THE MORTALITY OF A HERD OF MICE UNDER "NORMAL" CONDITIONS

By M. GREENWOOD, W. W. C. TOPLEY and J. WILSON.

(*From the London School of Hygiene and Tropical Medicine.*)

FOR the purpose of assessing the effects of exposure to a special environment on a herd of mice, one naturally desires a control series, viz. a herd not exposed to a specific risk but otherwise *in pari materia* with our colonies under experiment.

In 1928 one of us (Greenwood) published a study of two sets of mice not exposed to specific risk. These were sufficient to demonstrate a wide difference between herd mortality under favourable and unfavourable conditions, but the objection could be taken that in neither instance was the environment precisely the same as that of our herds at the London School of Hygiene and Tropical Medicine. We therefore decided to observe over a necessarily limited period a herd recruited, housed and treated in precisely the same way as our infected herds save that infected animals were at no time introduced.

This experiment was begun on 4. x. 1929 by the assembling of 20 normal mice; from 5. x. 1929 to 7. x. 1929 one mouse was added daily and from 8. x. 1929 to 17. i. 1930 three mice were added daily. The experiment was brought to an end on 27. v. 1930. In all 329 mice were under observation; of these 56 died. In 41 of these dead mice an autopsy was performed, and no

Table I.

Cage age in days	Expectation of life, unlimited	Expectation of life, limited to 60 days	Probability of dying in the next 5 days	Cage age in days	Expectation of life, unlimited	Expectation of life, limited to 60 days	Probability of dying in the next 5 days
0	205·08	56·79	0·0182	105	124·76	58·96	0·0035
5	203·83	57·37	0·0031	110	120·19	58·99	0·0070
10	199·45	57·12	0·0062	115	116·03	59·27	0·0
15	195·69	57·05	0·0031	120	111·03	59·15	0·0035
20	191·30	56·79	0·0063	125	106·41	59·23	0·0
25	187·49	56·72	0·0063	130	101·41	59·09	0·0037
30	183·67	56·69	0·0222	135	96·78	59·17	0·0038
35	182·81	57·65	0·0162	140	92·14	59·23	0·0
40	180·78	58·30	0·0066	145	87·14	59·04	0·0
45	176·96	58·42	0·0033	150	82·14	58·84	0·0045
50	172·55	58·37	0·0067	155	77·51	58·92	0·0050
55	168·71	58·52	0·0034	160	72·87	59·03	0·0053
60	164·27	58·47	0·0034	165	68·24	59·20	0·0
65	159·82	58·44	0·0068	170	63·24	59·04	0·0
70	155·89	58·62	0·0068	175	58·24	—	0·0
75	151·93	58·81	0·0034	180	53·24	—	0·0
80	147·45	58·83	0·0	185	48·24	—	0·0074
85	142·45	58·64	0·0	190	43·59	—	0·0088
90	137·45	58·45	0·0103	195	38·94	—	0·0
95	133·85	58·86	0·0069	200	33·94	—	0·0106
100	129·76	59·12	0·0				

