studies in which this subject is considered. Other agents besides minerals are involved in cell-wall differentiation. Jacobs (*10*), for example, has recently concluded that auxin is a limiting factor in the differentiation of xylem cells. Our evidence suggests that boron is one morphogenetic agent affecting the differentiation of cell walls. How this action may be mediated by boron is not understood. A close involvement of boron in cell-wall differentiation, however, is suggested by the fact that it very likely complexes with a number of polyhydroxy compounds in the plant, such as various sugars and pectic materials (*11*), which become part of the cell-wall substance.

Intensive studies of the cell walls in relation to boron nutrition show that the normal pattern of cell-wall differentiation is profoundly changed by boron deficiency. This fact and the relationship of boron to carbohydrate metabolism implicate boron as an agent in the morphogenesis of plant cell walls (*12*).

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Amino Acids in Fossil Human Bone

In a recent investigation of the chemical constituents of fossil human bone conducted in our laboratory, it was observed (*1, 2*) that bones of great archeological age may contain appreciable quantities of organic nitrogen. The significance of these findings for dating prehistoric bone has been discussed elsewhere (*2, 3*). It is highly probable that the source of this nitrogen is the original proteins, as suggested by Abelson (*4*). If so, a question of interest is: How many of the constituent amino acids are able to retain their chemical individuality under the conditions attending archeological preservation.

Table 1. Dates of fossil bone samples.

Designation	State and culture period	Date before the present by C^{14} analysis or tree-ring count (yr)
UK3	Kentucky, Archaic	4900–5300
UK25	Kentucky, Adena	1170–1510
S76	New Mexico, White Mound	1175
AP692	New York, Frontenac	4370–5385
8450-1	California, Middle	1880

Each bone was first completely hydrolyzed by hydrochloric acid. Then aliquots of the hydrolyzate were analyzed by two-dimensional paper chromatography. This made it possible to identify the presence of traces of amino acids. As a control, we first examined fresh human femurs secured from autopsy and established the presence of the following amino acids: glycine, alanine, serine, valine, leucine, isoleucine, phenylalanine, tyrosine, cysteic acid, proline, hydroxyproline, aspartic acid, glutamic acid, histidine, arginine, lysine and methionine-sulfoxide. This list agrees substantially with that published by Eastoe (*5*) for fresh bone.

We next investigated a series of 20 fossil human and three fossil animal bones, representing a wide time span from relatively recent to archeologically very old. In bones exposed to burial for comparatively short periods, most of or all the amino acids found in fresh bone are detectable in nearly normal amounts. Some of the samples falling within this classification are shown in Table 1.

In bones the age of which appears to be definitely greater than those shown in the table, the constituent amino acids begin to disappear. We have as yet not developed the quantitative analysis to the point where it is possible to set forth the details of an orderly progression of depletion or retention. Nevertheless, certain amino acids evidently persist in all but the very oldest specimens. Thus, sample 6075 (site FRe-48, California, very ancient) contained only aspartic acid. A human bone, early post-Pleistocene from site LAn-172, California, contained aspartic acid, glycine, and glutamic acid. A mammoth bone from Melbourne, Fla. (site Bre-44, very ancient) and a human bone from site SJo-142 (Early culture period, central California) both contained aspartic acid, glycine, and glutamic acid together with a few other amino acids which differed between the two samples. Finally, a human bone and a horse bone from Melbourne, Fla. (site Bre-44) both gave tests showing no amino acids whatever.

The preliminary results reported here therefore suggest the conclusion that decomposition of protein in buried bones proceeds extremely slowly over many thousands of years but tends to release in the process certain amino acids while retaining certain others with great tenacity (*6*).

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Behavior of Light- and Dark-Reared Rats on a Visual Cliff

From the 18th century to the present, the empiricist and the nativist theories of depth perception have been vigorously debated. One experiment aimed at resolving the dispute is Lashley and Russell's (*1*), in which rats reared in darkness jumped to a platform from a stand placed at a variable distance from it. The force of the jump was found to be graded in accordance with the distance of the platform. This is evidence for nativism. But, since the tests with graduated distances were not given until the rats' third day in the light, and after pretraining, the conclusion was not indubitable. Confirmation by another technique is desirable and has been provided in the experiment described in this report (*2*).

A technique of testing for visual depth perception which involves no pretraining at all—the "visual cliff"—was developed. It is based on the assumption that, given a choice, an animal will avoid descending over a vertical edge to a surface which appears to be far away (*3*). The apparatus (Fig. 1) was constructed of two thicknesses of glass (24 in. by 32 in.), parallel to the floor and held by metal supports 53 in. above it. A board (4 in. wide, 24 in. long, and 3 in. high) extended across the glass, dividing it into two equal fields. On one side (the "near" side), patterned wallpaper was inserted between the two sheets of glass. Through