Notes on the Alluvial History of the Lampasas River, Texas

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Introduction

Excavations made in connection with the Stillhouse Hollow Dam construction in Bell County, Texas, offered an excellent view of almost complete sections of the floodplain and the two terraces developed in the valley at this point. In the process of work sponsored by the National Park Service,[2] these sections were measured and their lithology recorded. A molluscan fauna was recovered from approximately two tons of sediments quarried from a shallow zone near the base of the T-1 terrace. A radio-carbon date from shells higher in the same terrace indicates an age of 4970 ± 250 B.P., according to the determination of Dr. Meyer Rubin of the U.S. Geological Survey. The tests were run on valves of *Tritogonia verrucosa* (Barnes), *Quadrula pustulosa* Lea, and *Amblema perplicata* (Conrad).

Occurrence

The valley of the Lampasas River is cut into the Edwards Limestone and is eight hundred yards wide at its top. The walls of the north side are steep and canyon-like. The south side of the valley slopes much more gently due to the preservation of two alluvial terraces. The T-2 terrace stands forty-five feet above normal stream grade and averages twenty feet in thickness. The basal gravel is six feet thick, and in the lowermost two feet it is strongly cemented. Above this basal unit is thirteen feet of yellow sandy clay capped by a four-foot soil.

The basal gravel of the T-1 terrace, which stands twenty feet above normal stream grade, is not indurated and is but 4.5 feet thick. Above this is a yellow clay somewhat sandier than that of the T-2 terrace and 4.5 feet thick. Conformably over the yellow sandy clay is reddish brown clay. This unit is 17 feet thick and near its base it is charged with calcareous nodules—caliche or fresh-water marl. The molluscan

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[2] Contract SWR 33-334.

fauna was recovered from within the yellow sandy clay just below the nodular zone.

The floodplain (T-0) overlaps the eroded slope of the T-1 terrace except near the channel where the T-1 terrace has been completely removed. It is made entirely of loose humic sand (sandy loam). The disconformity between these sediments and the undelying T-1 deposits is easily recognized.

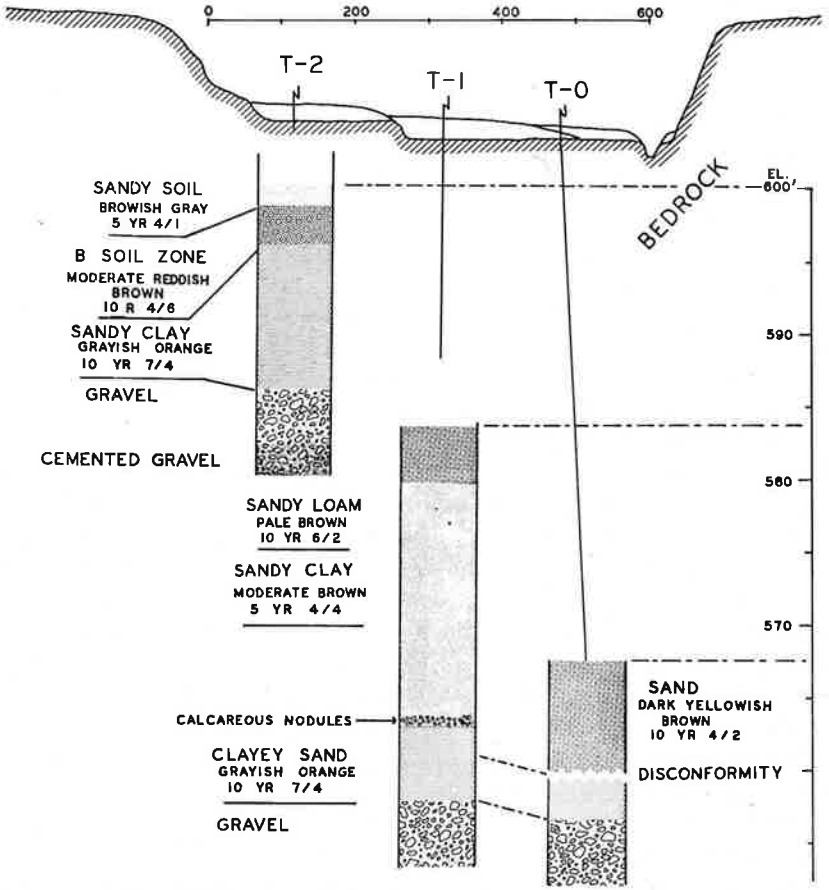

Figure 1.—Cross section of the Lampasas River at Stillhouse Hollow Dam showing terraces and lithology of alluvial deposits.

