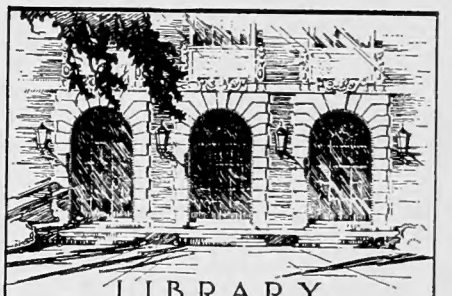
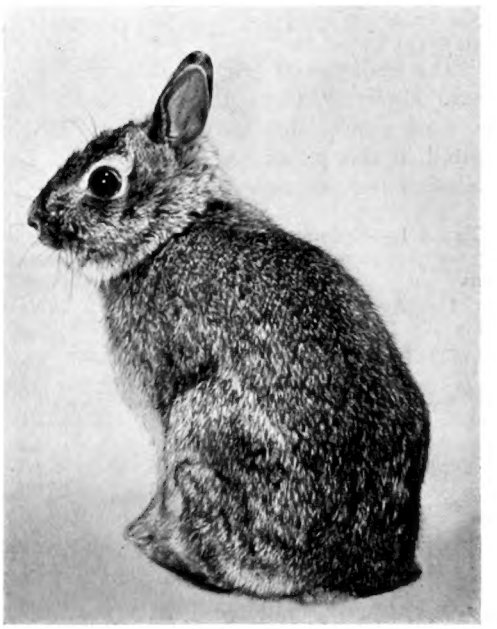


TABLES FOR ESTIMATING AGES AND BIRTH DATES OF COTTONTAIL RABBITS

With Suggestions for Handling Lenses

WILLIAM R. EDWARDS



ILLINOIS NATURAL
HISTORY SURVEY

Biological Notes No. 59
Urbana, Illinois • December, 1967

STATE OF ILLINOIS
Department of Registration and Education
NATURAL HISTORY SURVEY DIVISION

TABLES FOR ESTIMATING AGES AND BIRTH DATES OF COTTONTAIL RABBITS, With Suggestions For Handling Lenses

William R. Edwards

Lord (1959) first presented the concept of estimating the ages of cottontail rabbits (*Sylvilagus floridanus* spp.) on the basis of the dry weight of the eye lens. He gave a graphic representation of the relationship between age (x) and the dry weight of the lens (y) for approximating the ages of cottontails in days (Lord 1959:360). Dudzinski and Mykytowycz (1961:159), using Lord's data (1959:359), reduced the relationship of dry lens weight to age for cottontails to the algebraic form

$$\log_{10} y = 2.4890 - \left[\frac{68.7927}{(x + 41)} \right]$$

Manipulation of this equation to the form

$$x = \frac{68.7927}{(2.4890 - \log_{10} y)} - 41$$

allows the biologist to estimate the age of a cottontail in days. However, the equation is tedious to use with samples of appreciable size. Consequently, the tables presented in this paper were prepared to facilitate the compilation and processing of cottontail lens data.

Estimated ages in days were computed for lens weights of 11–210 mg (Table 1). Because of the relatively low precision of the estimating equation, as suggested by the work of Dudzinski and Mykytowycz (1961:158), there is little justification for using the equation for growth of cottontail lenses in estimating ages beyond the first-year class. When one knows the dry weight of a lens in milligrams, it is a simple matter to find that weight in one of the columns in Table 1 and to read the estimated age in days in the adjacent column.

Statistics gathered at the Illinois Natural History Survey suggest a high degree of bilateral symmetry in weight between a rabbit's lenses. We now believe that the difference in weight between lenses of a pair is primarily the result of sloughing off of tissue of one or both during handling. Thus, we suggest that only the weight of the heavier lens of each pair be used in estimating age even when both lenses are in apparently good condition.

Table 2 was prepared to simplify determination of an estimated date of birth after an estimate of age has been obtained. In this table days of the year are num-

TABLE 1.—Estimated ages of cottontails from dry weights of eye lenses.