Table II. *Expectation of life, limited to 60 days.*

Cage age in days	Normal mice	Hill's mice (day 90 = day 0)	Murray's mice (day 0 = day 90)	Cage age in days	Normal mice	Hill's mice (day 90 = day 0)	Murray's mice (day 0 = day 90)
0	56·79	59·36	—	61	58·43	59·69	—
1	56·86	59·35	—	62	58·58	59·67	—
2	56·76	59·56	—	63	58·54	59·66	—
3	57·02	59·55	—	64	58·49	59·64	—
4	57·10	59·54	—	65	58·44	59·63	—
5	57·37	59·53	—	66	58·40	59·61	—
6	57·29	59·74	—	67	58·54	59·60	—
7	57·21	59·73	—	68	58·70	59·58	—
8	57·12	59·72	—	69	58·66	59·57	—
9	57·03	59·72	—	70	58·62	59·55	—
10	57·12	59·71	—	71	58·58	59·53	—
11	57·03	59·70	—	72	58·54	59·52	—
12	57·30	59·69	—	73	58·69	59·50	—
13	57·22	59·69	—	74	58·65	59·49	—
14	57·14	59·68	—	75	58·81	59·47	—
15	57·05	59·67	—	76	58·77	59·46	—
16	57·14	59·66	—	77	58·73	59·44	—
17	57·06	59·66	—	78	58·91	59·43	—
18	56·97	59·65	—	79	58·87	59·41	—
19	56·88	59·64	—	80	58·83	59·40	—
20	56·79	59·86	—	81	58·79	59·38	—
21	56·88	59·86	—	82	58·75	59·37	—
22	56·80	59·86	—	83	58·71	59·35	—
23	56·71	59·85	—	84	58·68	59·33	—
24	56·81	59·85	—	85	58·64	59·31	—
25	56·72	59·84	—	86	58·60	59·29	—
26	56·64	59·84	—	87	58·56	59·28	—
27	56·74	59·84	—	88	58·52	59·26	—
28	56·84	59·83	—	89	58·49	59·24	—
29	56·77	59·83	—	90	58·45	59·22	56·07
30	56·69	59·83	—	91	58·60	59·20	56·05
31	57·16	59·82	—	92	58·56	59·18	56·11
32	57·47	59·82	—	93	58·53	59·16	55·99
33	57·77	59·81	—	94	58·70	59·60	55·88
34	57·71	59·80	—	95	58·86	59·59	55·85
35	57·65	59·79	—	96	58·83	59·58	55·82
36	57·59	59·78	—	97	59·00	59·57	56·07
37	57·71	59·77	—	98	58·97	59·56	55·95
38	58·03	59·76	—	99	59·14	59·55	56·20
39	57·98	59·75	—	100	59·12	59·53	56·27
40	58·30	59·73	—	101	59·09	59·52	56·54
41	58·24	59·72	—	102	59·06	59·51	56·70
42	58·38	59·71	—	103	59·03	59·50	56·58
43	58·33	59·70	—	104	58·99	59·49	56·66
44	58·47	59·92	—	105	58·96	59·47	56·54
45	58·42	59·91	—	106	58·92	59·46	56·42
46	58·87	59·90	—	107	58·89	59·44	56·29
47	58·52	59·89	—	108	58·85	59·89	56·35
48	58·47	59·88	—	109	58·81	59·87	56·22
49	58·43	59·87	—	110	58·99	59·86	56·09
50	58·37	59·85	—	111	58·96	59·85	56·06
51	58·72	59·84	—	112	59·35	59·84	56·03
52	58·67	59·82	—	113	59·33	59·83	56·09
53	58·62	59·81	—	114	59·30	59·82	56·14
54	58·57	59·79	—	115	59·27	59·80	56·20
55	58·52	59·78	—	116	59·25	59·79	56·38
56	58·47	59·76	—	117	59·22	59·77	56·35
57	58·42	59·75	—	118	59·20	59·76	56·43
58	58·57	59·73	—	119	59·17	59·74	56·70
59	58·52	59·72	—	120	59·15	59·73	56·78
60	58·47	59·70	—				

disease was detected; 15 cadavera were not examined. The number of mouse days at risk was 53,906. Table I sets out: the probability of dying in the next 5 days, the complete expectation of life and the expectation limited to the next 60 days, at intervals of 5 days from day 0 to day 200 inclusive.

In Table II the expectations of life limited to the next 60 days of these mice and of the two series used by Greenwood are compared; the experience is limited to the first 120 days of observation. By day 200 the exposed to risk had dwindled to 96, and it seemed an unreasonable use of space to carry the study beyond the 120th day.

It has been assumed that day 90 of the Hill experience corresponds to day 0 of this experience, and that day 0 of the Murray experience corresponds to day 90 of this experience. The Hill mice were observed from birth, the Murray mice from the age of 6 months, while it is probable that our mice enter the herd at the age of about 3 months.

It will be seen that, although the experience of the Hill mice was somewhat more favourable than that of our control herd, the absolute difference is not very striking. We think, therefore, that this and the previous study provide a norm sufficiently exact for the purposes of our work which, for obvious reasons, must be mainly concerned with the first 50–100 days of herd life.

REFERENCE.

Greenwood, M. (1928). *J. Hyg.* **28**, 267–294.