ANIMAL DISEASES

W. D. POUNDEN, SECTION EDITOR


Normal cows were distinctly less sensitive to intradermal injections of antigens prepared from a culture of \textit{Str. agalactiae} than were cows infected with \textit{Str. agalactiae}. Cows with clinical mastitis had greater reactions than infected cows without clinical manifestations. Some cows with streptococcic mastitis failed to react, and irregularities in the reaction make the method of little value in diagnosis. Two formerly infected hypersensitive cows given intramammary injections of antigens developed rapid inflammatory reactions, while injections of distilled water caused no appreciable swelling. Intramammary injections of streptococcic polysaccharide also caused severe inflammatory response. Intramammary injections of polysaccharide in a normal cow produced a mild reaction similar to that following distilled water. Similar results with intramammary antigens were observed in normal and hypersensitized rabbits. These studies indicate that hypersensitivity may be an important factor in clinical bovine mastitis.

E. W. Swanson


This is a brief review of mastitis based on the experiences of a veterinary practitioner. The veterinarian is primarily interested in proper diagnosis and treatment of this disease. A differential diagnosis is essential. Various methods of treatment are discussed. Several herds of dairy cows are on an annual check basis. The cows are tested with the Hotis test and the results suggest proper control and sanitary measures. Good herd management is one of the most valuable factors in controlling mastitis.

B. B. Morgan


An excellent review on the treatment of pyelonephritis in cattle is given. Several treatments are discussed. Until the advent of penicillin, most treatments were of doubtful value. Successful therapy depends upon early diagnosis and prompt, proper treatment. Symptomatic treatments alone, including the use of dextrose, saline and blood transfusions are ineffective. The sulfonamides have not shown much promise in the treatment of this condition when employed as the only therapy. Penicillin has given the most encouraging results. Doses of 2-3 million units have been used. Most practitioners use 10 million units of penicillin/cow. Therapy should cover an interval of about 10 d. Cows which recover clinically should be examined every 6 mo. for 18 mo. in order to determine if the animal has permanently recovered.

B. B. Morgan


Repeated courses of treatment with 1.5 gr./lb. of sulfamethazine intravenously followed by 0.75 gr./lb. \textit{per os} for 4-7 d. accompanied by a transfusion of 1 l. of citrated whole blood or 300 ml. of normal cow serum were given to brucellosis-infected cows. Three infected cows were used as controls. Changes in blood titers were insignificant and brucella were still shed in the milk of 3 of the treated cows following the experiment. One treated cow and 1 control became negative to the blood test before the end of the experiment. Death of 2 of the treated cows during
the experiment was attributed to the treatment. Reaction to the blood transfusion frequently was marked.

E. W. Swanson


A brief review is presented on the various conditions of cattle in which retained fetal membranes may be involved. These included brucellosis, vibriosis and trichomoniasis. In other instances no microorganisms can be incriminated. Cows which give birth to twins frequently fail to expel the placenta. A review of the anatomy and physiology of the uterus also is presented. Symptoms, lesions and treatment of retained fetal membranes are discussed. Important sequelae of placentitis included metroperitonitis, pyometritis and abscess formation with pelvic adhesions.

B. B. Morgan


Tyrothricin-B.F.I. uterine tablets were used in 210 cows to prevent infections and promote healing of the uterine wall. Two to 4 tablets were inserted at each treatment. The tablet consisted of tyrothricin (0.05 g.), bismuth-formic-iodide (0.5 g.), bismuth subgallate (2.0 g.), boric acid (2.15 g.), and urea (1 g.). The cows treated were divided into 4 groups: (a) 110 retained placentas removed manually after calving, (b) 20 cows with partially removed placentas, (c) 50 cows with retained placentas after abortion and (d) 30 cows which developed metritis about 1 wk.–10 d. after calving. The results indicated that the tablets were a safe and effective material for treating retained placentas.

B. B. Morgan


Six bulls known to be infected with T. foetus were sampled at frequent intervals (1–2 d.) over periods as long as 6 mo. Samples of fluid were secured from the glans penis and surrounding preputial membrane by means of a glass pipette and rubber bulb. The number of T. foetus organisms per ml. of fluid was determined undiluted in a hemacytometer. The average collection of fluid was 0.52 ml. Of 241 examinations, 217 (90%) were positive and 3 of the bulls were positive at every examination. One bull sampled on alternate days with pipette and swab exhibited only 6% of the organisms from the swab as found by the pipette. Wide variations in concentration of organisms were observed with each bull. The highest average was 44,000/ml. and the lowest bull averaged 80/ml. The highest single count was 488,000/ml.

