

Comments and Communications

Successful Transplantation of a Fertilized Bovine Ovum

SINCE Heape (*Proc. Royal Soc. [London]*, 48, 457 [1890]) first demonstrated that fertilized rabbit ova could be transplanted and young obtained, successful transplantations have been made by other workers with mice, rats, rabbits, and sheep. Umbaugh (*J. Vet. Research*, 10, 295 [1949]) and Dowling (*J. Agr. Sci.*, 39, 374 [1949]) have reported unsuccessful attempts with the bovine. This paper is to report what the authors believe is the first calf developed from a transplanted bovine embryo and carried to term. This is the one successful case out of three we have attempted.

The donor was a yearling heifer, one fourth Short-horn and three fourths Holstein, and solid black except for a few white spots on the body and head. The sire was a purebred Holstein, and the recipient was a grade Holstein yearling heifer, and each had characteristic white feet and switch. Prior to transplantation, the estrual cycles of donor and recipient were synchronized by daily injections of progestationally active concentrate furnished by the Glidden Co. (Christian and Casida, *J. Animal Sci.*, 7, 540 [1948]). The donor was superovulated by administration of sheep pituitary gonadotrophins (Willett *et al.*, *J. Animal Sci.*, 7, 545 [1948]), and she was inseminated on the day she received the intravenous injection and again the next day. On the fifth day following the intravenous injection she was slaughtered and the reproductive organs were removed. The fertilized ova were washed from the upper ends of the uterine horns with homologous blood serum approximately 1 hr later. The recipient, which had been in heat 5 days previously, but not inseminated, was anesthetized and a mid-ventral laparotomy performed. The uterus was exteriorized, and a single 8-celled ovum inserted into the lumen of the right horn near the tubo-uterine junction; this was done by puncturing the wall of the uterus with a glass micropipette. At intervals throughout pregnancy the corpus luteum was palpated in the left ovary and the fetus in the right horn. A heifer calf was born 278 days following the intravenous injection of the donor. The calf weighed 84 lbs the day following birth and had black feet and switch. Blood types were determined for the recipient, the sire, and the calf. Three antigenic factors (A, W, and S at three different loci) were carried by the blood cells of the calf that were not carried by the recipient or the sire. The blood of the donor was not studied.

The improbability of fertile sperm being introduced with the ovum into the recipient because of the 4-day interval from last insemination of the donor to transplantation, the further improbability of the egg of the recipient being fertilizable 5 days after her heat period, the position of the fetus in the uterus in re-

lation to the corpus luteum, the color markings, and the blood-type analysis all indicate that the calf developed from the transplanted ovum.

It is believed that this technique, with improvements, may be valuable in the study of certain fertility problems in cows where a question of normality of the ovum vs. normality of the genital tract is involved.

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Two Points of View

WE HAVE read the moving letter of Barbara J. Bachmann (*Science*, 112, 364 [1950]) and would like to express our complete agreement with her stand on the issue of the freedom of scientific inquiry. We hope that her courageous action in sacrificing personal gains for the concrete expression of her convictions will serve as an example for the many others of us who feel as she does.

The question in this case is not one of the undeniable necessity of the government to protect classified information. The question here is clearly one of "... political orthodoxy to sanction the position of individuals in all fields of thought and action. . . ."

As was mentioned in a recent magazine article, we should never lose sight of the fact that freedom of thought "... is not a phrase to wind up an oration, or an hierloom to be put aside for safekeeping until good times return. . . ."

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SCIENCE for September 29, 1950, contains a well-expressed and courageous protest against applying a political test to holders of government fellowships for nonsecret work. The crux of the matter is in the protestor's statement, "I think that a law barring from support for scientific training or research persons with particular political views can serve no purpose favorable to the advancement of science." In a world at peace this truth would be self-evident.

