physiological reasoning, it probably doesn't matter what fluid you use. All of the solutions discussed here are sufficiently balanced to be safe to use in almost any condition (though not necessarily the most rational). At The Ohio State University Veterinary Hospital, we find more cattle in alkalosis than in acidosis. Other workers have also observed hypochloremic alkalosis in a wide variety of disease conditions (8). I would, therefore, recommend Ringer's solution for supportive therapy in cases where there is some doubt as to the acid-base status.

All of the solutions I have discussed are easily obtainable. At our hospital, we weigh out packets of electrolytes which we can use to make all sorts of solutions. The Asiatic formula for calf scours can be prepared to be dispensed to clients with calf scours problems.

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Panel Discussion

Harold Amstutz, *D.V.M., Chairman*
W. Lafayette, Indiana

Question: What are the responsibilities of the veterinarian when he uses a drug not approved for food producing animals? What are his responsibilities when he makes up his own solutions?

Answer: The veterinarian who uses a product that is not approved for food animals assumes full responsibility for causing drug residues that might go on to the consumer. I guess the real problem here is that he is going to get away without getting caught. I think what bothers me as a practitioner is if a consumer, rightly or wrongly, did pin that back to me that I gave this animal chloramphenicol and this person got aplastic anemia and died. You can obviously see the impact of that kind of situation. I think the answer to this question is yes, the veterinarian who does this has that responsibility. What can he do if he has to do it in an emergency case when nothing else is going to work? The point I would make here is that he is going to have to become more familiar with the metabolic kinetics of the drugs that he chooses. I think if you don't do that and you give a drug that has not been approved, and you have no earthly idea about the withdrawal time or distribution in tissue, then you better not use it. If you have an idea or you can find some metabolism data somewhere, you've kept yourself up on this, and you know that the product is fairly rapidly metabolized, then I think you could probably build in a safety factor. Suppose in five days the drug is safely metabolized in some species of animal, then you caution the farmer and say that this animal must not go to slaughter for 30 days, or 40 days, etc. Some way, build in a safety factor to protect you. Again, I don't think the FDA can sanction this, obviously we don't. I think we realize the facts of life. You're going to use it. All I'm saying is that I would certainly know something about the metabolism kinetics of that drug before I did it. Be sure that the man whose animal you're using that drug on is sufficiently cautioned not to ship that animal to slaughter. As far as solutions that you prepare, I think the same thing basically applies although basic elements and so forth-electrolytes-they're not considered drugs. Unless a producer comes in with a claim, they're supplemental therapy; they're not considered drugs so you really don't have that problem as such. I think that is a fair answer.

Question: What is the advantage of glycene in some preparations? Are chloramphenicol capsules absorbed from the rumen in baby calves?

Answer: First of all I would like to confess that I really haven't analysed a bunch of different products and in the light of this, I would really like to do this. That is, analyze electrolytes and all the electrolyte products that are sold. Just let me say that the same mechanism by which sodium is absorbed along with glucose is also operative with amino acids. In other words, there is a sodium-glucose carrier mechanism that will transport sodium and glucose together, one for one. There is also an amino acid-glucose transport system that takes an amino acid on one arm and a sodium on the other, and that works also. Glycene is simply an amino acid which, I understand, exploits this same mechanism. I probably should mention the use of amino acids also in this oral solution, but since the basic research from which this came didn't use

amino acids–they said it worked, but they didn't use it.

Chloramphenicol is not only absorbed, but it is absorbed to the point that it builds as good a blood level the same dosage would if given parenterally. This really leads us to sitting back and thinking. You're treating an enteritis and you're giving chloramphenicol orally and the problem is back in the small intestine, or farther back in the intestinal tract, and the chloramphenicol has almost all gone into the bloodstream. Could we treat enteritis as well systemically with chloramphenicol because we feel that the chloromycetin gets into the lower gut by means of the bloodstream, really? The other point is that in the adult, the other organisms in the rumen destroy it.

Question: We occasionaly run into defective silos. What is a safe level of aflatoxin a man can feed?

Answer: First of all, cattle are more resistant to aflatoxins than are the other species. The porcine species and the poultry species are particularly sensitive so I'm going to hedge on it just a little bit because at the present time the Federal Register has a proposal on safe levels of aflatoxin which is 15 parts per billion. That level is low compared to cattle. This is a human food level. I think adult cattle could consume a high concentration.

Question: Did I understand you to imply that ionized calcium is so common that it is not considered a drug? Is that a correct interpretation of your remark?