E. W. Swanson


Five steers made hypersensitive to johnin and 1 hypersensitive to tuberculin were used in an experiment designed for statistical analysis to measure the reaction on various parts of the body to intradermal injections of johnin or tuberculin. The size of reaction was measured with a dermal thickness gauge. The regions in order of decreasing sensitivity were neck, back, side and caudal fold. The mean size of reaction at the neck was more than twice that at the caudal fold. Results were similar with johnin and tuberculin.

E. W. Swanson

Also see abs. no. 639.

CHEESE


The construction details and the operation of a cheese trommel are described. The unit consists of a stainless steel perforated drum 15 ft. long and 5 ft. in diameter, with ends tapering to openings 18 in. in diameter. At about 0.2% acidity the curd with a portion of the whey is pumped into the trommel, where firming of the curd is completed. The whey drains into a specially constructed trough which conducts it to a sump vat from which the whey is pumped to separators. The trommel is mounted on rails and thus may be moved from vat to vat. The unit is claimed to be labor saving and to allow increased manufacturing output.

J. C. Olson


To provide uniform pressure on cheese in hoops in the conventional horizontal type cheese press, a heavy coil spring is inserted between the end plate and the first hoop.

R. Whitaker

See abs. no. 557.

CONDENSED AND DRIED MILKS; BY-PRODUCTS

BY-PRODUCTS

F. J. DOAN, SECTION EDITOR


An alkaline solution of casein is extruded into a heated hardening bath of a metal salt and formaldehyde, followed by a final stabilization of the fibres in a concentrated buffer solution at a pH of 6-8. R. Whitaker


A water base paint is described, consisting of peptized casein, pigments, fillers, water and 1 of the following acids: gluconic, arabonic, mannonic, gulonic, galactonic and talonic. R. Whitaker


An animal feed in the form of small pellets, made by extruding a moist plastic mass of lactose and protein feed materials is described. R. Whitaker

Also see abs. no. 654, 655, 674.

DAIRY BACTERIOLOGY

P. R. ELLIKER, SECTION EDITOR


The effect of different disinfectants at various concentrations on Str. agalactiae was tested. Str. agalactiae survived for as long as 3 wk. on various objects in the barn and up to 26 d. on the skin of cattle. The organism can multiply and persist in sores on the teats of non-infected udders, thus providing a constant source of infection. Fourteen different substances were tested in vivo and in vitro. A drug mentioned only as CTAB was found to be satisfactory. CTAB in an aqueous solution (0.5-1%) or in cream and iodine solution was a good disinfectant for the skin, while CTAB in aqueous solution (2%) and formaldehyde were best for barns. CTAB in an aqueous solution was the most satisfactory for dairy utensils while CTAB and penicillin creams were the most efficient for the treatment of teat sores. A 0.1-0.2% CTAB aqueous solution was suggested for the routine washing of the udder before milking. B. B. Morgan


The authors outlined a method which may be used for detection of tubercle bacilli in cows' milk. Approximately 100 ml. of each composite sample were centrifuged at 3,000 r.p.m. for 30 min. One ml. of the gravity cream from each sample was injected into separate pairs of guinea pigs. The same procedure was followed with the sediment from each sample, except the sediment was emulsified in 1 ml. of normal saline before injection. The guinea pigs were killed from 6-8 wk. following the injections and microscopic observations for tubercle bacilli were made. Of the herds producing milk for the Pretoria market, 4% produced milk contaminated with tubercle bacilli. K. M. Dunn

Also see abs. no. 625.

