BIOLOGY

Proxy Mothers Is Science's Aim

In animal world now, mothers bear offspring not really their own. Applied to humans new methods promise babies for childless women.

By WATSON DAVIS

➤ IT IS getting so that in the animal world a mother can not be sure that a baby is really her own. And an offspring of a cow or a rabbit or a dog can never be sure that its mother really is its mother, biologically speaking.

So far as fathers are concerned, animal babies, those of the best cows at least, can never hope to see papa, and they are often not even born in the same state or the same country. For proxy papas are the rule for the best-bred cows. Calves are progeny of parents who never see each other.

Providing the male for a herd of cows by mail order is relatively old stuff. This artificial insemination of cows allows the dairyman or cattle-raiser to dispense with the trouble, cost and danger of keeping a bull on the premises. One out of ten of America's cows are serviced through breeding associations using only about 2,000 high-caliber bulls, or one bull to some 1,300 cows.

Combined with the selection and cross-breeding that has been possible through the application of the scientific principles of heredity, the improvement of farm animals has been greater in the past couple of decades than it had been in all the centuries since men have been farmers.

Not content with multiplying the potentialities of a superior bull, the animal breeders are now looking with interest and anticipation to a method making scrub or just ordinary cows give birth to superior-bred calves on the mother's side as well as the father's side of its lineage.

One Calf Produced

One such calf has been produced. It was quite an event in animal husbandry. A calf still microscopic in size was transplanted from one cow to another and there allowed to grow until the substitute mother calved. A heifer was born, weight 84 pounds, with markings and blood factors that the foster mother could not have given.

This happened at the University of Wisconsin. It was the culmination of much previous work, for as long as 16 years ago this transfer of a fertilized egg from one animal to another had been accomplished in rabbits and it has since been done with mice, rats and sheep.

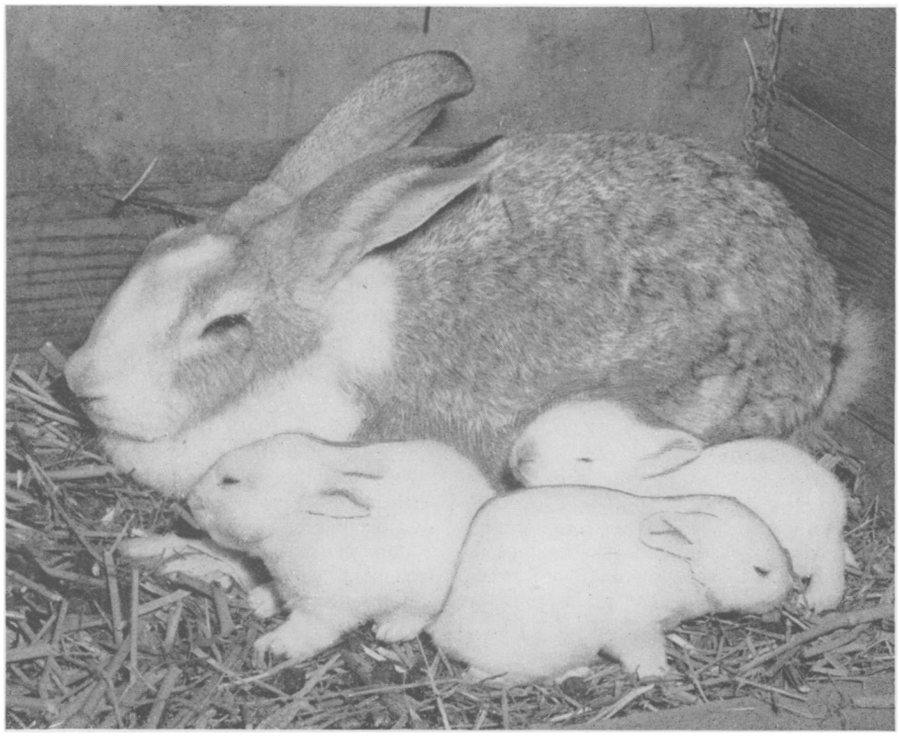
Dr. Gregory Pincus of the Worcester Foundation for Experimental Biology is the pioneer in this method, since he transferred artificially inseminated eggs from one female rabbit to a foster mother which did the work of giving birth to these bunnies not her own. These rabbit eggs are not the sort depicted on Easter cards, of course, but they are actual mammalian eggs, extremely small. As is the usual way with mammals, these ova develop within the animal and the little ones arrive ready to take up their own existence.

Applying this method to animals as large and as valuable as cows was something else. The economic returns are inviting, because a cow can produce only about one calf a year and this takes her out of production for a good part of that time. But if the ova of a blue-blooded cow could be transferred to wombs of less valuable or even scrub cows, a superior cow might have as many as 20 calves a year without actually going through the long process of pregnancy herself.

Two serious attempts have been made to give this ova transplanting a serious trial in cows. Success came first to the University of Wisconisn research joined in by the U. S. Department of Agriculture's Bureau of Dairy Industry and the American Foundation for the Study of Genetics in which there is participation by the American Breeders Service, largest cattle artificial insemination organization.

