

Applying this to the mixed condenser curves (p. 219) of Bonnardel and Goudchaux<sup>6</sup> the upper minimum is with a capacity of about 1 mfd. Therefore  $k = 1/1 \times 10^{-6} \times 13 \times 10^3 = 77$ ,\* approximately, which is 5 to 9 times as great as those in Table I.† These excitabilities are not greatly different but with other data (p. 218) 2 curves have their higher minima at about 0.1 and 0.5 mfd., respectively, giving  $k = 700$ \* and 150, approximately. These values are considerably greater than those in Table I but the data are not very extensive and their validity is not so certain as that of the others (p. 219, data above).

It is concluded from these considerations that the excitatory process in the slowly reacting muscle of the leech is of the same type as that occurring in highly excitable tissue<sup>5</sup> and that while the excitability as usually determined is about 10 there are others considerably greater. It is not established that these higher excitabilities are from nerves but it does not seem likely that the muscle itself would show such a range with wire electrodes.

## 8451 C

### Parabiotic Twins as a Means of Determining Cellular Individuality.\*

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It has been shown<sup>1</sup> that a division of species-specific substances of the erythrocytes of Pearlneck (*Spilopelia chinensis*), not present in those of Ring dove (*Streptopelia risoria*), is found in the progeny of male hybrids backcrossed to Ring dove. Individual differences in the cells of these backcross birds make reasonable the conclusion that many different heritable cellular components distinguish Pearlneck from Ring dove. It seemed opportune to test whether or not

\* Condenser chronaxie is  $2/k = 0.026$  sec. and  $0.0028$  sec., respectively.

† The lower minima in these mixed curves are not well defined but it is indicated that they correspond to excitabilities like those of the simple curves in Table I.

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<sup>1</sup> Irwin, M. R., and Cole, L. J., *J. Exp. Zool.*, in press.

a successful "take" of parabionts in backcross hybrids depends, at least in part, upon the relative number of such Pearlneck substances in one member of the pair as contrasted with their absence in the other. The appearance of antibodies would presumably be due to reciprocal immunization, since to date no isoagglutinins have been observed within the Ring dove species nor in the backcross hybrids.

Accordingly, several unions of backcross hybrids, of various ages and in different backcross generations, were made by one of us, (R.T.H.). Kozelka<sup>2</sup> made parabiotic pairs of very young chicks by a metatarsal union. In our experiments a considerably different technique was used. If the birds to be operated on were under a week old, a thorough chilling in an ice box proved an excellent anesthetic, which reduced blood flow to a minimum, and allowed a rapid recovery. In older birds (young adults) sodium amytal, supplemented with ether, was used as an anesthetic. The operative procedure herein described was for the older birds, being nearly the same for young ones.

The feathers were plucked from each of the wings which were to be united. A ligature was put around the axillary artery in the proximal axillary region, the vessel being easily visible externally. The ligature was put on in such a way as to make subsequent removal easy. The radius and ulna, and their attendant muscles, were next dissected from the humerus, followed by the removal of skin and muscles from the dorsal side of one wing and the ventral side of the other wing. The periosteum was scraped from the bare humerus. The wings were then overlapped, so the 2 humerus bones were in contact, the distal end of one lying next to the proximal end of the other. The 2 bones were then securely fastened with silk, and the overlying skin sutured with silk. The ligature on the axillary artery was removed, making possible the establishment of a fairly good circulation. Only semi-sterile operative precautions were taken. The birds, obviously not able to fly, managed very well in getting around a cage and obtaining food. The tests to be described were made on a pair which had been parabionts for 64 days.

The birds were bled separately, and reciprocal agglutinations by the serum of each were made with their cells, as shown in Table I. The serum from 510H agglutinated the cells of 532B at a higher dilution (24) than did the serum of 532B with 510H cells in the reciprocal test, although there was definite clumping of the cells of 510H by the serum from 532B. These tests show definitely that there were cellular differences between the 2 birds, and also establish the fact of a blood interchange.

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<sup>2</sup> Kozelka, A. W., *Anat. Rec.*, 1929, **44**, 209.

TABLE I.  
Tests for reciprocal immunization of parabionts.

Serum	Absorbed by cells of	First Serum Dilution	Agglutinations of cells of:			
			510H	532B	Pearlneck	Ring dove
510H	—	3	0	4	+4	3
532B	—	3	2	0	±	+
Anti-Pearlneck	Ring dove	180	≡	4	+8	≡
Anti-Ring dove	F <sub>1</sub> <u>Pearlneck</u> Ring dove	45	4	±	0	+4

Symbols: ≡ = doubtful clumping; ± = very faint trace; + = faint trace. The numbers signify the highest serum dilution (by halves) at which definite agglutination was observed under the microscope (*i. e.*, if 1 = 180; 4 = 1440, and 8 = 23,040).

The reactions with Pearlneck antiserum absorbed by Ring dove cells, and with Ring dove antiserum absorbed by the cells of the hybrid between the 2 species, show that the cells of 532B and 510H were characterized, respectively, by specific Pearlneck and specific Ring dove constituents which were not present in the cells of the co-twin. Further, since the serum from each parabiont agglutinated the cells of both Pearlneck and Ring dove, it would seem that cellular differences were present other than those particular to each of the 2 species.

*Summary.* Each member of a pair of parabiotic twins developed antibodies against the red cells of the other.

## 8452 P

### Augmentation of Ovary-Stimulating Action of Gonadotropic Preparations.\*

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A "prolan-like" substance in the urines and blood sera of different mammals which has little or no action by itself, but which was augmented or "synergized" by the gonadotropic action of an hypophyseal extract has been reported by Evans, Simpson and Austin.<sup>1</sup>

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<sup>1</sup> Evans, H. M., Simpson, M. E., and Austin, P. R., *J. Exp. Med.*, 1933, **58**, 545.