DAIRY CHEMISTRY

H. H. SOMMER, SECTION EDITOR


The Na of milk is exchanged for the NH₄ radical by contacting it with ammonium sulphonated phenol formaldehyde cation exchange resin. The NH₄ ions then are displaced by the addition of Ca and K hydroxides to the milk. R. Whitaker


The method consists of weighing a 10–20-g. sample of butter into a graduated centrifuge tube, adding sufficient fat solvent (kerosene or gasoline are recommended) to dissolve the butterfat and
then centrifuging to obtain the aqueous layer. Readings are corrected for casein and soluble salt content and then converted to per cent moisture. The procedure is convenient and rapid. A Babcock centrifuge may be used but it is necessary to provide special cups to hold the centrifuge tubes. For production control work and most other purposes the results appear to be sufficiently accurate.

S. Patton


Certain imperfections in the original method (Lait, 29: 576. 1949.), which is based on measurement of difference in phosphorus content of mother's milk and cow's milk, are remedied.

S. Patton

DAIRY ENGINEERING

A. W. Farrall, Section Editor


Power requirements expressed as K.W.H./ton of butter were obtained from 3 New Zealand butter plants. The requirements included power used in operating the churns during washing of butter. Average requirements in the 3 factories were sufficiently uniform to indicate that 15 units (K.W.H.)/ton of butter may be used as a working basis for calculating power costs for churning of butter in N. Z. Variations of from 10-20 K.W.H./ton of butter were observed. Most of the data were obtained from observations on 100-box capacity churns. The rate of power utilization at various stages of the churning process was studied in 1 plant. Two to 4 units/min. were required during the first 15 min., increasing to 10 at time of maximum viscosity before the breaking stage, followed by a decrease during granule formation to the time of draining. During working, the power requirements remained constant at 4.04 units/min.

J. C. Olson


When good diesel fuel oil could be purchased for 6¢ or less/gal., diesel power could produce a K.W.H. for less than 0.5¢ in the smaller installations. The increased cost of electric power from the utilities is not as phenomenal as the increase of the price of fuel and lubricating oil and, therefore, comes close to competing with diesel power at present prices, especially in small installations from 50-500 h.p. Wasted heat recovery with the diesel and development of the gas diesel should not be overlooked. Sheer thermal efficiency is not always a sound yardstick for measuring economy of operation and the adoption of either diesel or purchased power should be closely investigated.

C. J. Babcock


A brief procedure for preparing a firetube boiler for boiler inspection is given. On the fireside, remove soot from the tubes, remove soot from the furnace, and inspect grates and setting. On the waterside, drain water from boiler, remove handhole manhole plates, remove oil and wash. Boiler accessories should be checked.

S. Patton


Safe handling of anhydrous NH₃ depends on how thoroughly the handler understands the three potentially hazardous properties of the refrigerant: (a) toxicity, (b) flammability of oil-ammonia mixtures and (c) rapid expansion of liquid.

NH₃ odor is so irritating that no one purposely inhales dangerously high concentrations. NH₃ is not cumulatively toxic. It gives warning of its presence by its irritating properties. Gas masks should be stored outside NH₃ equipment rooms and be used when it is necessary to work in areas of high concentration.

Although limits of flammability are from 16-27% by volume in air, the range is so narrow that a flame cannot be made self-sustaining. Investigations of NH₃ fires usually reveal that they were caused by leakage of oil-NH₃ mixtures rather than by NH₃ alone. The high side NH₃ contains oil from the compressor. When the high side of an NH₃ system must be emptied, it is preferable to store the charge in another part of the system rather than to replace it in the cylinders. In case the charge is placed in cylinders, the cylinders should be carefully weighed to prevent overfilling and danger from bursting on heating.

Because NH₃ attacks nonferrous alloys, the universal construction material is steel and the piping is extra-heavy steel. Valves usually are of the backseating type which can be packed under pressure.

H. L. Mitten, Jr.

A method for attaching a card indicator system to large NH₃ and Freon compressors is suggested. The cards tell the refrigerating work being done by each cylinder. They also indicate defective operation. A number of cards are presented to show typical curves for various types of malfunction. H. L. Mitten, Jr.


