C. Christians & Co., milk by Bowman Dairy Co., ice cream by Goodman American Ice Cream Co., on which was placed three flavor toppings by Welch Fruit Products Co.

Community singing was followed by entertainment, by home talent, forty prizes for those who came costumed as well as to those who entertained and to the ladies for the most chic hats, ending up with an exciting raffle.

TED SCHEDLER
Chairman, Entertainment Committee

Florida Association of Milk Sanitarians

Florida milk sanitarians met at the Dairy Products Laboratory on the University campus April 20, 21, and 22, for the 5th annual meeting. The registered attendance of over 75 persons was the largest in the history of the organization.

C. A. Abele, of the Diversey Corporation; Lee H. Minor, of the Wyandotte Chemicals Corporation; and E. R. Andre, of the Ex-Cell-O Corporation, came from out of the state to appear on the program. Other portions of the three-day program were presented by staff members of the State Live Stock Sanitary Board, State Board of Health, State Department of Agriculture, Miller Machinery and Supply Company, and the University staff.

Position Open

THE WEST VIRGINIA STATE HEALTH DEPARTMENT WILL ACCEPT APPLICATIONS FOR THE FOLLOWING POSITIONS IN THE DIVISION OF SANITARY ENGINEERING TO BE FILLED JULY 1, 1949:

	Annual Salary Range
SANITARIAN Minimum requirements—College graduation	$2640–$3120
JUNIOR ENGINEER Minimum requirements—Graduation from an accredited four-year college or university with a major in Engineering	$2880–3840

Possibility of future promotions

Write to: Dr. N. H. Dyer, Commissioner
W. Va. State Department of Health
Charleston 5, West Virginia

"DOCTOR JONES" SAYS— *

By Paul B. Brooks, M.D.

We were talking, a while ago, about how effective minute quantities of iodine, like in iodized salt, are in preventing the goiters that're so common in large sections where there's a deficiency of iodine from natural sources. But I never quite realized how important an adequate supply of iodine is to life and health generally until I read an article on "Iodine in Nutrition" that was in the American Medical Journal.

It's one of a nutrition series that's being written, each one by outstanding authorities, at the request of the Council on Foods and Nutrition. They aim, eventually, to put 'em all together in a handbook and it'll be the "last word" on the subject. The only trouble—perhaps I shouldn't mention this but one or two of the previous ones have been so technical that—well, maybe, before they get to that "last word" stage, they can get the professors to sort of translate 'em into language an ordinary M.D. can understand.

Anyway, about iodine, the main thing is that the proper operation of the thyroid gland depends on its getting sufficient iodine and other bodily functions essential for life and health depend on the thyroid working right. A large part of the thyroid secretion is iodine. It's necessary, among other things, for proper growth, reproduction and so on. So much so that, in some iodine-short sections, they're giving it to live-stock.

Because there's iodine in sea water and sea foods, the popular idea is that sea water's its source. Actually it's the earth's crust. Where it's plentiful in the soil, animals get it from plant food and water and the humans get it from all of 'em.

Adding iodine to all salt—the best authorities advise it. It's in salt naturally but the refining process takes it out. The amount required is so small they figure it in micrograms and a microgram is only one *millionth* of a gram. The simplest way to provide what we all need is through "the salt of the earth."

* Bulletin, New York State Department of Health, April 4, 1949.