

for hypersensitiveness was made 5 weeks after the first or sensitizing injection. The reaction was read 24 hours after injection, the width and breadth of the involved skin area being measured.

The results shown in the accompanying table indicate that there was a distinct variation in the reactions on the flank and abdomen in every animal, those on the flank being larger than those on the abdomen. Furthermore, in 8 of the 12 guinea pigs and in 4 of the 9 rabbits, there was practically no reaction in the abdominal area in contrast to the definite flank reaction in each case. Besides the difference in the size of the reaction, most of those on the abdomen were macules, while those on the flank were for the most part papules.

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A Case of Hybrid Vigor in the Albino *Mus Musculus*.

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Two strains of mice, both albino *Mus musculus* and here designated as H T M and E L T M, are known to differ in the number of tail-rings as previously reported (Fortuyn¹). They also show differences in the number of young per litter which the mother, in the absence of the father, is able to raise to an age of one month. In each strain this has been tested in the offspring of a single pair so as to reduce variability. Table I gives the size of the litters. In 45 first litters of H T M the average number of young which lived

TABLE I.

Mother x father			Litter No.	Total Number of litters, one month old, with the following number of young.												
				No. of litters	0	1	2	3	4	5	6	7	8	9	10	11
same mothers	{	H T M x H T M	1st	45	5	0	4	6	3	9	4	7	6	0	1	
		H T M x H T M	2nd	28	2	0	1	1	3	9	2	4	2	2	1	1
	{	E L T M x E L T M	1st	32	18	3	1	4	2	1	2	1				
		E L T M x E L T M	2nd	39	19	8	0	2	3	2	3	2				
	{	H T M x H T M	1st	26	2	0	3	4	1	6	1	4	4	0	1	
		H T M x E L T M	2nd	26	1	0	0	0	1	2	2	7	9	3	1	
	{	H T M x E L T M	1st	26	1	0	2	2	4	3	4	4	3	3		
		H T M x H T M	2nd	26	2	0	1	1	3	8	2	4	2	1	1	1
	{	E L T M x H T M	1st	15	2	2	2	1	0	2	3	1	1	0	0	1
		E L T M x E L T M	2nd	15	6	4	0	1	1	1	0	2				

¹ Fortuyn, A. B. D., PROC. SOC. EXP. BIOL. AND MED., 1928, **25**, 543; *Genetics*, 1931, **16**, 160.

with the mother to an age of one month is 4.75 ± 0.48 (mean error). For 28 second litters this figure is 5.60 ± 0.48 . In 32 first litters of E L T M the average number of young, one month after birth, is only 1.53 ± 0.37 , in 39 second litters it is 1.74 ± 0.37 . The differences with their mean errors amount to 3.22 ± 0.53 for the first litters and 3.86 ± 0.60 for the second, and are therefore statistically significant in both cases. This difference in fecundity is explained by the fact that in H T M only 5 first litters and 2 second ones are completely destroyed by the mother, whereas in E L T M these figures are 18 and 19. Moreover, in those cases where the litter is not completely destroyed, more young survive in H T M, which may have litters of 10 and 11 young than in E L T M which never had litters of more than 7 young. No observations have been made on the question of whether death occurs shortly after birth through the inability of the young to suck, or because the mother has no milk, or kills the young independently from either condition.

These 2 strains were crossed. In the first instance 26 H T M females were given H T M males as fathers of their first litters and E L T M males as fathers of their second litters. Another group of 26 H T M females were crossed with E L T M for the first litters but mated with H T M for their second litters. All mothers were of approximately the same age. All the resulting litters, therefore, are as strictly comparable as possible. The average number of surviving offspring at the age of one month for the pure H T M first litters is 4.92 ± 0.50 and for the second litters 5.50 ± 0.50 . For the hybrid litters the average number is 5.53 ± 0.45 for the first and 7.07 ± 0.38 for the second litters. For the first group of mothers with pure first litters and hybrid second ones, the difference in the number of surviving young is 2.15 ± 0.62 and therefore significant. In the second group the advantage which the second litter usually has over the first one is completely balanced by the fact that the first litter is hybrid and the second one pure.

For E L T M mothers less complete figures are available. 15 E L T M mothers raised on the average 4.20 ± 0.80 young per litter to the age of one month in their first litters when H T M mice are the fathers, but these same mothers raised only 2.00 ± 0.63 young in their second litters when E L T M mice were the fathers. If the hybrid first litters are compared with the pure first litters of the strain in general again a significant difference is found (2.67 ± 0.88). Another remarkable fact is that, whereas the largest observed litters of E L T M were of 7 young, among the 15 hybrid litters one contained 8 and one 11 young.

So-called hybrid vigor, or heterosis, usually finds its expression in physical strength, in fertility, or in longevity, in which characters the hybrids surpass both parent strains. In the case of the mice described above no difference in size has been noticed and about the duration of life nothing is known, but there is no doubt that a cross between the 2 strains gives more viable young than either one of the pure strains. The birthrate in this case has not been studied, because, especially in the case of E L T M where the mothers destroy so many young, it would require the closest observation to state accurately how many young are born. On the other hand the observation as to how many survive with the mother one month after birth is easily made. Hybrid vigor certainly does not occur in all crosses between mice and the term is used for a variety of phenomena. Most often the explanation is lacking but sometimes hybrid vigor is explained by the fact that genetical factors which promote each other are combined in the hybrid. A more complete analysis will be necessary to understand the case reported here.

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A Simplified Technique for the Study of Pneumococcus Growth Inhibition.

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Various techniques have been employed to determine the pneumococidal power of serum, plasma or whole blood of naturally or artificially immune animals. Robertson and Sia¹ used serum-leucocyte-cocci mixture placed in small paraffin corked tubes and agitated during incubation in a manner simulating the circulating blood. The procedure is complex and time-consuming. Bull and Tao² claimed that whole blood prevented from coagulation by sodium citrate served just as well as the serum-leucocyte mixture in demonstrating the pneumococidal property of the sera of chicken and immune rabbits and that agitation was not necessary as shown to be important by the former workers. The present report deals with the results obtained while looking for a simplified technique of the original method.

¹ Robertson, O. H., and Sia, R. H. P., *J. Exp. Med.*, 1924, **40**, 467.

² Bull, C. G., and Tao, S. M., *Am. J. Hyg.*, 1927, **7**, 648.