were recovered from the uteri 4 days after mating shrank in serum within 15 min at 30° C, but none of the large 6-day-old blastocysts shrank under this condition. It seems that 4-day-old blastocysts are more delicate than 6-day-old ones.

TABLE 2

DEVELOPMENT OF TRANSFERRED RABBIT OVA OR BLASTOCYSTS AT DIFFERENT AGES AND AFTER STORAGE AT 10° C FOR 1 DAY*

Age of ova in days	Ova transferred	Recipients used	Recipients pregnant	Young obtained	% Development of all ova transferred	Site of recovery and transfer
1	239	24	21	130	54	From tubes
Stored	94	7	4	35	37	to tubes
2	76	7	5	17	22	From tubes to uteri
3	132	11	5	41	31	From tubes
Stored	103	7	6	38	37	or uteri to uteri
4	167	17	13	71	43	From uteri
Stored	138	8	7	26	19	to uteri
6	50	7	6	21	42	From uteri
Stored	28	5	4	12	43	to uteri

* Transplantation at the corresponding stage of ova and corpora lutea.

In order to show the probability of normal development of transferred ova or blastocysts at different stages, and after low temperature storage, the data published previously (*2*) and the data accumulated in a recent study on the development and fate of transferred ova in relation to the ovulation time of recipients (*3*) were pooled and are presented in Table 2. After direct transfer to the portion of the tract normal for a given stage, the percentage of transferred ova developing into young varies from 31% (3-day ova) to 54% (1-day ova), indicating no very great variation in transplantability from stage to stage. Although storage at low temperature may reduce the viability of transferred ova (e.g., 4-day blastocysts), this is not invariable, so that 24-hr storage under the conditions we have employed appears to have no markedly deleterious effect. The low percentage of development in the case of 2-day-old ova is probably owing to the fact that ova were recovered from the tubes but transferred to the uteri.

The development of transferred ova in rabbits (*5, 8, 9*), in rats (*6*), and in mice (*4*) has been reported. So far as the writer is aware, this is the first report on the successful transplantation of blastocysts at a late stage. Technically, the recovery of tubal ova and transplantation of ova to the tubes of recipients require delicate surgery, whereas the recovery of ova or blastocysts from the uterus and transfer to the uterus of a recipient can be performed without surgery in large farm animals. The present study demonstrates this possibility. These findings have an application in the experimental study of early development in mammals.

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Brucella Agglutinin-blocking Phenomenon in Bovine Sera[1]

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Recently Griffitts (*1*) demonstrated the existence of an agglutinin-blocking property, sometimes called "incomplete antibody," in sera from known cases of human brucellosis. His work was prompted by reports of Wiener (*5*), Race (*4*), Levine (*3*), and others on the agglutinin-blocking phenomenon in sera of individuals sensitive to the Rh factor, and by the absence of agglutinins in significant concentration in a number of individuals known to have brucellosis.

The agglutination test is probably the most extensively used diagnostic procedure in both human and bovine brucellosis. Its diagnostic usefulness in bovine brucellosis may be even greater than in human brucellosis, since certain critical titers have been established designating an individual animal as a reactor, suspect, or nonreactor. Therefore, the existence of agglutinin-blocking substances in bovine sera could be of considerable diagnostic—and economic—importance. Although this blocking phenomenon has been encountered in human brucellosis sera (*1*), reports of its occurrence in bovine sera have not appeared in the literature. The following experiments demonstrate the presence, in significant concentration, of such agglutinin-blocking substances in bovine sera.

A study of the agglutinating and agglutinin-blocking properties was made on the sera of animals of five bovine herds. Three separate tests were carried out on each serum at repeated intervals: First, a double-dilution tube-agglutination test with dilutions in 0.9% saline beginning with a dilution of 1: 2. The last tube contained no serum and served as a control. The total volume of serum dilution-antigen mixture per tube was 1.0 ml. Tubes were incubated at 37° C for 2 hr and read after remaining in the refrigerator overnight. Second, an agglutinin-blocking test, consisting of the addition to each tube in the tube-agglutination test of 0.1 ml of known complete *Brucella abortus* rabbit antibody in a dilution such that complete agglutination occurred in the saline controls after further incubation at 37° C for 2 hr and refrigeration overnight. Third, a rapid macroscopic agglutination test, with the

[1] Authorized for publication as paper No. 1545 in the Journal Series of the Pennsylvania Agricultural Experiment Station.

bacterial cells suspended in 12% saline, following essentially the method of Huddelson and Abell (*2*). The S-19 strain of *Brucella abortus* was employed in preparation of antigens and antisera.

