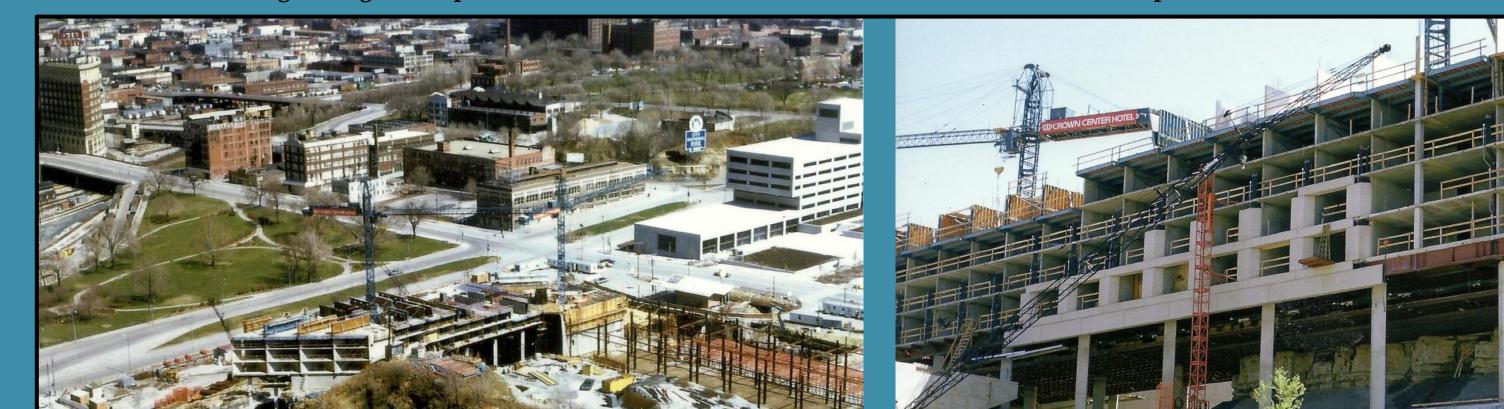


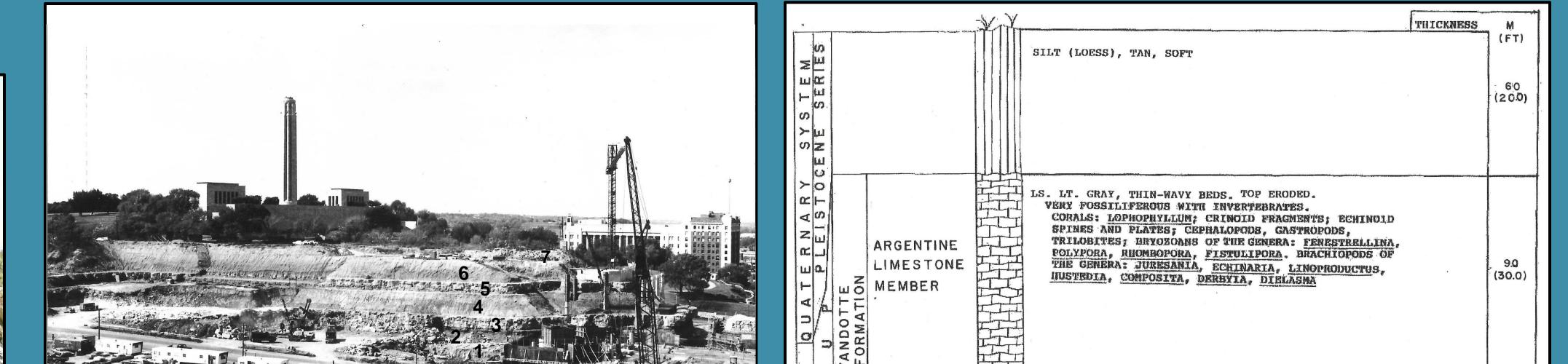
THE CROWN CENTER COMPLEX Crown Center consists of four large office complexes, two major hotels, a large retail center, an international marketplace, and a variety of restaurants, high-rise garden apartments and condominiums. The northern anchor of the Complex is the 750-room Westin Crown Center Hotel.



THE GEOLOGY OF SIGNBOARD HILL AND THE CONSTRUCTION OF THE CROWN CENTER COMPLEX, KANSAS CITY, MISSOURI

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The major purpose of this poster is to reconstruct the geologic history of Signboard Hill as read from the rock section exposed along Main Street and during construction of The Crown Center Complex in 1971-72. For over 50 years the Main Street reference section was visited by numerous field trip participants to gain a better understanding of the Pennsylvanian stratigraphy of the Central United States.