Answer: If the producer or sponsor does not have a drug claim it's not considered a drug. Supplemental calcium is not considered a drug unless you have a big label across there that says this mineral is for the treatment of milk fever or whatever. If you make a drug claim then it is a drug. It's kind of touchy. I know I haven't answered the question, but it goes either way. A determiniation has to be made depending on how it is made, packaged and sold.

Question: If calcium were injected other than for the treatment of hypocalcemia, or for a local action, would it then be regarded as a new drug?

Answer: If you make a claim for it, yes. The condition requires that you make a claim–therapeutic, preventative or prophylactic. Then it would be a drug.

Question: The other question has to do with Rompun which, at least in the area in which I visited, is used by probably 99% of the practitioners. I would like to substitute chloramphenicol in the previous question and ask if this dimension effects your action in any way. How does an instructor in a veterinary school discuss Rompun with students ethically?

Answer: Well, the fact of the matter is that the sponsor of that particular drug (Rompun) is in the process of getting a new drug approval for this compound. It's very good in cattle, I understand. It is extremely good in horses and so forth. I think it is a case where a drug has come out, and it was simple to get it approved in horses. The additional cost of drug residue studies and metabolism work is slower coming along with a drug that has as much potential as this compound, it is just a matter of time before it is approved in cattle. There is no reason to suspect that it will not be approved.

Since I am an instructor in a veterinary school, I'd like to comment on how we deal with that ethically. I am extremely aware of the FDA problems, and I have worked with them closely for a number of years. We take this philosophy. The veterinarian is entering into a doctor–patient relationship when he deals with the animal. Built into that, hopefully, is the kind of thinking about residues and kinetics that we're giving them in the terms of general principles. I know for a fact that probably half of the drugs that are used in veterinary medicine - I'm not restricting this to bovine practice - do not have a veterinary label and probably never will because of the problem of economics of the low veterinary market. It's a very small dollar market. It costs too much to develop the research. From an ethical point of view, we tell the student what we know about the metabolism of drugs. Those that are going to be long lasting; the insecticides as a class. We tell him that he must make this judgment when he chooses one for use, and that he is assuming a doctor–patient relationship when he does. He assumes full liability not only for the patient but for the broader aspects of public health, but we do not neglect drugs that do not have the veterinary label.

Question: I stumbled on to a big batch of corn on one of my client's places recently that was combined with a borderline moisture content. It's gone through a heap; it is moldy. Some of it is even sprouting. We're talking about $4,000.00 worth of grain here that it is hard to tell a man to bury. I wonder if you were in that position what would you advise your client to do, and what could he expect? Is there any way you can salvage or treat something like this? Cook it, etc?

Answer: We've had that problem in Ohio a number of times and in 1967-1968 we had literally millions of bushels of corn like this. The experience that we had when we had this severe moldy corn problem was that it was not a major problem in beef cattle. It was a terrific problem in swine. The approach that we made was to select the best corn to feed to swine; you could salvage most of this corn through beef cattle if you could dilute it. Mix it with any corn you have remaining from last year. But again we've got thousands of dollars invested. You can't salvage it by heating it. You can dry it, but once it's molded and all the mold products are there the only thing you're going to do by drying it is prevent further mold growth. If this is stored in bins as ear corn is, the mold growth will be arrested about this time of year because of temperature and a degree of drying. In the spring it will start to grow again. You can't neglect the problem of drying the corn even if it is dry now. If it is going to be stored over winter, it is going to have to be dried sometime before spring or the mold growth will continue. By and large, we have had a lot of it. It has not been free of problems, but less problem in feeding

to beef cattle.

Question: Is it a problem in pregnant animals?

Answer: Here again, we have to go on a basis of experience. While this was a problem in pregnant sows, it did not appear to be a problem in pregnant dairy animals.

Question: I realize the problem with the significance of egg-counts in cattle, but is sodium nitrate flotation an acceptable means to demonstrate eggs of nematodes and coccidia?

Answer: I think sodium nitrate flotation is as good as anything. I prefer sugar as the flotation solution. The problem is there is so much fluid in normal cattle that eggs tend to be diluted, and you can have very low counts in very high parasitized cattle. You really need, as far as I'm concerned, a better means of diagnosis of parasitism in cattle.

Question: On the remark that you made on dosage of these anthelmintics, would you say that if you used a 700-pound dosage on a 1000-1200 pound cow, would that be enough?

Answer: Yes. I think that after you get up around 700-pounds you don't have to increase the dosage. Usually the error is made the other way. Giving a dosage too small to the smaller animal.