Lens Weight in mg	Age in Days	Lens Weight in mg	Age in Days	Lens Weight in mg	Age in Days	Lens Weight in mg	Age in Days	Lens Weight in mg	Age in Days	Lens Weight in mg	Age in Days
11	7	45	41	79	75	112	115	145	169	178	247
12	8	46	42	80	76	113	117	146	171	179	250
13	9	47	43	81	77	114	118	147	173	180	253
14	10	48	44	82	79	115	120	148	175	181	256
15	11	49	45	83	80	116	121	149	177	182	260
16	12	50	46	84	81	117	122	150	179	183	263
17	14	51	47	85	82	118	124	151	181	184	266
18	15	52	48	86	83	119	125	152	183	185	269
19	16	53	49	87	84	120	127	153	185	186	272
20	17	54	50	88	85	121	128	154	187	187	276
21	18	55	51	89	86	122	130	155	189	188	279
22	19	56	52	90	88	123	131	156	191	189	283
23	20	57	53	91	89	124	133	157	194	190	286
24	21	58	54	92	90	125	134	158	196	191	290
25	22	59	55	93	91	126	136	159	198	192	293
26	23	60	56	94	92	127	138	160	200	193	297
27	24	61	58	95	94	128	139	161	203	194	301
28	25	62	58	96	95	129	141	162	205	195	304
29	26	63	59	97	96	130	142	163	208	196	309
30	27	64	60	98	97	131	144	164	210	197	313
31	28	65	61	99	98	132	146	165	212	198	317
32	29	66	62	100	100	133	147	166	215	199	321
33	30	67	63	101	101	134	149	167	217	200	325
34	31	68	64	102	102	135	151	168	220	201	329
35	32	69	65	103	103	136	152	169	222	202	334
36	33	70	66	104	105	137	154	170	225	203	338
37	34	71	67	105	106	138	156	171	228	204	342
38	35	72	68	106	107	139	158	172	230	205	347
39	36	73	69	107	109	140	160	173	233	206	352
40	37	74	70	108	110	141	161	174	236	207	357
41	38	75	71	109	111	142	163	175	239	208	362
42	38	76	72	110	113	143	165	176	242	209	366
43	39	77	73	111	114	144	167	177	244	210	371
44	40	78	74								

bered consecutively and arranged by month. For example, when one knows that a specimen was collected on December 12 (day 346) and was estimated to be 216 days old when collected, one can estimate the date of birth by subtracting 216 from 346, in this instance day 130, or May 10. Data on estimated dates of birth permit computation of a mean estimated birth date and its standard error and thereby facilitate testing of differences in these parameters among populations or comparison with a normal as a means of determining differences in age structure.