But the world is not at peace. Unhappily for science and for free thought generally, events have forced us to observe that, in today's world, the person whose political views are derived from Karl Marx is in practice indistinguishable from one who believes in advancing the military aims of imperialist Russia. If the Marxists were simply another political party, willing to abide by the election returns, like the Republicans or the Prohibitionists, it would be different. The whole country, scientific or not, ought to protest the denial of privileges to anyone because he happened to be, say, a Dixiecrat or a Socialist. But adherence to a party that takes orders from an admittedly belligerent foreign power is not just a "particular political view;" it may be, and sometimes is, membership in the army of a self-confessed enemy of scientific and civil freedom. The Russian Empire is at present fighting a bitter, though as yet undeclared and limited, war against the non-Russian world. This war has already included siege operations in Germany, combat in Korea, and conquest and looting in Hungary. Hardly anyone doubts that it would become a declared and unlimited war the day Russia's rulers decided that the odds for a quick victory had risen high enough. It is a lamentable fact that good scientists have secretly given aid to Russia in this war. I believe most of them did it because of a sincere conviction that Marx was right and that victory for those who fight in his name would be a good thing; I cannot believe that they uphold the military ambitions of the Politburo or that they favor its methods of slavery and terrorism. But by their actions they have approved these methods and furthered these ambitions. It would be foolish for the citizens of a nation under attack by the Politburo to subsidize individuals sympathetic with such attacks, and who, as some have done, may even help Russia overtly against their own country.

Suppose, as an analogy, that in 1941 Fritz Kuhn, former Nazi leader in America, had applied for a grant of money from the government for scientific training. Does anyone contend that Kuhn's political views—he was a member of the National Socialist German Worker's Party—would be irrelevant in the matter, and not a just cause for denying him the funds?

From a broader point of view, it is obvious that war brings more serious dangers to science and to civil liberty than those resulting from political discrimination in passing out government money. Drafting a civilian to be shot at, or even telling him how he may or may not earn his living, is a far worse threat to freedom than withholding aid out of public funds from people sympathetic with the enemy. There is a difference in kind here, as well as in degree; whereas the one is only failing to confer a special privilege—which is necessarily quite limited anyway—the other is universal use of coercion. History is full of examples of arbitrary powers assumed by governments in wartime and never given up afterwards. Let those who love freedom, in science as well as in ordinary life, resist wartime attacks on liberty whose purpose is not to

damage the enemy but to strengthen the government. They will have plenty to do, and they will be striking far more telling blows for the freedom of science than when they advocate public support of pro-Russian scientists.

When a workable peace is established, and men may earn their livings and criticize authority as they please, and episodes like the Lysenko-Michurin persecution are impossible, it will be of no consequence whether a scientist believes in Karl Marx, Adolf Hitler, or Calvin Coolidge. In the meantime, unhappily, we fight a defensive war for scientific and other freedoms. The most tragic phase of this war is that we must distrust, defy, and murder the human beings who fight under the other flag, for no other purpose than to keep them from murdering those who fight under our own. While this dark savagery continues, science will suffer. I do not believe it will suffer any worse because we citizens do not tax ourselves to keep and train the enemy's soldiers.

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Perfection None Must Hope to Find

I HAVE read with great interest the two recent communications to SCIENCE regarding my review of Dr. Pauli's new textbook, *The World of Life*. The letters of Drs. Breland and Laubenfels have confirmed my fear that I have been unfair in reviewing Dr. Pauli's book. It was my responsibility, I believe, to judge the book at least partly in terms of its ability to meet the needs of the average or typical college course currently being offered. Instead I evaluated it in terms of an ideal college biology course, which exists nowhere, to my knowledge, but in my mind. Nevertheless, I am glad that my review has raised, to use Dr. Breland's words, "several fundamental issues relative to the teaching of general biology and the subject matter that should be included in a textbook for such a course." With the permission of the editors of SCIENCE, I should like to say a few words on these issues.

When I think of a general biology course at the college level, I think of a one-year course given to all liberal arts and sciences students regardless of their choice of career. Its goal would be to help raise the college student to such a level that he may clearly see our present general position in biology, as well as the horizons where the answers are not readily forthcoming and where, indeed, the questions are not simple or very easy to formulate.

In a general course I do not think we need to cover all the roads that have been traveled in the biological sciences and examine all the theories, all the observations, all the catalogues of data and systems of fact, all the experiments and their results. The college student, who may have no further direct contact with the study of life than the course I am