The Molluscan Fauna

The shells upon which the radiocarbon tests were made were collected from reddish brown clay of the T-1 terrace seven feet above its contact with the underlying yellow sandy clay. The radio-

carbon date is 5,000 B.P. This entire terrace is believed to have formed after the close of the Pleistocene. Thus the molluscan fauna could be as old as 8,000 B.P., probably not much older and possibly slightly younger.

Cheatum and Allen (1965) have reviewed certain Texas molluscan assemblages for which C_{14} dates and other specific age indicators are available, beginning with the fauna of the Good Creek Formation in Foard County (currently assigned to a period early in the last major interstadial) and ending with the Ben Franklin fauna in Delta County with a C_{14} dating of 9,550 ± 375 B.P. No more than 1,500 to 2,500 years are believed to separate the Ben Franklin local fauna from the Stillhouse Hollow fauna. Even though the two deposits are about 200 miles apart, the extant recent molluscan faunas of the two areas are essentially the same. Therefore it is of interest to compare the Ben Franklin and Stillhouse Hollow faunas in order to see what molluscan changes presumably occurred in this relatively short time.

Exclusive of the unionids, sixteen families—including thirty-one species—are represented in the Stillhouse Hollow assemblage, whereas the same number of families are representd by thirty-seven species in the Ben Franklin assemblage. Among the species which now have a more northerly distributional range, and which appear in the Ben Franklin assemblage but which were absent at Stillhouse Hollow are: *Somatogyrus depressus, Valvata tricarinata, Lymnaea caperata, Lymnaea reflexa, Planorbula armigera* and *Pupilla blandi.* More northerly in distribution today but still lingering on in the Stillhouse Hollow assemblage are *Pomatiopsis lapidaria, Gyraulus circumstriatus, Discus cronkhitei* and *Vallonia gracilicosta.* The remainder of the molluscan fauna is essentially what one might find today in Bell County. Among the land gastropods in the Stillhouse Hollow assemblage, *Strobilops texasinana* was dominant, followed by *Hawaiia minuscula, Gastrocopta procera, G. contracta, G. armifera* and *Discus cronkhitei* in that order. *Gyraulus parvus* was the dominant aquatic species, but the shells of the aquatic species were much less common than the land shells.

It seems strange that out of two tons of washed sediment no sphaerid shells were recovered from the Stillhouse Hollow site, whereas four species of sphaerids were present at Ben Franklin. Another aquatic species, *Helisoma trivolvis,* usually the most common planorbid in Texas, was conspicuously absent from Stillhouse Hollow. Adequate water must have been present for these species, judging by the presence of *Tritogonia, Quadrula, Amblema, Amnicola* and

Pomatiopsis. Large numbers of *Strobilops* indicate moist woodlands or abundant humus which conserves moisture. Yet the common woodland species, *Zonitoides arboreus* and *Mesodon thyroidus*, were absent in the Stillhouse Hollow assemblage. The fact that *Discus cronkhitei* still lingered on in this southerly location is also a good indicator of adequate retention of moisture.

Among the aquatic species which no longer live in this region are *Pomatiopsis lapidaria* and *Gyraulus circumstriatus*. *P. lapidaria*, however, has been reported as Recent for Oklahoma by Wallen (1961). Hibbard and Taylor (1960) point out errors which have been made in confusing *Gyraulus circumstriatus* and *G. parvus*. The separation of these two species has been based upon the planospiral coiling of the first whorls and slow enlargement of whorls in *G. circumstriatus*, in contrast to the more rapidly expanding whorls and the appearance of a sunken nucleus in *G. parvus*.