An internal tube cooler is described in which the milk is pumped at high velocity to permit rapid cooling without freeze-on, thus permitting the use of a low temperature refrigerant. The amount of refrigerant used is adjusted automatically to compensate for variations in pressure and velocity of the milk. R. Whitaker


This invention is concerned with a means for removing separately, the front end and the cylinder or barrel of a horizontal freezer. Suitable adjustments are provided to prevent leakage at the joints and to compensate for wear. R. Whitaker


The cylinder of a horizontal freezer is extended to form an elongated tubular portion beyond the dasher; it contains a device for varying the size of the outlet from which the frozen ice cream is withdrawn. R. Whitaker


The overrun of ice cream is controlled automatically by varying the amount of air admitted to a continuous freezer. The overrun is measured from changes in sound velocity resulting from passing sound waves through a layer of given thickness of the ice cream as it leaves the freezer. R. Whitaker


Milk and other liquid food products may be continuously deaerated by this device, which consists of a rotor operating in a vacuum chamber. The product is introduced into the center of the rotor, whence it travels outwards past baffles that break it up into small droplets and then collect the deaerated droplets and discharge the liquid from the chamber. R. Whitaker


A vacuum concentrator for milk and other liquid food products has a method for collecting the condensable volatile flavor forming materials from the vapor proportionally returning them to the concentrate after pasteurization. R. Whitaker


An entrainment separator for vacuum pans is described. R. Whitaker


Stable oil-in-water emulsions or creams may be made in this equipment, which consists of a chamber in which are located 2 perforated cone-shaped nozzles pointing toward each other and separated by a distance about 1/3 of the diameter of the chamber. The continuous phase liquid is introduced under pressure through the lower nozzle, the dispersed phase liquid through the upper nozzle. The emulsion leaves the chamber through an outlet in the top. R. Whitaker


Milk and other liquid food products may be heated continuously in this equipment, consisting of a 3-compartment cylindrical chamber containing steam under pressure. The liquid to be heated passes through a spiral channel located in the wall of the cylinder. R. Whitaker

Milk is pasteurized by the high-temp., short-time method by passing through a high frequency electric field. The hot milk is rapidly cooled by spraying into a vacuum chamber. The hot vapors are employed to heat the incoming cold raw milk.

R. Whitaker


In a milk pasteurizing unit containing a milk to milk regeneration step, an auxiliary milk pump is provided ahead of the raw milk inlet to maintain milk pressures throughout the system within a carefully selected range. The system is electrically controlled and operated.

R. Whitaker

Also see abs. no. 633, 634, 672.

HERD MANAGEMENT

H. A. Herman, Section Editor


This is a review article to acquaint practical workers in the dairy industry with the theory and practice of machine milking. There are 3 parts: Part I, “The cow,” in which milk let-down, reflexes, stimulation, stripping, milking machines and mastitis, and speed of milking are discussed; Part II, “The milking machine,” presenting pumps, pulsators, relief valves, teat cups and claws, and rubber ware; and Part III, covering the various aspects of installation and servicing.

J. C. Olson


This manifold for milking machines has 4 openings for teat cups, so placed as to permit easy attachment to the udder. A finger-operated valve cuts off the vacuum and milk outlet and vents the manifold for removal from the udder.

R. Whitaker


A holder for positioning teat cups under the cow’s udder is described.

R. Whitaker


An attachment for a milking machine, inserted in the lines leading from the teat cups, indicates when milk is flowing through the lines to the milk-collecting reservoir.

R. Whitaker


A vacuum-operated pulsating type of milker is constructed as part of the lid of a milk pail.

R. Whitaker


A milking parlor arrangement, including a system of entrance and exit for the animals, a 2-cow milking platform with the animals standing tail to tail and provisions for cooling and storing the milk is described.

R. Whitaker


A cow is prevented from swishing her tail by this device which grips the tail and one rear leg.

R. Whitaker


A siphon arrangement flushes out this animal drinking bowl as soon as the animal’s nose ceases to press a lever in the bowl.

R. Whitaker


A feeding trough for cattle consists of a cylindrical reservoir holding dry feed and a feeding trough protected by an overhang to prevent water from collecting in the trough. A mechanism in the trough, actuated by the animal’s nose, agitates the feed in the reservoir to keep it uniform and...
conveys it from the reservoir into the trough as it is consumed. R. Whitaker


Nine spray formulations were applied by power sprayer at 250–400 lb. pressure, and compared in efficiency of cattle grub (Hypoderma lineatum and H. bovis) control. About 2 qt. of spray/animal were used, and control data were determined 7 d. after treatment.

