

# Problem Solving Exercises of Field Situations

## Self-Assessment Device for Feedlot Veterinarians

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100 thought-provoking self-assessment questions put together by recognized feedlot experts.

Each question is worth a point.

75-80 correct ..... Average Feedlot Practitioner  
 80-90 correct ..... Above Average  
 90-100 correct .....Possess a Great Deal of Expertise

Assembled by John B. Herrick, Iowa State University

### Nutrition

1. What's the minimal amounts of roughage that should be provided in a finishing feedlot ration to insure a healthy rumen epithelium and minimal digestive upsets?
2. What is the average concentrate percentage utilized to start yearling cattle in a feedlot on feed?
3. What is the minimal amount of time to move a yearling steer from the starting ration of approximately 30% concentrate to the finished ration of 90% concentrate?
4. What is the protein equivalence of urea?
5. If a feed tag states that the protein content of a feed is 40%, of which 28.2% is NPN (non-protein nitrogen) equivalence, how much urea is in this feed?
6. What is the percent protein, on a dry matter basis, of a feed which is 20% protein, as is, and contains 60% water?
7. By definition, what percent moisture is in air-dried feed?
8. What percent body weight will a feedlot steer eat daily on a dry matter basis?
9. What does UFP stand for?
10. What are the three main volatile fatty acids produced in the rumen?
11. In what method does Monensin increase performance of the cattle by increasing average daily gain or increasing feed efficiency?
12. What is the Californian net energy system?
13. What is the advantage of this system in computing feedlot rations over other systems?
14. What is the cleared level of DES that can be fed per head per day to feedlot animals if they are also on a low level of antibiotics?
15. What is the cleared level of DES if fed without antibiotic?
16. What is the withdrawal time of each implant?
17. What is the advantage of feeding a low level of antibiotics throughout the entire finishing period to feedlot cattle?
18. Is the L.D. 50 of monensin in horses between 2.0 and 3.0 mg/kg or 0.666 mg/kg of body weight?

### Economics and Treatment

19. You do not vaccinate for a specific disease until it becomes a problem in the feedlot. True or False?
20. Salmonellosis is a highly infectious disease and may be spread throughout the feedlot if strict quarantine or isolation of known infected cattle are not enforced. True or False?
21. If feeders cost 40¢/lb. at time of purchase, what is their base cost with a 5% mortality?
22. Weaner calves should be started on a high-energy ration containing over 50% concentrates. True or False?
23. The predominant organism genus found in liver abscesses is: a. *Spherophorous sp.*, b. *Streptococcus sp.*, c. *Staphylococcus sp.*?
24. To increase cattle resistance to disease or stress they should be implanted immediately with: a. DES, b. Ralgro, c. Synovex, d. None?
25. Legend drugs are not needed in feedlots. True or False?
26. Since the USDA approves vaccines for use in cattle, all brands will cause about the same reaction in calves. True or False?
27. Cattle that have received treatment with antibiotics or chemotherapeutants must be identified. True or False?
28. A veterinarian may prescribe feed medications which will be mixed in the feedlots mill without clearance from FDA. True or False?
29. In comparing a low level 28-day antibiotic feeding program with a 7-day high level feeding program, which is: a. more economical? High or low level. b. More effective? High or low level.
30. If a veterinarian received \$500/month for services to a feedlot that finishes 20,000 head per year, what would the cost per head be? a. 50¢, b. 60¢, c. 30¢.
31. If processing and treatment costs average \$5/head, how much more does a 400-lb. calf cost per pound? a. \$1.25, b. 2.5¢, c. 5¢.
32. The incidence of bovine papular stomatitis is observed more frequently in cattle that are not vaccinated for BVD. True or False?

### Parasitology

33. From the external appearance of cattle can you determine the need for deworming with any reliability?
34. Although young cattle receive the greatest benefit from deworming, are yearlings offered any improvement in performance by deworming?
35. Is there an age cutoff in which deworming no longer returns benefit?
36. Is an EPG a reliable measure of establishing the need for deworming cattle?
37. Does a low EPG in older cattle confirm a lack of parasitism?
38. Are there seasonal influences on a greater return from deworming over other times of the year?
39. What importance is a Phase II ostertagiosis and how common is this problem?
40. How safe are dewormers in cattle and do they "set cattle back"?
41. How often should deworming be performed under severe-to-average exposure conditions?
42. Does a low EPG in cattle necessarily eliminate the need for deworming?
43. What influence does an organic phosphate (grubicide) have on an egg count and does it reduce a worm burden?
44. Is there a cutoff dosage based on body weight possible in heavier cattle to reduce the cost of deworming?
45. Of what economic importance are lungworms and how widespread is the problem?
46. How do larval stages of lungworms cause respiratory disease and how effective are the dewormers?

