ponents in these extracts. In fact, the large quantity of tissue required to obtain measurable amounts of bio-activity in each experiment has permitted the use of a relatively small number of assay animals. Thus the results have limited quantitative significance. It would appear, however, that our data offer unequivocal evidence for the presence of adrenal hormonelike activity in placental tissue, without demonstrating whether the active factors have been produced by this tissue or are just stored in it after having been transported from some extraplacental source. If placental tissue does produce this type of hormone activity, it may be discharged rapidly into the circulation. Thus the yield of bio-activity in extracts of this tissue indicate nothing about the dynamic aspects of the production of this material. It is of interest to mention certain clinical observations which may indicate that placental tissue has the ability to produce adrenocorticoid material.

In 1938 Hench (*7*) reviewed the clinical data, which indicated that there is a striking, generally complete, relief from the symptoms of rheumatoid arthritis during pregnancy. The now classical demonstration of the effect of cortisone (*8*) and other adrenal hormones in controlling this disease has been offered as an explanation for the observations in pregnancy. The common interpretation is that the adrenal cortex itself is caused to secrete increased amounts of its hormone factors during this special type of physiological stress. One must also consider, however, the possible secretory capacity of the placenta as a means of augmenting the supply of adrenal hormones.

In 1950 Jailer and Knowlton (*9*) observed evidence for the apparent production of adrenal hormones in an Addisonian patient during pregnancy and suggested that the human placenta might be capable of elaborating adrenal cortical-like hormones.

It would thus seem that the detection of adrenal cortex hormone activity in extracts of human and equine placental tissue may help to explain certain clinical observations associated with pregnancy. Further investigation of the character and source of this hormone activity will be required before its true role in endocrinology is fully appreciated.

TABLE 2

ADRENAL CORTEX HORMONE CONTENT OF EXTRACTS OF EQUINE PLACENTAL TISSUE

Lot No.	Bio-assay procedure			
	Glycogen deposition* (u/kg tissue)	No. rats	Wt gain† (u/kg tissue)	No. rats
1	3.0	3	267.0	10
2	3.4	3	—	—
3	17.0	10	—	—

* One unit in the rat liver glycogen deposition test is the amount of bio-activity equivalent to 0.1 mg 17-hydroxycorticosterone (Kendall's compound F, hydrocortisone).

† One unit in the rat weight gain test is the amount of bio-activity equivalent to 1 μg 11-desoxycorticosterone-21-acetate (DOCA).

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The Fluorine Content of Associated Human and Extinct Animal Bones from the Conkling Cavern, New Mexico

T. D. Stewart

Division of Physical Anthropology, U. S. National Museum, Washington, D. C.

The discovery of human bones in association with the bones of extinct animals in a cavern on the lower slope of Bishop's Cap Peak in southwestern New Mexico was reported in 1929 by the late William Alanson Bryan (*1*), of the Los Angeles Museum. Roscoe P. Conkling, of El Paso, Texas, discovered the cavern, and hence his name is usually associated with the find. Mr. Conkling is responsible also for the only other description (*2*) of the contents of this cavern. In his account he said very little about the human remains, but he claimed, because of the animal associations and the depth of the deposits, that "proof is conclusive that man was co-existent [in the remote past] with the sloth, camel, horse, cave bear, and great dire wolf." Thus for 20 years the human material has remained incompletely described, and its claim to antiquity has rested solely upon the relationships within the cave.

Early in 1951 I arranged with Hildegarde Howard, of the Los Angeles County Museum, to study the human remains from the Conkling Cavern. Soon thereafter I reported (*3*) my preliminary findings to the American Association of Physical Anthropologists. So far as I can see, the skulls, of which parts of two were found, cannot be distinguished from those of modern Indians. This opinion does not contradict Mr. Conkling's claim as to their antiquity, because evidence from other sources indicates that the first men to reach the Western Hemisphere were already modern in type.