In Texas there is also an extensive application of ova transplantation to cows by the Southwest Research Institute founded by Texas oil man Tom Slick, Jr. Working with cattle of both the beef and dairy types, the cattle ova transplantation is under the supervision of Dr. M. C. Chang, a young Chinese scientist on leave from the Worcester Foundation for Experimental Biology, who has specialized upon mammalian eggs and their transplantation. This program until recently was in charge of Raymond E. Umbaugh, who worked on this problem even when a pilot in World War II.

With cows it is not nearly so simple, as it is with rabbits. The rewards for a successful method are larger but the bigger animal is harder to handle and the failures are more costly. Nature arranges it so that a cow produces only one ovum each 35 days and it is difficult to find and extract. The scientists get around this by injecting pituitary extract that brings about super-ovulation with something like 25 ova produced at the same time. But these eggs are seemingly not so strong as ordinary ones. The calves produced too often die before birth.



BIOLOGICAL IMPOSSIBILITY?—This gray rabbit actually gave birth to these three white albino young. Ova transplantation made her a mother by proxy. Fertilized eggs taken from an albino doe were transferred to the Dutch pattern gray rabbit.

There is potentially a revolution for stock breeders in the making, although the experts warn that the cattle ova transplantation work is a long way from practical application just now. The farmer is going to benefit from the egg transfer method of birth by what the geneticists learn about fertility and other biological factors in applying it experimentally.

Transplant Ovaries Also

Why be content with transferring mere eggs from mother to proxy mother? Transplantation of the whole female sex organ, the ovaries, has been accomplished in the dog, with the result that one breed of dog can become the proxy mother of puppies unrelated to her. Dr. Leon F. Whitney, a geneticist-veterinarian of Orange, Conn., has done this. There are interesting possibilities in this technique, aside from the question of how to register the pure-blooded puppies whelped by a foster mother.

Working with Dr. Harry S. N. Greene of Yale, Dr. Whitney found that worn-out ovaries of older dogs were actually rejuvenated when transplanted to a young dog. A champion dog might have puppies by this method years after she herself is dead.

Applied to human beings, this ovary transplantation suggests that a young woman could give a new vigor and span of usefulness to an old woman's sex organs and give birth to the older woman's children.

Less radical would be the application to human beings of the egg transplantation method. Women who cannot have children because they are infertile might undergo ova transplantation and experience a foster motherhood in this way. Or women who want children of their own heredity and desire to dodge the burden of childbearing and birth could arrange to have some willing female receive and nurture her hereditary progeny. The process would be more complex scientifically and practically than the artificial insemination that is now used among humans under medical supervision.

But this is only natural. The female is more complex than the male so far as reproduction is concerned. Biologically, the woman has more hereditary burdens than the male of the species.

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MILITARY SCIENCE

Sniperscope Spots Enemy

➤ AMERICAN SOLDIERS in Korea are seeing prowling enemies in the darkness of night with the same device with which they saw prowling Japanese during the latter part of the war in the Pacific. It is the so-called sniperscope, a rifle attachment which reveals the prowlers by invisible infra-red radiation.

The sniperscope being used in night-fighting in Korea today is an improved type, details of which are not revealed. But the Army has disclosed that it is now standard equipment for infantry divisions in Korea and that it is in quantity production. It operates, however, on the same general principles as the older models.

The night-fighter using the sniperscope carries a six-volt battery and vibrator on his back which powers the device. On the gun is a tube in which infra-red radiations are generated and beamed to the front in the direction in which the rifle is pointed. These infra-red, or heat rays, are reflected back from an object encountered just as ordinary light rays are returned, making the object visible.

The returning infra-red rays are invisible, but they are picked up by a telescope on the barrel of the weapon and passed into a tube in which the invisible image made is converted into one that is visible. When the infra-red rays strike the image tube, electrons are released which are in direct proportion to the intensity of the rays. These electrons pass to a fluorescent screen, producing a visible image.

A version of the sniperscope called a snooperscope was used during World War II attached to helmets of soldiers or to trucks to enable drivers to detect obstacles in the path ahead. It was also used to detect enemy tanks and other war equipment at night. The Nazis had a detection device of the same sort. It was called a "heat-eye tube," and was used in trucks and tanks but never refined, as far as is known, for use as a rifle or helmet attachment for use of the foot soldier.

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INVENTIONS

Patented Device May Oust Honybee as Pollen Carrier

➤ THE HONEYBEE may lose its job in carrying pollen from one blossom to another in the fruit orchard, replaced by a man-operated device which can spray pollen gathered from a selected tree to the blossoms on others.

To use the device, the operator does not need to climb the tree being pollinized. The sprayer is at the end of a pole, so that pollen can be distributed without leaving the ground. A blast of air, either from a manually-operated bulb or from a compression tank, dispenses the pollen from a container on the tubular device. Inventors are Ira A. Marchant and Edwin P. Johnson, Oroville, Wash., and the patent is 2,548,487.

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