Conclusions

The T-2 terrace seems to be by far the best preseved along Texas Rivers, although the major valleys often have one or two higher and older terraces. The T-2 terrace of the upper Trinity River is believed to belong to the last major interstadial of the Wisconsin, which ended about 25,000 B.P. Along the medium-sized tributaries of the Trinity River the T-2 is the highest terrace preserved. Unless earlier alluvial deposits of these streams were removed during pre-T-2 downcutting, the smaller rivers presumably are not older than the early Wisconsin. We have no faunal evidence that the T-2 terrace of the Lampasas River is correlative with the T-2 terrace of similar elevations above present floodplains of other rivers, although a rather close age relationship seems probable.

The T-1 terrace of the Lampasas was probably deposited after the close of the Pleistocene, although the lower portion may be latest Pleistocene, depending upon where the reader places that event. The radiocarbon date was recovered from this terrace at about mid-thickness. It seems probable that the lowest portion of the terrace dates no more than 9,000 B.P., and that post-T-1 downcutting did not begin long before 2,000 B.P., although the earliest as well as the terminal dates are speculative.

Although the Texan mammalian fauna of 9,500 years ago (Slaughter & Hoover, 1963) contained many northern species and thus was quite different from the modern fauna, by 7,000 B.P. only mammals that currently occur in the area were present.

A small unreported molluscan fauna recovered from alluvial de-

posits of White Rock Creek in Dallas County resembles the Stillhouse Hollow assemblage in that it is for the most part typically modern in faunal make-up but does include *Pomatiopsis*. *Discus* was reported by Dalquest (1962) for a sub-Recent deposit near Wichita Falls, Texas. These occurrences seem, therefore, to indicate that the northern species of some mollusks lasted slightly longer in the South than did the species of mammals.

COMPARISON OF MOLLUSCAN FAUNAS

	Ben Franklin (Cheatum & Allen, 1963	*Stillhouse Hollow*
Family Sphaeridae		
Sphaerium striatinum	X	
Sphaerium partumeium	X	
Pisidium nitidum	X	
Pisidium walkeri	X	
Family Amnicolidae		
Amnicola integra	X	X
Samatogyrus depressus	X	
Family Valvatidae		
Valvata tricarinata	X	
Family Pleurocaridae		
Goniobasis sp.	X	
Family Pomatiopsidae		
Pomatiopsis lapidaria	X	X
Family Physidae		
Physa anatina	X	X
Physa gyrina	X	X
Family Lymnaeidae		
Lymnaea dalli	X	X
Lymnaea caperata	X	
Lymnaea reflexa	X	
Family Planorbidae		
Helisoma trivolvis	X	
Helisoma anceps	X	X
Gyraulus circumstriatus		X
Gyraulus parvus	X	X
Planorbula armigera	X	
Family Charachiidae		
**Carychium exiguum*	X	X

* Hubricht (1962), distinctly separates *C. exiguum* from *C. exile* by the "best distinguishing character," the outer lip, which is "somewhat expanded" in *C. exiguum*, but "narrowly reflected" in *C. exile*. Our shells show a definite expansion of the outer lip. Therefore the implication is that even though *C. exiguum* ordinarily has a more northerly range it does extend into Texas.

Family Zonitidae		
Hawaiia minuscula	X	X
Zonitoides arboreus	X	
Retinella indentata	X	X
Retinella roemeri		X
Retinella electrina		X
Euconulus fulvus	X	X
Family Polygyridae		
Stenotrema leai		X
Praticolella berlandieriana		X
Polygyra texasiana		X
Polygyra mooreana		X
Mesodon thyroidus	X	
Family Succineidae		
Succinea ovalis	X	
Succinea sp.		X
Family Bulimulidae		
Bulimulus dealbatus		X
Family Helicinidae		
Helicina orbiculata tropica	X	X
Family Endodontidae		
Helicodiscus parallelus	X	
Discus cronkhitei	X	X
Anguispira alternata		X
Helicodiscus signleyanus	X	
Family Strobilopsidae		
Strobilops texasiana	X	X
Family Valloniidae		
Vallonia gracilicosta	X	X
Family Cionellidae		
Cionella lubrica		X
Family Pupillidae		
Gastrocopta armifera	X	X
Gastrocopta contracta		X
Gastrocopta procera	X	X
Gastrocopta procera sterkiana	X	
Gastrocopta procera mcclungi	X	
Gastrocopta cristata		X
Gastrocopta pentodon	X	
Gastrocopta pellucida hordeacella		X
Pupilla blandi	X	

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