### Differential Diagnosis

47. The term "shipping fever" refers to a complex disease syndrome in feedlot calves that results from infection with: (a) IBR, *Pasteurella multocida*, and/or *Pasteurella haemolytica*. (b) IBR, *Pasteurella multocida*, *Pasteurella haemolytica*, and *Haemophilus somnus*. (c) *Pasteurella multocida*, *Pasteurella haemolytica*, and *Haemophilus somnus*. (d) IBR and BVD with secondary bacterial invaders. (e) BVD in any combination with *Pasteurella multocida*, *Pasteurella haemolytica*, or *Haemophilus somnus*. (f) PI<sub>3</sub> in any combination with IBR, BVD, *Pasteurella multocida*, *Pasteurella haemolytica*, or *Haemophilus somnus*. (g) All of the above may produce "shipping fever." (h) None of the above will produce "shipping fever."
48. Corneal opacities ("white spots") 2.0 - 3.0 mm in diameter at the corneal-scleral junction of a sick feedlot steer are an indication of current or past infection with: (a) PI<sub>3</sub>, (b) BVD, (c) IBR, (d) MCF (malignant catarrhal fever), (e) b or c, (f) any of the above, (g) none of the above.
49. Cattle vaccinated against IBR with modified live virus injections right off of the truck may still break with acute IBR because: (a) the commercial vaccine was no good when used; (b) the cattle were "stressed" or "run-down" upon arrival and the vaccine can cause the disease under such circumstances; (c) the animals had already contracted IBR and were in the late incubative phase of the disease when vaccinated; (d) the cattle had already recovered from natural IBR and consequently the injected modified live virus was neutralized by circulating antibody; (e) none of the above; (f) all of the above.
50. The average incubation period for IBR under field conditions is: (a) 4-8 hours, (b) 48-72 hours, (c) 7-10 days, (d) 14-21 days, (e) 30 days, (f) none of the above.
51. The average incubation period for BVD under field conditions is: (a) 4-8 hours, (b) 48-72 hours, (c) 7-10 days, (d) 14-21 days, (e) 30 days, (f) none of the above.
52. The erosions and ulcers that often develop in the eye, nose, mouth, coronary bands, and gastrointestinal tract of cattle with BVD occur during: (a) the incubation period when animals are

otherwise asymptomatic; (b) the acute febrile stage of the disease when a viremia is likely present; (c) an outbreak of BVD in cold weather but not in warm weather; (d) the recovery phase of the disease or late in the course of the disease; (e) none of the above; (f) all of the above.

53. MCF (malignant catarrhal fever) can be differentiated from BVD and IBR by: (a) the extremely short course usually terminating with death; (b) a history of past association of affected cattle with sheep; (c) corneas that turn completely white in only 24-36 hours; (d) the more rapid loss of condition; (e) the more voluminous amounts of catarrhal discharge from the body openings; (f) all of the above; (g) none of the above.

54. Six-hundred-pound feedlot calves with bloody diarrhea and numerous fibrin casts being passed or hanging from the rectum may or may not have co-existent BVD, but one should also consider a diagnosis of: (a) coccidiosis, (b) IBR, (c) PI<sub>3</sub>, (d) MCF (malignant catarrhal fever), (e) salmonella enteritis, (f) a and d, (g) none of the above.

55. The ideal way to gather information useful in making a differential diagnosis between feedlot cattle diseases where no death losses have yet occurred is to: (a) observe while moving slowly through the affected and unaffected cattle; (b) thoroughly examine no less than six head, including affected and unaffected animals, while restraining them in a chute; (c) take the rectal temperature on whatever you can catch; (d) stay away from the feedlot and advise the producer to send some live, sick ones to the state laboratory for examination; (e) discuss the source of the cattle, vaccination history and the course of the disease thoroughly with the manager or producer; (f) kill a moribund animal if available and post it; (g) a, b, e, f; (h) none of the above.