SUGGESTIONS FOR HANDLING COTTONTAIL LENSES

1. Care must be taken to remove eyeballs intact (Fig. 1). When an eyeball is ruptured, frequently at the

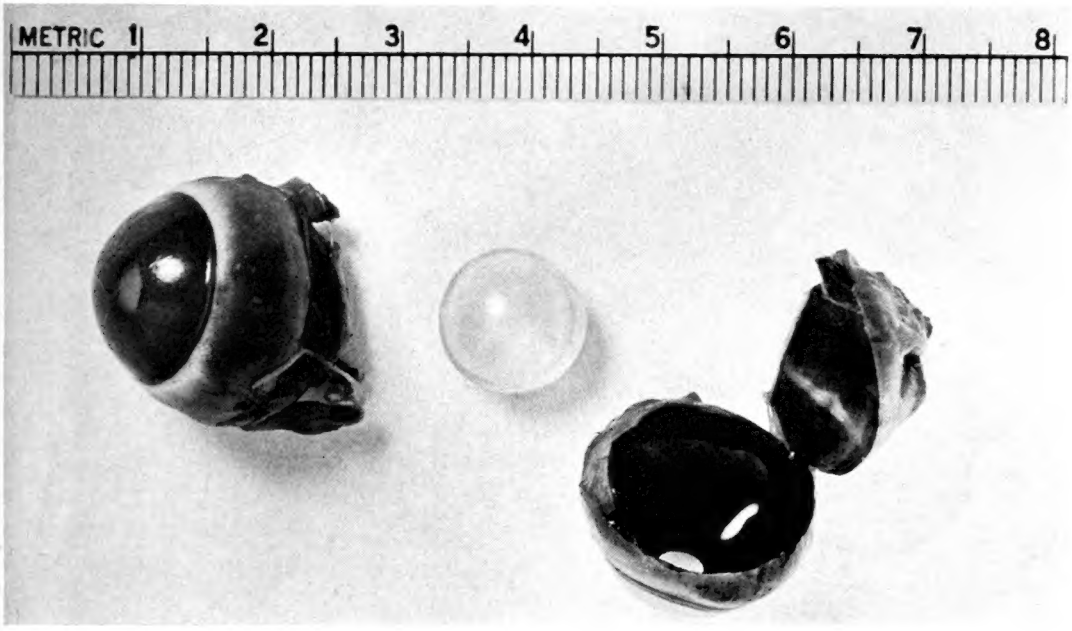


Fig. 1. — Cottontail eye intact and eye with lens removed. The eyeball at left is in the proper intact condition after fixation in a 10-percent formalin solution. The fixed lens is shown after removal but before drying.

TABLE 2.—Figures for estimating birth dates of cottontails from the estimated age in days.

Day of Month	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1	1	32	60	91	121	152	182	213	244	274	305	335
2	2	33	61	92	122	153	183	214	245	275	306	336
3	3	34	62	93	123	154	184	215	246	276	307	337
4	4	35	63	94	124	155	185	216	247	277	308	338
5	5	36	64	95	125	156	186	217	248	278	309	339
6	6	37	65	96	126	157	187	218	249	279	310	340
7	7	38	66	97	127	158	188	219	250	280	311	341
8	8	39	67	98	128	159	189	220	251	281	312	342
9	9	40	68	99	129	160	190	221	252	282	313	343
10	10	41	69	100	130	161	191	222	253	283	314	344
11	11	42	70	101	131	162	192	223	254	284	315	345
12	12	43	71	102	132	163	193	224	255	285	316	346
13	13	44	72	103	133	164	194	225	256	286	317	347
14	14	45	73	104	134	165	195	226	257	287	318	348
15	15	46	74	105	135	166	196	227	258	288	319	349
16	16	47	75	106	136	167	197	228	259	289	320	350
17	17	48	76	107	137	168	198	229	260	290	321	351
18	18	49	77	108	138	169	199	230	261	291	322	352
19	19	50	78	109	139	170	200	231	262	292	323	353
20	20	51	79	110	140	171	201	232	263	293	324	354
21	21	52	80	111	141	172	202	233	264	294	325	355
22	22	53	81	112	142	173	203	234	265	295	326	356
23	23	54	82	113	143	174	204	235	266	296	327	357
24	24	55	83	114	144	175	205	236	267	297	328	358
25	25	56	84	115	145	176	206	237	268	298	329	359
26	26	57	85	116	146	177	207	238	269	299	330	360
27	27	58	86	117	147	178	208	239	270	300	331	361
28	28	59	87	118	148	179	209	240	271	301	332	362
29	29		88	119	149	180	210	241	272	302	333	363
30	30		89	120	150	181	211	242	273	303	334	364
31	31		90		151		212	243		304		365