A wetting agent increased the effectiveness of ground derris formulations but sulfur did not. Five lb. of derris (5% rotenone content) to 100 gal. of water was about half as effective as a 10-lb. rate. Piperonyl butoxide and N-octyl bicycloheptene dicarboximide did not increase rotenone efficiency. H. bovis was more resistant to insecticides than H. lineatum. E. H. Fisher


It is contended that sheep could be better utilized as producers of milk than is presently the case. The point is made that wool production is not antagonistic to milk production in the sheep and that high production of wool and milk usually go hand in hand. Recommendations are made concerning methods for making better use of the sheep as a milk producing animal.

S. Patton

Also see abs. no. 686, 687, 688.

ICE CREAM

C. D. Dahle, Section Editor


An ice cream novelty consisting of a split doughnut and ice cream is described. One half the doughnut is placed flat side down on the bottom of a round package of approximately the same diameter. Ice cream then is filled into the package and the remaining half doughnut, also flat side down, is placed on top. The ice cream fills the holes in the doughnut halves.

R. Whitaker

672. Measuring dispenser for filling ice cream containers and the like. K. P. Herbold (assignor to Eskimo Pie Corp.). U. S. Patent 2,510,-


A device is described for delivering a measured quantity of ice cream into a container, using a reciprocating piston, the volume of which may be easily changed manually to compensate for changes in overrun. R. Whitaker


A vending machine for wrapped pieces of ice cream, cooled by air refrigerated by a small motor driven compressor, is described. R. Whitaker

Also see abs. no. 650, 651, 652.

MILK AND CREAM

P. H. Tracy, Section Editor


The dairy industry should take care of its own surpluses by enriching its own products instead of expecting the baking industry and others to use its surplus milk powder. Increasing the serum solids content of the fluid milk consumed annually from 8.5–10% automatically would remove 750 million lb. of nonfat dry milk solids from the market. This enrichment would increase the nutritional ingredients by 12.5% with only a 5% increase in selling price. Increasing the solids-not-fat in evaporated milk from 18–19% would absorb another 27–30 million lb. of nonfat dry milk solids and the serum solids of other products could be increased.

C. J. Babcock


Methods of determining acidity, bacteria count, density, fat, solids-non-fat, watering and adulteration of mother’s milk are given. Procedures for bottling, sterilizing and refrigerating the milk also are presented.

S. Patton


A milk bottle crate, having metal bound wooden sides and metal rod partitions, is described. R. Whitaker

An all metal milk bottle crate is described.

R. Whitaker


A few gallons of milk in a can may be pasteurized automatically by placing the can in this electrically heated and agitated farm or home pasteurizer.

R. Whitaker


Report of a Dutch Committee which visited the U.S.A. in April, 1949. A. F. Tamsma

Also see abs. no. 649, 653, 658, 659.


Merino sheep with permanent ruminal fistulas were used for the trials. The ruminal cavity was connected to a rubber diaphragm tambour for the registration of pressure changes.

Complete rumen stasis followed the intravenous injection of 1-2 mg. of histamine. This cessation of ruminal movement lasted for a period of 30 min. The sheep defecated repeatedly from 5-10 min. following the histamine administration, indicating a constriction of the intestines. The ruminal stasis and intestinal constriction were prevented or cured by the administration of antihistamine drugs prior to or following the histamine administration.

The authors point out that their findings may give a physiological basis for the use of antihistamine drugs for the treatment of various types of bloat in ruminants. It was shown that the rumen paralyzed with histamine was still capable of responding to faradic stimulation of the vagus nerve. This response showed that the paralysis caused by the histamine was of myogenetic origin.

K. M. Dunn


The effects of variations of pH, ionic strength and alcohol concentration on the solubility of hyaluronidase and their influence on purification procedures were studied employing a crude hyaluronidase obtained by extracting decapsulated, ground bovine testes in the cold with acetic acid followed by precipitation with (NH₄)₂SO₄. Optional recovery and purity of hyaluronidase were obtained in the pH range of from 6-8, 0.15 ionic strength and ethanol concentration between 20-40%. Refinement of the single stage ethanol precipitate by 1 salting-out operation with (NH₄)₂SO₄ brought 50-60% of the recovered solids to a purity of about 40 units/mg. The over-all recovery of starting material obtained was above 30% with a 20-fold increase in activity.