Two of the five herds studied, consisting of a total of 36 animals, were considered clinically free of brucellosis. In addition, most of the animals had been previously tested at intervals for significant *Brucella* titers. Only one of the animals in these two herds had been previously vaccinated against brucellosis, and it showed a tube agglutination titer of 1: 256 and a rapid macroscopic titer of 1: 320. None of the remaining animals showed tube-agglutination or rapid-macroscopic titers of more than 1: 40, and none of the 36 sera possessed agglutinin-blocking properties.

TABLE 1

AGGLUTININ AND AGGLUTININ-BLOCKING TITERS* IN NINE SELECTED BOVINE SERA

Animal	Tube-agglutination titer		Blocking titer		Rapid-macroscopic titer
	Complete	Partial	Complete	Partial	
R1	0	8	32	128	640
R2	0	0	128	256	640
R5	0	0	1024	4096	640
R17	0	0	128	0	640
R18	0	0	128	256	640
R37	0	0	128	512	640
R38	0	0	256	1024	640
R40	0	16	128	1024	640
S3	0	0	32	0	640

* Expressed as reciprocals.

Three of the five herds, consisting of a total of 52 animals, had never been vaccinated or tested and were considered to be clinically "suspicious" of harboring *Brucella*-infected animals. Twenty-four of the 52 sera showed tube-agglutination titers greater than 1: 40; 35 showed rapid-macroscopic titers greater than 1: 40; and 33 showed agglutinin-blocking properties. It was of particular interest that nine sera which had negative or diagnostically insignificant titers by the tube-agglutination test possessed considerable agglutinin-blocking properties as well as high rapid-macroscopic titers. These results are shown in Table 1.

These results indicate that a significant number of sera from animals in bovine herds where brucellosis is clinically suspected may show negative or very low tube-agglutination titers while possessing agglutinin-blocking properties to a considerable degree. Furthermore, such sera have demonstrated high rapid-macroscopic titers. In this study, no sera were encountered which showed agglutinin-blocking titers, or "incomplete antibodies," which could not be detected by the rapid-macroscopic test. This apparent advantage of the rapid-macroscopic test over the tube-agglutination test would seem to be of practical importance. Further studies are being made to account for the detection of "incomplete antibody" by the rapid-macroscopic test.

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Water Absorption from the Atmosphere by Plants Growing in Dry Soil[1]

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The lower mountain slopes of southern California are blanketed by a cover consisting largely of brush. In some areas, however, Coulter pine (*Pinus Coulteri*) makes up an essential part of this cover. Both the brush species and the pine have one striking common characteristic, an ability to survive long periods of drought on shallow soils which are often at the permanent wilting

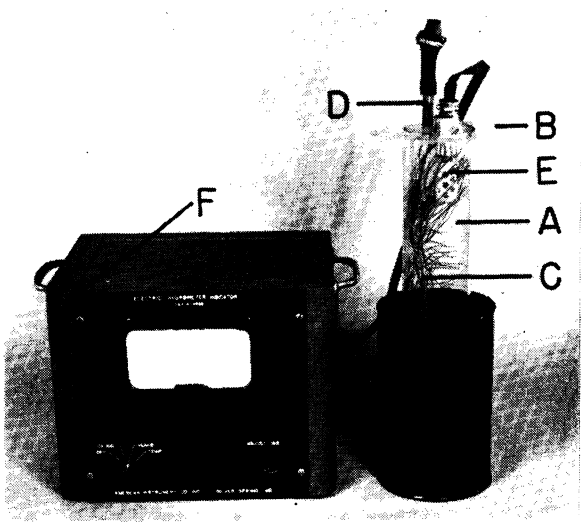

FIG. 1. Apparatus for measuring "negative" transpiration. A, chamber. B, chamber cover. C, Coulter pine seedling. D, brass pipe. E, Amico-Dunmore unit for temperature-humidity sensing. F, microammeter.

point for several months during the late summer. Unpublished lysimeter studies on the San Dimas Experimental Forest in southern California indicate that these plants can survive even on soils below the permanent wilting point as determined by the method of Briggs and Shantz (*1*). Fowells (*2*) worked with another species of pine, *Pinus ponderosa*, and reported that it also survived

[1] This work was carried out as a cooperative project between the California Forest and Range Experiment Station, which is maintained by the Forest Service, U. S. Department of Agriculture, in cooperation with the University of California at Berkeley, and the California Institute of Technology, Pasadena, California.