56. Polioencephalomalacia (polio) "downers" may often be differentiated from thromboembolic meningoencephalitis (thrombo) "downers" by the: (a) favorable response of "polio" cattle to I.V. thiamine and the lack of response of "thrombo" cattle to thiamine I.V.; (b) favorable response of "thrombo" cattle to I.V. thiamine and the lack of response of "polio" cattle to thiamine I.V.; (c) favorable response of "polio" cattle to I.V. tetracyclines and the lack of response of "thrombo" cattle to tetracyclines I.V.; (d) favorable response of "thrombo" cattle to I.V. tetracyclines and the lack of response of "polio" cattle to tetracyclines I.V.; (e) a and c; (f) a and b; (g) a and d; (h) b and d.

57. Polioencephalomalacia (polio) "downers" may often be differentiated from thromboembolic meningoencephalomyelitis (thrombo) "downers" by observing that: (a) "polio" cattle are blind and "thrombo" cattle may not be blind; (b) "polio" cattle do not have joint cavities filled with fibrin and pus as do "thrombo" cattle; (c) "polio" cattle will have a 1+ or less Pandy test on cerebrospinal fluid while "thrombo" cattle have a 4+ or greater Pandy reaction on cerebrospinal fluid; (d) strabismus is rare in "polio" cattle but is very common in "thrombo" cattle; (e) "polio" may occur at any time during the feeding period and "thrombo" is commonly associated with a history of recent respiratory disease; (f) all of the above; (g) none of the above.

58. There is no such thing as chronic urea toxicity. True or False?

59. There are no lesions to be observed during postmortem of a stock cow that has died of "grass tetany" (hypomagnesemia). True or False?

60. Polioencephalomalacia of cattle is believed to be caused by a virus that has not yet been isolated or identified. True or False?

61. The "dumb form" of rabies does not occur in cattle. True or False?

62. Abnormal posture of the head and neck of individual cattle that "star-gaze" and wander aimlessly is very suggestive of listeriosis. True or False?

63. Listerial encephalitis is rare in cattle that are not consuming silage. True or False?

64. Thromboembolic meningoencephalitis may produce randomly distributed focal areas of hemorrhage and necrosis that can be seen upon gross examination of the bovine brain. True or False?

