



A two-seat folding top surrey, one of the carriages offered at the annual carriage consignment sale held by Paul Z. Martin, Gordonville.



Transplant Calf

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coat resembling a bleached-out Hereford. Conrad feels this is the breed that's going to become a dominant factor in the business because of superior growth rate, size, marbling and milking ability. He pointed out that in the last two International Livestock Expositions at Chicago, grand champion ribbons went to Simmentals both years.

There are precious few purebred Simmentals in the U.S., and virtually all of those are females. The American Simmental Association considers a seven-eighths female purebred, but a bull must be fifteen-sixteenths before it can join the purebred ranks. Strict laws against the importation of foreign animals keeps purebred European bulls out of the U.S., but there are some purebreds in Canada. Semen from these bulls has been used in artificial insemination programs by various cat-

tlemen throughout the country in the past few years in an attempt to develop purebred breeding stock in the U.S.

AI is a tremendous boost in the race for breeding stock, Conrad said, but it's still a slow process. There won't be any purebred Simmental bulls in the country until at least next year. And there are probably only a few hundred purebred heifers. That's why Simmental breeders like Conrad are especially interested in embryo transplants. The process is expensive, but it allows a prize cow to have as many as 12 offspring a year instead of just one.

A growing number of firms across the country are offering to perform embryo transplants. The transplants must presently be done surgically, and the cost is admittedly high - as much as \$10,000 for each operation.

There are several steps to embryo transplants. The first is to find a suitable

donor cow, whose calves should be potentially valuable enough to justify the cost of the operation. Her heat cycle is timed accurately, and synchronized with a group of potential recipient cows. Exactly five days before the donor cow is expected to ovulate, a fertility drug, such as pregnant mare serum, is administered. This drug causes the donor to super-ovulate, releasing as many as a dozen eggs, rather than the usual one.

When the cow comes into heat on the fifth day, she is artificially inseminated with semen from a superior bull. Five days after that she, along with a dozen or so donors, are prepared for surgery. In the antiseptic operating room, the donors' reproductive organs are exposed and slit open, and the fertilized eggs are flushed out of the cow and into a ceramic dish. The eggs, which are actually not eggs anymore since cellular division has begun, are examined by microscope to determine their suitability for transplanting. Those which are suitable are then placed surgically into a recipient cow. This

Although she doesn't know it, this three-quarter Simmental cow is mother to the calf by her side. The calf is the product of an egg which had been fertilized in the mother's body. After fertilization, the egg was

removed and placed in the uterus of a Jersey, which actually bore the calf for nine months and 10 days. Both animals are owned by Dr. Thomas Conrad, Bird-in-Hand.

recipient, which was a Jersey in Conrad's instance, then bears the fertilized egg for a full term pregnancy. If the operation is entirely successful, there will be as many as a dozen live births of genetically superior animals. These calves will have all the genetic material of the AI bull and the donor mother, but none of the genes of the recipient cow which actually gave birth to the animal. The recipient mother serves only as an incubator for the last nine months and ten days of the calf's pre-natal existence.

The operation's price keeps it out of the ballpark for the average cow-calf or dairy operation, but breeders of top-flight animals are seriously interested. One firm, International Cryo-Biological Service, Inc., of Minneapolis, said that they have booked 60 percent of their

1973 capacity of 200 operations. As this and other firms gain more experience with transfer techniques, costs are expected to come down. Transfer won't likely become a viable tool for commercial dairy or beef farmers until non-surgical techniques are perfected both for the removal of fertilized eggs and their implantation in donor cows. Another technique that's being worked on is the storage of fertilized eggs. If this were perfected, it would eliminate the need for estrus synchronization.

Is there much risk to the life of a prize cow that undergoes the transplant operation? "The real risk isn't to the cow," Conrad said, "it's financial. You first of all don't know how many fertilized eggs you're going to get from a donor cow. You could get none and you could get 20. No matter

how many you get, it still costs \$10,000. Right now, embryo transplants aren't really a money-making proposition, at least not always. I do know a man in the midwest who put a prize cow through the operation and had 10 pregnant recipient cows. He sold the recipients and the donor cow for \$161,000, with an insurance policy guaranteeing live births and six months of age. I think he made a good investment."

ICBS, the Minneapolis firm mentioned earlier, says its success so far has been 3.7 live births for each operation.

Conrad said he has no financial interest in embryo transplants, and that his real business is raising purebred Simmentals. He added that he'd be glad to discuss the technique, though, with anyone who might be interested.

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