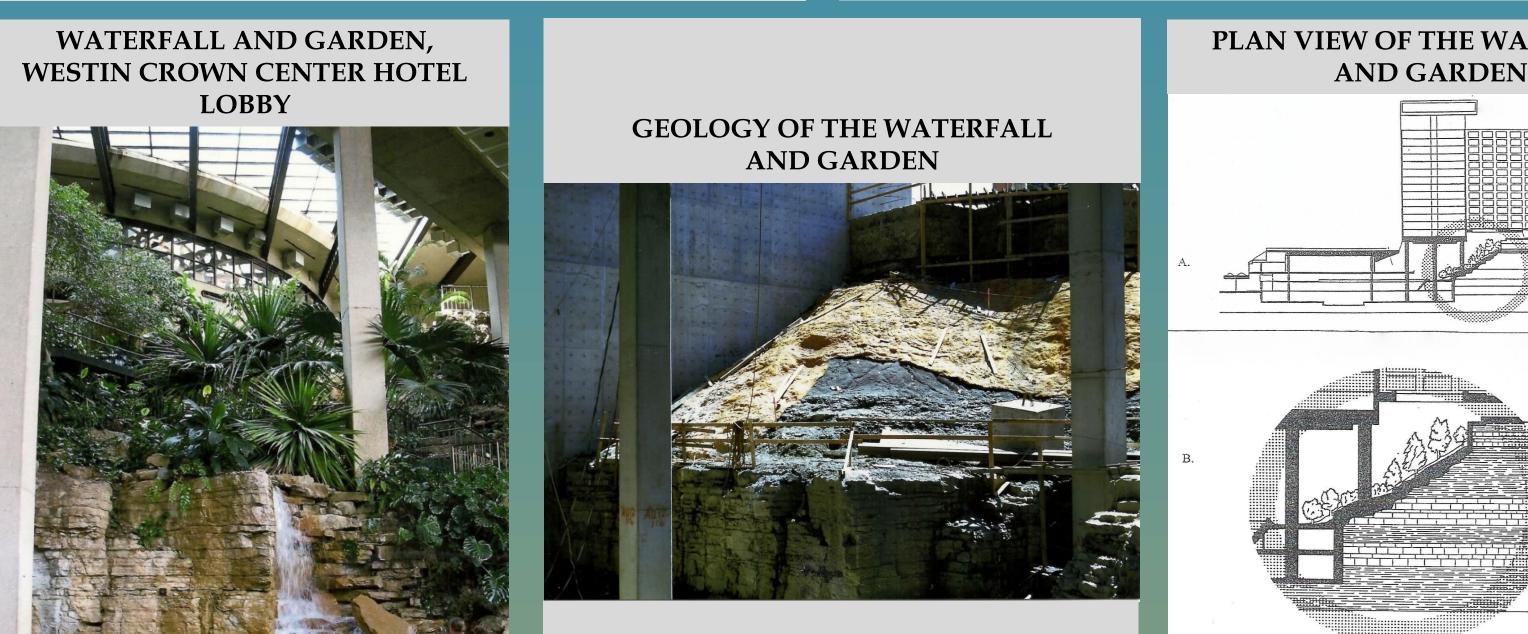
QUINDARO

SHALE, VERY FOSSILIFEROUS, SILTY.



CONSTRUCTION OF THE CROWN CENTER COMPLEX The Main Street cut became inaccessible shortly after completion of the Crown Center complex and is covered by vegetation and slope stability structures. (photo taken from Liberty Memorial, 1971-72)

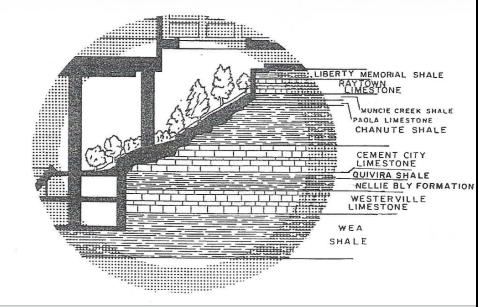
CONSTRUCTION OF THE WESTIN CROWN CENTER HOTEL AT MAIN STREET AND PERSHING ROAD Limestone is capable of supporting large buildings. In contrast, shale is much weaker and is subject to sliding and prone to deformation under large amounts of weight. Piers to support the hotel pass through the shale and bottom on the more compact limestone. The hotel is anchored to the bluff by piers driven horizontally 12 m (40 ft) into beds of limestone. (photo taken April, 1972)



A major attraction in the Crown Center Complex is the waterfall and garden in the lobby of the Westin Crown Center Hotel. The unique waterfall and garden are carved from the hill's alternating limestone and shale beds and preserved as the hotel was built around it. Water for the man-made waterfall is tumbling over the Cement City Limestone.

The rock section that underlies the garden and waterfall in the Westin Crown Center Hotel Lobby as it appeared during construction of the hotel, April 1972. The Cement City Limestone forms the ledge and is overlain by the Chanute Shale that is partly covered by the tarpaulin.