65. The specific etiology and pathogenesis of polioencephalomalacia in feedlot cattle is still not known. True or False?
66. BVD and IBR never occur simultaneously in the same animal but both may be present at the same time in a pen or feedlot filled with cattle. True or False?
67. BVD does not directly produce a cough in cattle, but the increased susceptibility to pneumonic pasteurellosis during the course of BVD often indirectly results in a "BVD-cough." True or False?
68. Lead and products containing lead kill more cattle nationwide than all other "poisons" combined. True or False?
69. Cattle acutely affected with anaplasmosis will frequently develop lethargy, icterus and hemoglobinuria. True or False?
70. "Late shipping fever" seen after cattle have been in the feedlots for three weeks is usually pneumonic pasteurellosis secondary to primary BVD. True or False?
71. The most significant bacterial agents recovered from lesions of bacterial pneumonia were: (a) *Pasteurella hemolytica*, *P. multocida* and *E. coli*; (b) *P. hemolytica*, *P. multocida* and *Mycoplasmas*, (c) *P. hemolytica*, *P. multocida* and *Corynebacterium pyogenes*, (d) *Pseudomonas aeruginosa*, *P. multocida* and *Hemophilus somnus*, (e) *P. hemolytica*, *P. multocida* and *H. somnus*?
72. *Corynebacterium pyogenes* is least likely to be resistant to: (a) penicillin G, (b) dihydrostreptomycin, (c) tetracyclines, (d) sulfonamides, (e) erythromycin, (f) tylosin.
73. The pasteurella bacteria associated with bacterial pneumonia in cattle: (a) are least likely to be resistant to sulfonamides, (b) are least likely to be resistant to tetracyclines, (c) are least likely to be resistant to penicillin G, (d) are in a dynamic state with respect to antibiotic resistance patterns.
74. The route of administration which was most effective in maintaining inhibitory serum concentrations of oxytetracycline after the 12th hour post treatment was: (a) the intravenous route, (b) the intramuscular route, (c) the subcutaneous route, (d) the oral route.
75. Concentrations of penicillin G, which are inhibitory for all sensitive pasteurella bacteria, can be maintained for 24 hours following subcutaneous or intramuscular administration of procaine penicillin G in aqueous suspension in a dose of: (a) 2,000 units per lb. of body weight, (b) 6,000 units per lb. of body weight, (c) 20,000 units per lb. of body weight, (d) 60,000 units per pound of body weight.
76. The most common gross lesion noted during pneumonic pasteurellosis is:
77. How many days lapse between exposure to pastures heavily contaminated with lungworm ova and the appearance of clinical signs?
78. A management factor common to verminous pneumonia and atypical interstitial pneumonia is:
79. The toxin produced by the *Clostridium hemolyticum* organism on culture media and in natural infection can cause erythrocyte hemolysis and tissue necroses. True or False?
80. If red water bacterin is administered according to the label, will it protect an animal for (a) one year, (b) nine months, or (c) six months.
81. What internal organ is thought to be the focal point of infection in red water?
82. What parasite is thought to be the primary source of insult to the liver in red water infection?
83. A commercial vaccine is not available for which of the following disease entities? Therefore, it is not usually recommended in health programs. (a) blackleg, (b) pasteurellosis, (c) *Hemophilus somnus* infection, (d) BVD, (e) IBR.
84. Which of the following agents may best aid in maintaining epithelial integrity? May also show clinical signs of respiratory disease when deficient? (a) vitamin K, (b) vitamin A, (c) vitamin B<sub>12</sub>, (d) vitamin D<sub>2</sub>.
85. Which of the following parasitic problems is of the greatest clinical significance in Southern cattle? (a) acariasis, (b) pediculosis, (c) myiasis, (d) nematodiasis.
86. BVD is thought to be a predisposing agent in the gastrointestinal tract to other infections, for example, salmonellosis and coccidiosis. True or False?
87. A disease entity that is characterized by thromboarteritis, pleuritis, embolic meningoencephalitis and sudden death may be best fitted with: (a) salmonellosis, (b) BVD, (c) IBR, (d) pasteurellosis, (e) *Hemophilus somnus*.
88. One degree of fever increases basal metabolism by what percent?
89. Starvation reduces the numbers of \_\_\_\_ and \_\_\_\_ in the rumen.
90. The \_\_\_\_ vitamins play an important part in antibody response.
91. The most important nutrient for cellulotic bacteria is:
92. What are bovine hip huggers?
93. Can an implant increase the daily gain even on grass?
94. (a) When should the viral vaccines and bacterins be used on newly arrived cattle in the feedyard? (b) What is the withdrawal time for those products?
95. What available products are approved for scabies? What is the withdrawal time?
96. What are the approved implants and withdrawal times of each?
97. What products are approved as growth promotants in the feed and what are the withdrawal times of each?
98. What are the cause and treatment for: (a) polioencephalomalacia? (b) TEME (thromboembolic meningoencephalitis)?
99. Case History: During the months of February and March, a feedyard with a capacity of 62,000 head of cattle observed and treated over 300 head of downer-type cattle. Most had been on feed over 90 days. Some were finished cattle, some had gone down on the way to the loading chutes. Two had gone down at the packing plant before slaughter. These cattle responded dramatically to corticosteroids and thiamine. Very few died; those that did either had other problems associated with the encephalitis or showed nothing. (a) What is your diagnosis? (b) What would be the next step-by-step process in finding the etiology? (c) How do you start a preventative program?
100. Case History: Last August and September, several feedyards were observing cattle that had been in the feedyard 60 days having excessive salivation, a grayish, watery diarrhea, ocular discharge and the loss of the "twitch," thus giving them the label "rat tails." These cattle usually had a temperature of 103°, and ulceration of the oral cavity was observed. Most lost considerable weight in a short period of time. Very few died. Necropsy showed ulceration throughout the alimentary canal. (a) What virus has been identified in causing this condition? (b) What treatment is most effective?

# Answers

## Nutrition

1. 7-10%.
2. 25-35% range.
3. 25 days.
4. 282%.
5. 10% (28.2 divided by 282-10%).
6. 100%-60% water = 40% D.M. divided by 20% = 50%.
7. 10%.
8. 2-3% (3% when he weighs 400-700 lbs.) 2½% from 700-900 lbs. Over 900 lbs. approximately 2%.
9. Urea fermentation potential. This is a new method to analyze a ration whereby one can mathematically calculate the amount of urea which can be properly added to the ration.
10. Acidic, butyric, propionic.
11. Increasing feed efficiency.
12. This is a system which partitions energy to two compartments: (1) net energy for maintenance, and (2) net energy for gain.
13. It allows one to more accurately determine the amount of average daily gain that will result from a certain ration.
14. 10 mg per head per day.
15. 20 mg per head per day.
16. DES - 120 days; Synovex - 60 days; Ralgro - 65 days.
17. It improves feed efficiency and decreases the incidence of liver abscesses.
18. 2.0 - 3.0 mg/kg of body weight.

