very much revenue but it does allow us a place to sit down and talk with each other. Our refrigerator is in the front. We have a shower room and it's used by one of our partners when coming back from playing tennis and sometimes after a very dirty calving. I am showing you some pictures of the clinic so you can appreciate the type of diversity there is in the practice and the necessity to have an inventory control system. Kennels, dog runs, and a calf ward area which is just an open room. There is a working area for the dogs and cats examination and treatment room, and a lab also in that same examination and treatment room where you can get your technician whenever you need her for small animal procedures. We have a scrub room. We have a small animal surgery and an equine surgery. Also a stainless steel table with an air mattress on it and the recovery stall is straight ahead. The equine stocks can also be used for cattle. They have to be halter roped to get them in there. Our recovery stall is hexagon, it's easier, the animals can't get in the corner and we can move around there fairly quick, there are bars up there and I can hardly reach them, I've only had to use them once and I can't use them unless something is chasing me!

Inventory Control:

Dr. Leslie L. Shane,
Worthington, Minnesota

I just want to make a few comments about inventory the way we do it in Worthington. I want to make three points. I'd like to talk about purchasing orders, we use a visa record, and a couple of comments about the storeroom. The purchasing orders we use, and we think it's real important, it does help us control it, comes in triplicate and is very straight forward, there is a number on it, a place for your name, the date, the quantity, the units, the size, and we've got a place for the description and a dollar amount. On the bottom we have a place for comments that you might have made over the telephone or when you made the purchase. And, then, of course, it has to be signed. It isn't that anybody can't use them but not too many of us use them. It is designated for one or a few. And then there is a place when we receive the items, the date, the number and then there has to be a signature there. Well, of course, where this comes in handy is if there are back orders or part orders, these are not filed away until all are filled out and everybody is happy about the prices and the amounts. We have a visa record card system, these fit in different trays, but the one we have is open cabinet, it's on rollers, rolls up beside your desk when you are using it, it's four feet by two feet and it stands about two and half feet high, just about desk height. This is divided into different ways; ours are divided in two main parts and of course we use the alphabet on these sections or whatever sections you need. We also have a place for the manufacturer's name and under each name you find their products, if you can't find what you want go back down the alphabet and it tells you exactly where to go. These are set in a row, they offset about an inch, these little notches at the bottom, they set right in there on a wire and if you pull one out, it says "out" at the top, so it's easy to just place back and where it should go. Let's just go through this visa card a little bit. At the top, there is a place for the item and the manufacturer. Right below that is the selling price, when these are in place when you look at them, that's all you see, about an inch, they are offset that much. Let's just go through this card, I don't suppose you are in the position to write but I'll just tell you what I wrote on this card. Name of product and manufacturer; over here is the date, quantity, size of the bottle, cost per unit, percent mark up, if you say 20%, 20% plus 100%, 120% of 11.00 dollars is 13.20 so you can add that in your selling price and that's plainly seen. Of course this tells how much you've paid in the past if ordering and it tells you how much you're using for so many months. Talking about these cards and inventory it draws your attention to suppliers and salesmen and it's real nice to have people you can call up and get a quote. We have the best suppliers in the area, they are great fellows. So, when we get the supplies in we put them in the storeroom which has metal frames with wood shelves. These frames are twelve feet long by 2 and 1/2 feet, there are four shelves which are numbered. Top one is one and they go down to four and we stock them from both sides with the letters, say A on this side and B on this side. On the door to the storeroom there is a list of products. On the end of the shelf we have inventory lists in alphabetical order and it tells you which place to go. Of course these people who have helped the veterinarians keep track of these things probably deserve a special place in heaven which reminds me of the cartoon. The veterinarian in the supply room was looking for drugs, "I can't find that calf eye patch, George, where is that?" And he says, "It's in your left hand", "Well, I don't see it". "Your other left hand, Doctor!"

