Table 1. Calculation of Poisson fit for the distribution of mitoses in sample No. 1. (Chi-square, 6.26; degrees of freedom, 6; probability level, 0.30 to 0.50.)

Mitoses	Grid unit (No.)*		$O-E$*	$\frac{(O-E)^2}{E}$
	Observed (O)	Expected (E)		
0	1	1.5	−1.8	0.42
1	5	6.3		
2	16	13.2	+2.8	0.59
3	17	18.5	−1.5	0.12
4	26	19.4	+6.6	2.25
5	11	16.3	−5.3	1.72
6	9	11.4	−2.4	0.51
7	9	6.9	+2.1	0.64
8	2	3.6	−0.3	0.01
9	1	1.7		
10	2	0.7		
11	1	0.3		
12	0	0.0		

* Pooled where number of grid units was less than 5.

Our impression was that the hair-follicles were distributed evenly throughout the samples but their density was too low to allow statistical analysis.

The data we obtained on mitoses were analyzed. Since the mitotic frequency in all specimens was less than 0.5 percent, the assumption was made that should mitoses be distributed randomly, their distribution would be akin to the Poisson distribution. If the mean number of mitoses per grid unit is designated λ, then according to the Poisson distribution the probability that a grid unit contained m mitoses is $e^{-\lambda}(\lambda^m/m')$. With this formula, in which e is the base of natural logarithms, the expected number of grid units containing a given number of mitoses was calculated and the results were compared with the observed values. The chi-square criterion was used for the testing of goodness of fit. Using the observed values (O) and the expected values (E) the chi-square value of $\Sigma(O-E)^2/E$ was calculated for each specimen and evaluated by standard chi-square tables. Table 1 shows the calculations for sample No. 1. Table 2 shows the findings in all samples.

Table 2. Distribution of mitoses in mouse ear epidermis compared to Poisson distribution.

Total mitoses observed	χ^2	df*	P level
	Ear sample 1		
420	6.28	6	0.30–0.50
	Ear sample 2		
171	2.79	3	0.30–0.50
	Ear sample 3		
408	12.43	6	0.05
	Ear sample 4		
241	1.84	4	0.75
	Ear sample 5		
199	3.57	4	0.50

* Degrees of freedom.

In all five mice the probability that the distribution of mitoses in the basal cell layer of the ear epidermis differed by chance alone from the Poisson distribution was 0.05 or greater. This method of analysis has thus brought forth no evidence that mitoses in mouse ear epidermis occur in clusters.

Our results are in agreement with the observations of Meyer, Medak, and Weinmann on the epithelium of the palate of mice (*5*) and those of Brues and Marble on the regenerating rat liver (*6*). Both of these groups found mitoses present in a Poisson distribution.

However, Harkness (*7*) who also studied mitoses in regenerating rat liver, warned that the grid unit used must not be too small. In his experiments mitoses appeared to be in a Poisson distribution when a small grid unit containing about 30 nuclei was used, but not with a larger grid unit containing about 270 nuclei. However, the grid unit we used was even larger, and the epidermis is a more homogeneous tissue than the liver.

There is no doubt that when the entire body surface is considered, there are wide variations of epidermal mitotic activity (*1*), but as far as a single location is concerned, the results of our experiment do not support the theory that mitoses are, at least in part, triggered by a local accumulation of a cell product. This does not necessarily mean that some general humoral or other mechanism is concerned [although this possibility has some experimental support (*8*)], since the observed chance distribution of mitoses is also compatible with the theory that cell division is stimulated by uniformly distributed intracellular needs.

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Dating Skeletal Material

Abstract. *A nitrogen test has become ancillary to radiocarbon dating.*

A system of relative dating of fossil bone, antler, and dentine has been developed during recent years (*1*). It combines fluorine analysis with uranium estimation by radiometric assay and nitrogen determination by a micro-Kjeldahl method. As a by-product of this research, estimation of the nitrogen content of fossil bone, antler, and dentine is now being used in Britain as a convenient means of assessing the organic carbon content of these materials, since the nitrogen content is an index of the residual collagen (the C/N ratio is about 2.5). Thus the nitrogen test has become ancillary to radiocarbon dating of bone and other skeletal material.

The recent dating of the Galley Hill skeleton (*2*) serves to illustrate the procedure. Analysis of suitably washed powder drilled from one of the humeri of the skeleton showed 2.0 percent nitrogen. It was estimated that this bone therefore contained about 5 percent collagenous carbon. Casts were made of both humeri, and portions weighing about 30 grams were cut off and pulverized. The powder was subjected to repeated washing in warm water and then in acetone to remove any possible traces of preservatives (*3*). The radioactivity was then measured in the Radiocarbon Laboratory of the British Museum and the results gave a radiocarbon age of 3310 ± 150 years (*4*). This confirmed the relative dating by the fluorine method (*2*), indicating that the skeleton was probably a post-Pleistocene intrusive burial.

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References and Notes

1. This work has benefited from grants-in-aid received from the Wenner-Gren Foundation, New York.
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