## Economics and Treatment

19. False.
20. True.
21. 42¢/lb.
22. False.
23. *Streptococcus sp.*
24. Ralgro.
25. False.
26. False.
27. True.
28. False.
29. a. High level; b. High level.
30. 30¢ (c).
31. \$1.25 (a).
32. True.

## Parasitology

33. Classic symptoms of cattle parasitism are generally associated with poor performance, which is commonly recognized in any number of health problems. Parasitism not only produces a proteinemia in the host but also an avitaminosis and mineral deficiency symptoms. The host appetite is depressed with further impaired assimilation of nutrients. As a result, the degree of parasitism can't be accurately visually determined nor the need for a deworming be established unless an EPG aids in confirming the presence of parasitism.

34. Age resistance occurs in parasitism with the younger animal more susceptible than the older. As a result, cattle previously exposed have a greater resistance and usually a less serious effect of parasitism. Therefore, younger cattle under one year of age nor-

mally, but not necessarily, receive the greatest benefit from deworming.

35. There is no sharp cutoff at which cattle no longer receive some benefit from deworming, but, generally, cattle over 18 months of age receive less response from a deworming. Of course, disease problems in cattle 18 months or over, if complicated by parasitism, require longer periods to recover than non-parasitized cattle. This is especially true in severely stressed cattle with complicating virus BVD or papillary stomatitis virus in which prolonged periods of recovery are required.

36. An EPG represents only an aid to a diagnosis of parasitism because of a number of variables. First, the fecal sample used represents less than .02% of the total fecal output. Such other factors as larval stages produce the greatest damage; type of feed, females' egg laying ability, state of nutrition, arrested larva, lungworms presence and the need for a different diagnostic technique, variance in the skill of the person doing laboratory examinations, are all factors that make an EPG only a diagnostic aid.

37. Although older cattle are usually more resistant to the devastating effects of parasitism, they still serve as a reservoir of female worms and a supply of ova. This creates problems in cow-calf operations, obviously. Also, encysted Phase II ostertagia historically appear in cattle with a low EPG since they are larval stages, not egg-producing stages.

38. In positive cattle parasitic burdens increase in severity when ideal life cycle conditions are present. This would be with temperatures of 60 to 80°F. and 2" of rainfall/month. However, there can be considerable variation between species. Usually, spring and summer dewormings offer the greatest economic return, which is coincidental with our winter and spring calving and optimum parasite life cycle conditions.

39. In the late summer and fall of the year, larval stages of *Ostertagia* encyst in the gastric glands of the abomasum rather than develop into adults. If sufficient numbers are encysted or emerge in the ensuing months, serious clinical problems result and often cause death. In surveys that have been done in different areas, abomasal pathology indicates a high incidence of the problem has occurred previously.

40. Benzimidazole dewormers are very safe with a 15X margin of safety. Organic phosphate dewormers have a 3 to 4X margin of safety. Levamisole, which is not an organic phosphate, has a 9X margin of safety orally in normal animals and a 5 to 6X margin of safety subcutaneously. In severely stressed cattle, the margin of safety of all dewormers is lessened and the effects of freeing the animal from parasitism could be hazardous.

41. Frequency of deworming is dependent upon exposure, age, temperature and moisture conditions, length of pasture, type of parasitism, and cattle management practices. No hard, fast rule can be made, as a result, but minimum life cycle days for the eight economically important nematodes will vary from 19 to 40 days. Usually, a repeat deworming at 60 to 90-day intervals under optimum cycling conditions is advised to minimize severe parasite burdens under heavy exposure conditions.

42. Weight gain response has been observed in controlled university and government laboratories field trials under a variety of management and deworming practices. Two newer anthelmintics that are FDA-approved demonstrated the following results:

	No. Tests	No. Animals	EPG Avg.	Counts Range	Avg. gain controls (lb.)
Thiabendazole*	7	551	72	2-511	5.3
Levamisole**	10	797	150	2-1042	18.79

\*Thiabendazole  
\*\*Ripercol (Tramisol)

Probably of greater importance than an arbitrary average EPG



would be the range in egg numbers in fecal samples in a herd. Of course, the wider the range, the greater the potential weight response in cattle.

