in which three generations were trained. Probable errors have been calculated for these larger groups.

The main feature shown by the table is the variability in the direction of the differences between successive generations. The summaries show that these differences, when combined, are nearly cancelled out and that whatever differences remain are too small to be significant. In other words, children from trained parents, or from trained parents and grandparents, take as long to learn the maze habit as the first generation trained.

Among various other criteria that have been studied may be mentioned, (1) the number of trials before the first trial in less than 10 seconds, (2) the number of trials before the first trial in less than 24 seconds, (3) the number of trials before the first perfect trial (the perfection being based on the course taken, irrespective of time). Each criterion gives the same conclusion, *i.e.*, in no case is found a significant difference between averages for different generations. This agreement indicates that the results do not depend upon the criterion chosen.

A parallel experiment was reported by Bagg,[3] who trained a pair of albino mice and their inbred descendants in a simple maze. The findings may be illustrated by the average time per trial for each of the first five generations, namely: 15, 60, 23, 74 and 66 seconds. These results are in full accord with those given above; they indicate that the training of the ancestors did not facilitate the learning of the descendants.

TABLE I

AVERAGE NUMBER OF TRIALS BEFORE AND INCLUDING THE FIRST TWO SUCCESSIVE TRIALS IN LESS THAN 20 SEC.

Generations trained	I	II	III
Strain A fam. 569	13.9 (8)	17.6 (13)	.....
572a	11.1 (7)	12.6 (8)	12.7 (10)
572b	.....	11.6 (5)	15.7 (11)
573a	17.1 (7)	11.7 (6)	12.5 (2)
573b	.....	11.2 (4)	13.5 (2)
Strain B fam. 575	14.7 (8)	12.5 (10)	.....
Strain C fam. 580a	11.1 (8)	12.3 (6)	9.6 (5)
580b	.....	15.5 (6)	12.3 (6)
Strain L fam. 605a	17.6 (23)	14.5 (14)	.....
605b	16.0 (17)	17.2 (14)	.....
All strains with 2 gens., trained	15.32 ± 0.35	14.41 ± 0.42	
	Diff. 0.91 ± 0.55 D/PE 1.6		
All strains with 3 gens., trained	13.26 ± 0.53	13.95 ± 0.56	13.16±0.63
	Diff. I–II 0.69 ± 0.77 D/PE 0.9		
	Diff. I–III 0.10 ± 0.82 D/PE 0.1		

E. C. MACDOWELL

CARNEGIE INSTITUTION,
COLD SPRING HARBOR,
LONG ISLAND

[3] Bagg, H. J., 1920, *Archiv. Psychol.*, No. 43.

THE NON-INHERITANCE OF THE EFFECTS OF TRAINING

THE experiments reported here deal with four successive generations of mice (247 animals) trained in a simple maze. The proficiency of the parents was known in each case. The results are based on the complete history of each individual.

The effects of the training are recorded in terms of the reaction time (seconds) and the number of perfect trials (in which the mouse makes no wrong turns) in 12 successive trials (one trial a day). Each individual was trained separately at the same age and with the same technic. For each trial the animal was placed in an ante-chamber shut off from the maze by a glass door. Opening this door was the signal for the mouse to make its way through the maze and find its food.

TABLE I

AVERAGE REACTION TIME PER TRIAL PER MOUSE

Generation	Seconds per trial	Number individuals
1	53.0	62
2	44.5	113
3	72.8	58
4	58.9	14

Tables I and II give the results of training in the first generation and three generations of descendants produced by inbreeding. Table I gives the average time per trial per individual, and the number of individuals trained in each generation. Table II gives the total number of perfect trials per individual in 12 trials. In considering the number of perfect trials, the number of mice that failed to make one perfect trial should be taken into account. So in the next column is given the percentage of individuals not making perfect trials during the 12 trials. In the third column is given the average number of trials before the first perfect trial was made, including only mice that made at least one perfect trial. The number of mice in each generation in this table is the same as given in Table I.

TABLE II

NO. PERFECT TRIALS; 12 TRIALS PER INDIVIDUAL

Gen.	Number of perfect trials	% Individ. failed	No. trials before 1st p. t.
1	1.27	37%	6.9
2	1.60	53%	6.0
3	0.94	58%	6.5
4	0.64	71%	3.0

It seems clear that the later generations have not been aided in learning the maze by the training of their ancestors.

E. M. VICARI

ZOOLOGICAL LABORATORY,
COLUMBIA UNIVERSITY