A Practical Approach to Prostaglandins in Large Animal Reproduction:

Dr. Martin Wenkoff,
Lethbridge, Alberta

Tonight, I'm going to tell you about some experiences I've had synchronizing beef herds with luteolytic agents over about the past five years. And hopefully as a result of this, you will go away with some guidelines on how to approach controlled breeding programs from a management point of view. For a bit of background, in 1977 and 1978 Prostaglandin $F_{2}d$ and its synthetic analogs became available in Canada, either experimentally or by license in that order and consequently were used fairly extensively to

synchronize beef herds especially in the western part of the country. According to the information available at that time, all you had to do was follow some sort of program that made physiological sense and breed the herd artificially about three days. You simply had to give two injections eleven days apart and breed three days later even without any detection. With synchronization this same feat would take approximately 24 days to accomplish. This seems quite simple and easy to follow but unfortunately the results are generally disappointing. The first service conception rates are usually lower than expected, many farmers were turned off, as a matter of fact a lot of the people who were exposed to prostaglandin synchronization in the early days never tried using prostaglandins again and part of the purposes of this presentation is to point some of the mistakes that were made in the earlier days, using prostaglandins in an effort that possibly you are just starting to use them now, you might be able to profit from this. This is a case like that in 1977, a fellow with 180 cows was sold 360 doses of prostaglandins. He injected the animals twice and ended up with 60 calves with that effort. The total cost was around 3,000 dollars which would be about 50 dollars per breeding. Now he was disappointed, his first reaction of course was to blame the drugs, he was disappointed in the drug, he was disappointed in the whole concept of cynchronization. His veterinarian was a little worried, too, because he had done the artificial breeding in this particular project. Between the two of them, they agreed to have synchronization trials by ICI in an effort to sort out what the problems might have been. I come from a dry country. In 1978 the trial began, the herd was palpated to establish cyclicity. Not surprisingly 57 cows, which is about a third of the herd, were found to be in anestrous. This dry weather accounts for the low first service conception rate in 1977 because in 1977, presumably about one third of the animals were not reproductively active at the time of the program. We did end up with 63 calves of 123 animals that were available for the program the first service conception rate of 51% which is about 20% higher than the previous year. Now this increase in the first service conception was accomplished by simply rejecting anestrous cows from the program. So the first point that I want to make real clear, and I want you to go away with, is that you cannot assume cyclicity in the herd. Prostaglandins and its analogues are not fertility drugs. They are simply luteolytic agents and the physiological action of these drugs is not apparent in the absence of a functional CL. Now if you think you could get around this and second guess the situation, which people tend to do if you are called out to do a herd, you might try to look at the herd and say they look pretty good and I think must be cycling. Suppose you said, "Well what I will do to get around this problem, I just pick the cows that are at least 50 days post partum, surely they will be cycling." Well, that may not be too bad if you happen to stumble into herd H, but if you were dealing with herd G, 211 of the cows were 50 days post partum but there were only 32 cows that were cycling at that time. If you gave these cows two shots of prostaglandin probably at a cost of 2400 dollars, the farmer will spend another 1000 dollars of semen and artificial insemination cost and he will end up with probably about ten calves. Now, these type of situations are where the expression regarding "two flat rocks" came from.

In 1979 the cows were palpated again, the anestrous rate was very high, 71 cows, just about 40% of the herd. We did end up with 58% first service conception rate on the cows that were available for the program which is almost twice what it was in 1977. Now the interesting part about this particular year was that in the four weeks following the program we had 50 of these 71 anestrus cows cycle, became pregnant by clean up bulls. So it was quite clear from that, that something had delayed the onset of estrus and of course the most common cause of delayed onset of estrus in range cows at least is inadequate nutrition over the winter period. Ted said we don't have very rough winters but sometimes we do! The winter of 1979 was particularly tough on the foothills and we had a real long hard winter.

This brings us to the second management requirement for the successful program and that is nutrition. You can talk about phosphorous, vitamin A, protein and sulphur, they are important but generally you don't see reproductive problems until clinical signs of their deficiently are apparent. For example, I really doubt if hypophosphoa temia really has much effect on reproduction unless their blood levels fall before about 4 ml. per 100 ml. Therefore, our discussion tonight will center basically around TDN. For the basic feeding requirement for reproductive efficiency for your average 100 pound cow, you should feed to gain from 100 to 150 pounds during the wintering period, if you realize of course that the cow is simply maintaining herself. The gains are fetus fluid membranes. The cow isn't gaining anything. Between calving and breeding, it's very important to gain from a half to three quarters of a pound a day. This is accomplished according to the NRC recommendation by feeding nine pounds of TDN per day in the winter and almost doubling this to 16 TDN per head per day in the flushing period. I believe these figures are a bit low for some of our heavier cross breds and pure bred cattle. I think that probably figures of 12 pounds in the winter and 22 pounds in the flushing period are more realistic. I'd like to point out that calculating TDN is quite simple. For example, some hays are about 50% TDN so if you need 10 pounds of TDN all you need is 20 pounds of hay. This is the type of situation that happens if the TDN is inadequate over the winter. The cows are not gaining anything. The onset of estrus will be delayed and there will be several anestrus cows when the breeding season starts, that makes synchronization programs hard to handle, that's what happened in 1979, we had nearly 40% of the cows lagging behind when the breeding dates rolled around. The reason for the delay of the onset of estrus apparently is inadequate release of gonadotrophin from the anterior pituitary. This type of situation can also happen where people are feeding properly in the winter time but, for some reason, the nutrition in the

