and consequently was not subjected to very great daily range of temperature and humidity. Moreover, since each trial lasted only a few minutes, the fluctuations of temperature and humidity during that time were too small to be regarded as interfering with the experiment.

The platform on which the insects were liberated was divided into quadrants. The quadrant lying between N.E. and N.W. was designated North; that lying between N.W. and S.W. was designated West; that lying between S.W. and S.E. was designated South; that between S.E. and N.E. was designated East.

Although the chamber was not completely lightproof, the intensity of the internal electric light was greater than that of the diffused light of the room, and as a result, the electric light was the only effective illumination within the chamber. There was no horizontal illumination gradient.

The insects found to be most suitable for the experiment were those which were fairly active.

To test the reaction of the insects to the apparatus without any current flowing, a locust nymph (*Schistocerca gregaria*), measuring about ¾" long, was liberated in the centre of the platform facing N. It was free to wander over the platform until it reached the edge, when it was collected, and its final position was noted. It was then replaced in the centre facing another direction. The insect was liberated 20 times facing each of the directions N., S., E. and W. In half the trials, the insect was introduced from the W. side, and in half from the E. side, lest the insect be influenced by the mode of entry.

Results.

Table 29 shows the results of the experiment. When the insect was started facing North, it finished up facing North in 16 cases, facing East in 3 cases, and facing West in 1 case.

TABLE 27.

Control experiment to test the response of a Locust nymph to the apparatus for testing reactions to a magnetic field, when no current was flowing.

		Final direction: N.	S.	E.	W.	Total
Initial direction:	N.	16	—	3	1	20
	S.	—	17	—	3	20
	E.	2	3	13	2	20
	W.	—	10	—	10	20
Total .		18	30	16	16	80
	χ^2	0·2	5·0	0·8	0·8	6·8

When it was started facing South, it finished up facing South in 17 cases and West in 3 cases.

When it was started facing East, it finished up facing North in 2 cases, South in 3, East in 13 and West in 2 cases.

Finally, when it was started facing West, it finished up facing South in 10 cases and West in 10.

The final directions were :—North 18, South 30, East 16, West 16 : total 80.

Despite the somewhat large value for χ^2 in the column "Final Direction South," the total χ^2 of 6·8 is not significant even at the 0·05 level.

It appears then that when the initial directions were evenly distributed the final directions were also evenly distributed, and that the insect tended to continue moving in the direction in which it was started.

In the second experiment, four similar locust nymphs were liberated simultaneously from a glass tube in the centre of the platform. They were free to move to the edge of the platform, where their final position was noted. There were 40 trials with the current off, and 80 trials with the current on, *i.e.* 20 trials with the N. Pole of the magnet pointing in the direction of each of the four cardinal points of the compass. This number of trials allowed for an even distribution of the initial direction of the insects. The results and summary are shown in Table 28.

TABLE 28.

Direction of movement of Locust nymphs in a magnetic field.

Current off								Current on															
								N. Pole to N.				N. Pole to S.				N. Pole to E.				N. Pole to W.			
N.	S.	E.	W.	N.	S.	E.	W.	N.	S.	E.	W.	N.	S.	E.	W.	N.	S.	E.	W.	N.	S.	E.	W.
1	1	0	2	0	0	1	3	1	2	1	0	1	1	0	2	1	0	2	1	1	0	1	2
0	2	0	2	1	1	2	0	1	1	0	2	0	3	1	0	1	1	0	2	1	2	1	0
1	0	1	2	0	1	0	3	2	1	1	0	1	1	1	1	0	1	0	3	1	1	0	2
2	0	0	2	1	0	1	2	1	1	1	1	2	1	0	1	0	2	1	1	1	2	1	0
1	1	0	2	1	1	1	1	2	1	1	0	0	1	2	1	0	2	0	2	1	0	2	1
1	1	0	2	0	2	1	1	0	1	2	1	1	2	0	1	1	1	0	2	0	2	1	1
0	0	2	2	1	0	2	1	2	1	0	1	1	1	2	0	0	1	1	2	1	2	0	1
2	2	0	0	1	1	0	2	1	0	0	3	0	3	1	0	1	1	0	2	2	0	1	1
2	1	0	1	2	0	1	1	1	3	0	0	1	2	0	1	1	1	2	0	1	2	0	1
0	1	1	2	0	1	3	0	3	0	0	1	0	3	0	1	1	1	1	1	0	1	1	2
2	0	0	2	1	1	2	0	0	1	2	1	1	1	2	0	1	2	1	0	1	1	1	1
1	2	1	0	0	2	1	1	0	1	2	1	1	2	1	0	0	1	0	3	0	1	3	0
3	0	1	0	0	2	1	1	0	1	3	0	1	1	1	1	1	1	0	2	1	1	2	0
1	1	1	1	1	1	2	0	1	1	2	0	2	1	1	0	1	0	0	3	0	3	0	1
1	3	0	0	1	2	1	0	0	3	0	1	2	0	1	1	1	3	0	0	1	3	0	0
1	1	1	1	1	0	3	0	1	0	2	1	2	1	0	1	0	2	1	1	1	2	0	1
3	0	1	0	0	3	1	0	1	0	2	1	2	1	1	0	1	2	1	0	0	2	1	1
2	0	1	1	1	1	1	1	1	2	1	0	0	2	1	1	2	1	0	1	0	1	3	0
2	0	1	1	2	2	0	0	1	1	1	1	1	2	0	1	1	2	1	0	0	2	2	0
2	2	0	0	0	2	1	1	1	0	3	0	1	1	1	1	0	0	2	2	0	0	2	2
28	18	11	23	14	23	25	18	20	21	24	15	20	30	16	14	14	25	13	28	13	28	22	17

	N.	S.	E.	W.	N.	S.	E.	W.
Average	21	21	18	20	20	2·75	19	18·25
χ^2	0·1	0·03	0·4	0·03	0	1·5	0·2	0·61

Discussion.

From the experiment no evidence was forthcoming to suggest that these insects did appreciate or orientate themselves in relation to a magnetic field. If the insects could appreciate and respond to the effect of the magnetic N. Pole, they would have distributed themselves relatively the same in all positions of the N. Pole of the electromagnet with an uneven distribution among the four points N., S., E. and W. However, as far as the experiment shows, the insects moved without regard for the magnet's position, as can be seen from the insignificant values of χ^2 in Table 3.

Other insects, namely *Calandra granaria* and *Araecerus fasciculatus* adults, and *Tenebrio molitor* adults and larvae, were used, but in no case was there any suggestion that the insect could appreciate a change in the magnetic field.

These conclusions would appear to be consistent with the behaviour of migrant insects in nature. If migrating insects orientated themselves to the earth's field, they would undergo a cyclic shifting in their directions of flight