The Conkling find would take on greater importance in connection with the antiquity of man in America if it could be proved that the juxtaposition of the human and animal remains was original and contemporary. To provide objective information on this point, I arranged with F. J. McClure, of the National Institute

TABLE 1

FLUORINE IN ASSOCIATED HUMAN AND EXTINCT ANIMAL BONES

Bone	Animal	Depth in cave (ft)	Ash (%)	Fluorine (%)	Fluorine in ash (%)
Metapodial	Camel	21–23	97.26	0.0071	0.0073
Vertebra*	Sloth	26–27	93.72	.0995	.1062
Radius†	Horse	35–38	98.30	.0686	.0698
Rib	Sloth	35–38	95.26	.0715	.0751
Calcaneum	Horse	35–38‡	94.57	.0284	.0300
Mandible	Man	20	89.13	.1030	.1156
Tooth (from mandible)	"	20	87.57	.1025	.1170
Humerus	"	21–23	96.41	.1786	.1853
Ulna	"	23–26	95.86	.1381	.1441
Radius	"	26–29	93.06	.4515	.4851
Parietal§	"	30	94.45	0.1406	0.1489

* Test on matrix surrounding bone: ash—98.55%; fluorine—0.0350%; fluorine in ash—0.0355%.

† Test on calcareous encrustation: ash—98.20%; fluorine—0.0358%; fluorine in ash—0.0365%.

‡ From so-called wolf den, which is regarded as the oldest part of the cave deposit. Being a separate compartment, it may not have had the same amount of ground water.

§ Test on calcareous encrustation: ash—92.75%; fluorine—0.0202%; fluorine in ash—0.0218%.

of Dental Research, to test a selection of the bones, both animal and human, for their fluorine content. Dr. Howard generously supplied the animal bones to be used in the testing and allowed me to select a comparable series from among the human bones.

According to the evidence at hand (*4*), there is a progressive fixation of fluorine in bones exposed to ground water containing fluorine. The amount of fluorine that accumulates under these conditions in bones, in the form of fluorapatite, a stable compound, thus is roughly proportionate to the time of exposure. And in the case of associated bones a similarity in fluorine content is indicative of contemporaneity. However, local variations in the amount of fluorine in ground water and other variable factors make it impossible to compare specimens from different sites.

The results of the tests made by Dr. McClure, using the standard procedure of Willard and Winter (*5*) as modified by Armstrong (*6*), are summarized in Table 1. The fact that Dr. McClure has had long experience with, and is constantly using, this difficult method ensures the reliability of his findings.

Unfortunately, the collections from the Conkling site do not include bones found on the surface, representing the remains of animals dying recently. We do not know, therefore, how much fluorine was in the bones of men and other animals in this region before they became exposed to ground water. But, judging from the findings elsewhere, the amount is likely to be small. Thus, Olsen (*7*) gives the percentage of fluorine in the Recent horse of Florida as 0.01. This is in contrast to his figures ranging from 1.5 to 2.7 for the Miocene horse in Florida. On the other hand, for Holocene bones from England, Oakley (*4*) gives the percentage of fluorine as 0.1–0.4.

Using for comparison these inadequate figures for Recent bones, we see that the findings in Table 1 indicate very small amounts of fluorine in all the tested bones—amounts that fall within the range for Recent bones. Surprisingly, the human bones show more fluorine than the bones of the animals now extinct and usually given a Late Pleistocene date. Yet the findings for certain bones from the two groups are not totally dissimilar. For example, 0.099% F in the sloth vertebra is comparable to 0.103% F in the human mandible. On this basis we cannot rule out the implication from the juxtaposition of the bones that all these forms lived contemporaneously.

On the other hand, the fact that the human bones exceed the animal bones in amount of fluorine could lead just as well to the somewhat improbable conclusion that the men are older than the animals. One reason for considering this interpretation improbable is the variability of the fluorine content of Recent bones. It is conceivable that the men had access in life to drinking water rich in fluorine, whereas the animals did not. There are a number of waters in New Mexico today which contain more than 1.00 ppm fluorine (*8*). It is pure speculation, however, that the ground water in this part of the Southwest ever contained unusual quantities of fluorine. Today, of course, the high fluoride waters in the area come from deep wells. It is possible also that the thinner cortex of the human bones is a factor in determining the rate of fixation of fluorine after death.

The inconclusiveness of the fluorine test for dating purposes in this instance probably is due largely to the fact that New Mexico is a dry area. According to Henry Wylde (*9*), who participated in the excavations, the bulk of the matrix within the cave was a fine loess; it was not a dry dust, nor was it wet, but it gave the impression of being slightly damp. Further evidence that some water reached the cave deposits, at least occasionally, is indicated by the encrustation on some of the bones, and by the presence of a thin layer of cemented sand sealing off the cavern 28 feet below the entrance. Yet there is nothing in the findings to indicate that ground water has ever been abundant here since Late Pleistocene times, or that the water present contained much fluorine.

In spite of their inconclusiveness, I regard these fluorine findings as worth reporting because they demonstrate some of the limitations of this method of relative dating.

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