flushing period is low. This can happen if the spring rains don't come, pastures are poor, people turn cattle out on pasture because they are standing there, they assume they're getting something to eat and they're not, there is nothing there to eat, lack of supplementation. If nutrition is adequate in the winter but is inadequate in the flushing period the animal will cycle on time, you can synchronize them with prostaglandins but the first service conception rates will be low. Quite a few reasons for this, one is that the glycogen levels in the female genital tract are low and glycogen level of course is necessary for the sperm cells and fertilized embryos. In cases like this, you'll probably end up with non-fertilization of early embryonic death. Glycogen under the influence of estrogens in the vaginal mucosa converts to lactic acid and this is part of the female defense mechanism against infections at estrus. Probably lack of gonadotrophian release also plays a part here. It is really important to monitor nutrition in this particular period because animals could lose 5 to 10% of their body weight and go entirely unnoticed, as a matter of fact, the farmers will tell you that they are gaining weight. Quite a few of the operators in Alberta are now incorporating scales, you could with a dozen cattle, note their ear tag numbers and bring them in a week or two later, reweigh them and see if they are actually gaining from 1/2 to 3/4 pound per head per day in that period.

Cooper in 1976 illustrated very nicely what the effects nutrition have on first service conception rates. The method of breeding has very little effect on the first service conception rates, as a matter of fact they closely parallel each other. Some of you might be surprised to notice that the first service conception rates with a natural service is under 60%. But, you will notice that the nutrition level has a very profound effect on the first service conception rate whether you synchronize the herd or use natural service. The problem with natural service is that people don't notice this and they don't admit it because probably these animals will conceive in the next cycle or two, so they end up with calving periods that are spread out. When you're synchronizing herds, you'll notice that all of your problems are concentrated in one day so if your first service conception rate is low it becomes much more noticeable than it does when you are using natural service. So we're talking about rejecting anestrus cows and what you can do about anestrum by nutrition.

Another factor that is very important is the effect of the post partum period on first service conception rates. In 1979 we noticed that although the numbers aren't great, the animals that were under 50 days post partum had a very low conception rate of 17%, except for a few. Cassida did work like this also and his data was very similar. This is understandable that the first service conception rate would be low, under 50 days, because the caruncular areas of the bovine endometrium are not histologically normal until about 50 days post partum. Wiltbank did some fine work here where he added the two effects of post partum period and nutrition on first service conception rate. From 10 to 30 days postpartum, nutrition has very little effect on the first service conception rate. You can increase it a little by really feeding well but it doesn't have a big effect. But when the post partum interval is adequate, from 50 to 70 days, then the first service concption rate is good only if nutrition is good and extending this post partum period from 50 to 70 days doesn't really make a lot of difference. In 1978 and 1979 approximately half of the animals rejected from the program for anestrus were three years of age and this is highly significant. You notice this when you start palpating some of these herds, that you reject the animals, put them off in the pen and have a look at them afterwards and a lot of them are younger animals. Your two and three year old animals should receive some special attention, probably they should be supplemented and even weighed in the post partum period. You have to be sure that they are gaining properly.

The last area to watch is AI technology. AI technology really has quite an impact on first service conception rates especially in the synchronization situation. We almost have a 40% spread between technicians. We went through all the trouble of palpating cows and palpating ovaries and selecting only the cows that were cycling. The nutrition is up to date and everything is perfect, you've got everything set up and you have a fellow hired to do the artificial insemination. You may end up with only about a 30% conception rate which is quite disappointing. So you better watch the qualifications of these people, check out their past performance, and don't ask him, check it out, look at records. If the first service conception rate was 30% last year, it will still be 30% in a synchronized situation. It might even be less and don't get taken in by people telling you that their non-return rates are 75 to 80% because non-return rates have very little to do with the actual first service conception rates. First service conception rates for technicians who are doing their own work are commonly 25 to 30%. They like to think that they are around 60 to 70% but they are not. So in order to get a conception you have to deposit semen at the right time. Another point that you shouldn't ignore is the quality of the semen. Just because the semen comes in nice fancy glass vials with printing on them does not mean that it is good. Make sure the semen comes from a reputable firm and have a look at it yourself. I know that evaluating frozen semen is not easy to do but at least take a look at it to see if there is some activity there. If you crack a vile and find some foreign object then you should become suspicious. Don't get yourself in the situation where you go through a lot of trouble and expense for yourself and somebody else, a livestock owner, and synchronizing a herd and hiring the best AI technology available and ending up putting a bunch of garbage into the animal because your conception just simply won't be there. This has happened.