H. J. Peppler


The competitive binding by bovine serum albumin of the detergent sodium dodecyl sulfate and dye p-(2-hydroxy-5-methylphenylazo)-benzoic acid was investigated to determine the relative heterogeneity of the binding sites. Interpreting the data in terms of a comparison of self-competition vs. detergent competition, it was concluded that the group 1 sites, which bind the dye most strongly, also bind the detergent most effectively and are able to assume structures complementary to a wide range of configurations. Group 2 sites bind less strongly and are more restricted in the range of configurations assumed.

H. J. Peppler


The binding of the anionic dye p-(2-hydroxy-5-methylphenylazo)-benzoic acid by bovine serum albumin was studied at 5 and 25° C. over a wide range of concentrations. An assumption of 22 binding sites/protein molecule affords accurate description of the data. The dye binding sites can be divided into 2 groups: Group 1 contains between 4 and 5 sites and is characterized by a high binding constant; Group 2, with about 17 sites, has a relatively low binding constant. The ability of serum albumins in solution to exist
in many molecular configurations of approximately equal energy is discussed. An hypothesis of configurational adaptability has been advanced to account for the distinctive binding properties of serum albumins.

H. J. Peppler

SANITATION AND CLEANSING

K. G. WECKEL, SECTION EDITOR


The relatively low cost, rapid action and wide effectiveness at high dilutions are some of the advantages provided by hypochlorites; if they are used properly on organically clean surfaces, they are effective chemical sanitizing agents. Testing methods for hypochlorites are given. The favorable qualities of quaternary ammonium compounds are summarized as follows: (a) not affected by extremely high temperatures and efficient down to 50° F.; (b) nontoxic, nonirritating, stable, colorless, odorless and nonvolatile in use-dilution; (c) neither a primary irritant nor a sensitizer when applied to the skins of humans or animals in a dilution as strong as 1:1,000; (d) exhibit good germicidal properties in the presence of large amounts of organic matter, such as horse-serum, skimmilk and ice cream mix; (e) contain no mercury compounds, hypochlorites, phenols, or formaldehyde, hence are not classified by FDA as a poison when used as recommended dilutions as specified by the manufacturers; (f) relatively constant in their rate of kill and on short exposures will destroy over 95% of vegetative cells in concentration as great as 1:15,000; (g) exhibit desirable qualities of surface activity, hence have greater penetration; (h) generally, extremely selective for Gram-positive bacteria, particularly thermodurics and, to a slightly less degree, for Gram-negatives; (i) long residual action which is essential in practical operation. Testing methods are given. The use of cleaner-sanitizers is a step in the right direction for securing better results with lower operating costs, labor and time.

C. J. Babcock


In addition to reviewing the principles of cleaning and sanitizing operations in food plants, the more common detergents and sanitizing agents are classified and their roles are described briefly. Some applications of detergents and chemical sanitizers are cited; bibliography of 136 references is provided.

H. J. Peppler


Laboratory tests were made with acetone solutions of 3 insecticides to determine their effectiveness in knockdown and kill of the house fly when used at concentrations of from 1-80 mg. of toxicant/ft² with exposures of from 1-10 min. At low exposure periods with low dosage of toxicant, DDT was slightly more toxic than dichlorodiphenyl dichloroethane and several times as toxic as methoxychlor. Higher toxicant dosages plus longer exposure periods eliminated these differences in toxicity.

E. H. Fisher


Laboratory tests with the house fly compared the residues of several insecticides at relatively low to high dosages, exposure periods and temperatures. DDT, DDD and methoxychlor caused faster knockdown and greater kill at 70°F. than at 90°F. Heptachlor, parathion, chlordane, dieldrin and toxaphene were more effective at 90°F.

It was surmised that the house fly is controlled with low dosages of DDT in cool climates, whereas a higher dosage is needed where it is warm.

E. H. Fisher


Field and laboratory tests with the house fly revealed that flies resistant to DDT also may be resistant to each benzene hexachloride and dieldrin. There is no evidence that resistant fly strains will become susceptible after non-exposure to the insecticide for several generations.

Presently accepted fly control procedures with residual insecticides may need to be revised with emphasis on sanitation, use of repellents and space sprays.

E. H. Fisher