43. Pour-on topically applied grubicides mainly reduce the EPG temporarily but they do not eliminate worm burdens. The only exception to this is the species *Haemonchus* which is reduced approximately 50% by the use of a grubicide.

44. From what has been reported in the literature, the digestive tract has apparently reached its ultimate development or capacity when cattle weigh 650 to 700 lbs. Theoretically, if not practically, the dosage of the heavier animals could be based upon this suggested cutoff weight.

45. Lungworms are widespread throughout the United States but they have a seasonal appearance because of life cycle considerations. Temperature extremes for lungworm development are 40 to 80°F. with ample moisture. Ideally, a 58°F. temperature enhances maximum cycling so each area of the United States could experience a seasonal problem. First- and second-stage larva can survive freezing carrying over in a field from one year to the next. So, the problem can be seen annually or sporadically, depending upon proper exposure, weather, etc.

46. Life cycle considerations of lungworms demonstrate the 4th-stage larva pass via the lymph and blood vessels to the alveoli of the lungs, whereby they break through the capillaries into the air passages. Considerable trauma occurs to the lung but secondary pasteurellosis becomes a very serious problem. Levamisole in criticals has demonstrated over a 90% efficacy against 4th-stage lungworm larva and 99% removal of adults which cause parasitic bronchitis.

#### Differential Diagnosis

47. All of the above may produce "shipping fever." (g)

48. IBR (c)

49. The animals had already contracted IBR and were in the late incubative phase of the disease when vaccinated. (c)

50. 48-72 hours. (b)

51. 14-21 days. (d)

52. The recovery phase of the disease or late in the course of the disease. (d)

53. All of the above. (f)

54. *Salmonella enteritis*. (e)

55. a, b, e, f. (g)

56. a and d. (g)

57. All of the above. (g)

58. True.

59. False.

60. False.

61. False.

62. True.

63. False.

64. True.

65. True.

66. False.

67. True.

68. True.

69. False.

70. True.

71. (c) *P. hemolytica*, *P. multocida* and *Corynebacterium pyogenes*.

72. (a) penicillin G.

73. (d) Are in a dynamic state with respect to antibiotic resistance patterns.

74. (c) The subcutaneous route.

75. (d) 60,000 units per lb. of body weight.

76. Red hepataziation.

77. 10 days.

78. A recent change in pasture.

79. True.

80. (c) Six months.

81. The liver.

82. Liver fluke.

83. (c) *Hemophilus somnus* infection.

84. (b) Vitamin A.

85. d) Nematodiasis.

86. True.

87. (e) *Hemophilus somnus*.

88. 10 to 20.

89. Bacteria and protozoa.

90. B-complex.

91. Cellulose.

92. Hip huggers are shims used to narrow the work alley for smaller cattle.

93. Yes, 40 pounds on grass in Nebraska.

94. (a) Within 48 to 72 hours; (b) 21 days.

95. (a) Lintax (Lindane-Toxaphene), 30 days; (b) Coral .3% concentration, 0 days; (c) GX 118, 21 days.

96. (a) DES, 120 days; (b) Synovex S, 60 days; (c) Synovex H, 60 days; (d) Ralgro, 65 days.

97. (a) DES, 14 days; (b) Rumensin, 0 days; (c) Chlortetracycline, 70 mg/head, 2 days.

98. (a) Polio—the exact cause is not known; however, an acute deficiency of thiamine is an important causative factor. Treatment consists of high levels of thiamine—as much as six grams (3 grams IV; 3 grams IM) and corticosteroids. The prognosis is usually favorable if treated early. (b) TEME is caused by a hemophilus bacteria. Treatment is not very successful unless it is done in the very early stages. Treatment consists of: tetracycline, 7.5 mg/lb.; corticosteroids; thiamine; and 50% dextrose.

99. (a) The response to thiamine indicates polio. (b) Examine common elements to which the cattle are exposed. In this case, that element was the ration. In examining changes that preceded the outbreak, it was discovered that a low-grade beet pulp had been added to the ration shortly before the problem began. (c) Remove the beet pulp.

100. (a) Bovine papular stomatitis, with the possibility of BVD involved secondarily. (b) The most effective treatment is "tender loving care." The cattle should be fed a high fiber ration and hay.