In the 1980 results, the first service conception rate was 61.3% which I think is fairly impressive. We rejected only 21 animals for anetrus. There are two reasons, one reason is during last winter we went in there in January and reviewed

the nutritional status of the herd and adjusted it upwards. Another reason, of course, is that the three year olds were not included in the program. We have them under another study with something else in mind for them. 173 cows were available for the program and we had a 61.3% first service rate. In the first 20 days of the breeding season last spring we had settled 76% of the herd, now that's the synchronized estrus plus the first return, 76%, and by the 40th day, 84% of the animals were pregnant. The overall conception rate of this herd is 98% with very few open animals.

I'd like to quickly summarize and go over some of the important points that were discussed. You can't over stress nutrition and the post-partum period. In order to know what the post-partum period is, you have to have records. I've palpated animals that were supposed to be 60 to 70 days post-partum and their uteri weren't even involuted yet! When you confront the owner with this, his wife will pop up and say "Oh, remember that one, she calved two weeks ago?" He'll say, "oh yea, that's right." You have to have records, you can't start guessing because you have a lot at stake here. Age consideration, we discussed your two and three year old animals. There is a problem with older cows too for most of the time their anestrus problem originates from inadequate TDN, probably poor teeth is the main reason for that, they can't take enough in. Heifers, you have to consider maturity age, weight and make sure that heifers are on a rising plane of nutrition, I could talk for an hour on heifers but I don't have time to do that tonight. Palpation ability, some veterinarians don't want to palpate, others won't and some can't but there are situations where you have to palpate in order to decide which animals to place in the program. There are programs designed to assess cyclicity in a herd and automatically reject the anestrus cows but we don't have time to discuss that either. Milk and blood progesterone levels can tell you whether you have a functional CL or not, but they won't sort out the pregnant animals in a situation like this but that's highly impractical in beef herds. The fifth point is your AI competence, there are other things here to consider too, besides the points I mentioned. If you are going to hire one fellow you better be a bit careful if you have three hundred head for him lined up to do in one day. You might have to provide two or three technicians. Another thing that might seem trivial but when you set up these programs make sure that the AI technician is available on the breeding day! Don't set up a program without telling him and then find out that he's gone on holiday somewhere, if you do that you better know how to do AI yourself. Your facilities should be able to handle 60 head per hour. I really like a herringbone situation where you can work on three animals at the same time. You can work on the animal on the right and they let the animal out and put another in so you have animals in front of you all the time for palpating ovaries and this is real handy for the AI technician too. Another thing you could suggest is that they put a roof over it for rain or whatever. When you are working on large herds, if you do too big a bunch at one time your timing is going to be off with the artificial insemination, so if you have a big herd make sure the fellow has some facilities to divide these into groups. If you don't have a facility like that, don't attempt to do it because if you breed animals late you could end up with early embryonic death. I think Dr. Woelffer mentioned that too.

Healthy herd: these are obvious things, one thing to watch for is anemia, you could get anemia from lice or deficiencies of copper or cobalt or whatever but whenever the hemoglobin levels drop to below about 9 grams percent you can start seeing anestrus as a result of anemia so watch this a little bit especially if you could get some serious lice problems right around breeding time. The last point: expectation and farmer understanding. Don't get into a situation where you promise success rate, maybe because of misinformation or maybe because you're trying to talk somebody into the synchronization program. Be realistic. 55 to 60% is a pretty good first service conception rate on the synchronized heat. There are other advantages and other ways of measuring success too, even if your first service conception rate is not much higher than 55% you will have more animals available the following year that are more than 50 days post partum so your first service rates will automatically go up in the second year. There are other advantages too like a short breeding season and calving season, so make sure you don't promise the fellow that he's going to get all his cows pregnant on one day because you will run into disappointments.

Moderator:

Thank you Dr. Wenkoff, I would like to personally thank you all for attending, for the excellent presentations and certainly it allowed us to kick off this conference in style. We tried something a little different and I hope you appreciated it. If you have any constructive criticism or comments, I'm sure that the program committee for Seattle would like to have them.

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