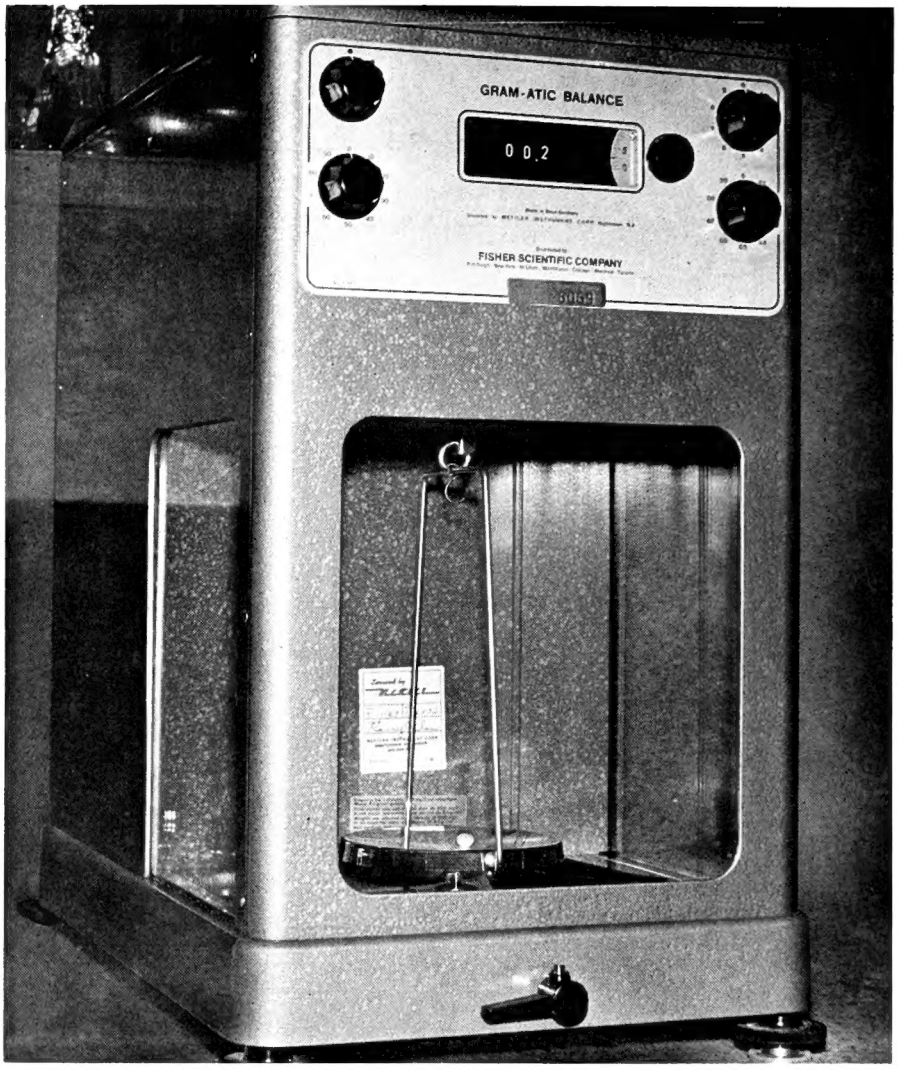


Fig. 2.—Mettler Gram-Atic balance. This type of balance is suggested for weighing cottontail lenses for reasons of speed and accuracy.

connection to the optic nerve, the vitreous humor is usually lost and the eyeball collapses around the lens. If this occurs, the outer fibers of the lens adhere to the inner coatings of the eyeball during fixation and are lost when the lens is removed. Discard damaged eyeballs.

2. Lenses should not be allowed to freeze prior to or during fixing. Freezing frequently results in lens tissue being sloughed off.

3. Lenses should be fixed in a *buffered* 10-percent formalin solution as soon as possible after the animal is collected.

4. Ten days should be allowed for fixing lenses in the buffered 10-percent formalin solution. Our data suggest that no adverse effects occurred when eyeballs were left in the fixing solution as long as 120 days.

5. After fixing, lenses should be dried for about 1 week at 80° C. in an oven equipped with a fan for circulation of air. For an unknown reason some lenses and batches of lenses do not fix and dry properly. These lenses differ in appearance from those properly fixed, and with a little experience "bad" lenses can be quickly recognized. Discard any lens which evidences sloughing off of tissue or appears atypical in color or shape.

6. Because lenses are hygroscopic, they should be weighed immediately after removal from the drying oven or stored immediately in suitable airtight, moisture-free containers.

7. Analytical balances of the Mettler type (Fisher Scientific Company, Pittsburgh, Pa.) (Fig. 2) are probably the easiest and most rapid to use and the most reliable now available for weighing lenses; Roller-Smith precision balances (Roller-Smith Company, Newark, N. J.) have also proved satisfactory.

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This paper is printed by authority of the State of Illinois, IRS Ch. 127, Par. 58.12. It is a contribution of Illinois Federal Aid Project W-66-R, the Illinois Department of Conservation, the United States Bureau of Sport Fisheries and Wildlife, and the Illinois Natural History Survey, cooperating. William R. Edwards is Associate Wildlife Specialist, Illinois Natural History Survey.