PLAN VIEW OF THE WATERFALL **AND GARDEN**



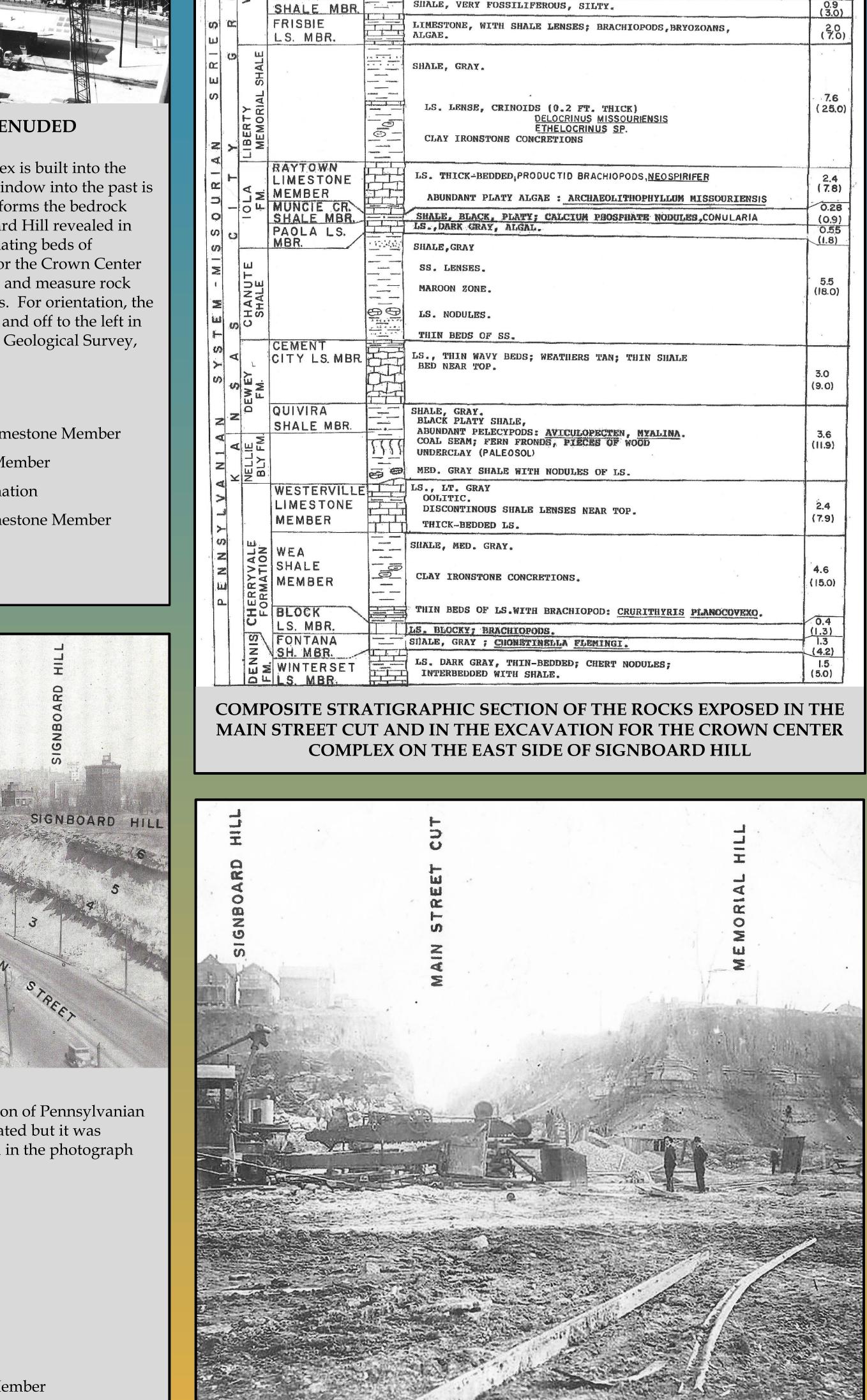
A. Cross section of the Westin Crown Center Hotel at the north base of Signboard Hill. B. Cut-away view shows the interior garden rising from the Cement City Limestone through the Chanute Shale, Paola Limestone and Muncie Creek Shale to the Raytown Limestone (after Vineyard, 1974



A PANORAMIC VIEW OF THE PARTLY DENUDED SIGNBOARD HILL, 1970-71

A major part of the 85-acre, \$300 million Crown Center Complex is built into the eastern part of Signboard Hill. For a brief moment of time a window into the past is opened that exposes over 31 m (100 ft) of the rock section that forms the bedrock underlying Kansas City and environs. The geology of Signboard Hill revealed in the construction site reads like pages in a book exposing alternating beds of limestone and shale. The Main Street cut and the excavation for the Crown Center Complex offered geologists the opportunity to inspect, sample and measure rock strata that otherwise would be inaccessible except by boreholes. For orientation, the columned building partly obscured by cranes is Union Station and off to the left in the distance is the Liberty Memorial. (Photo courtesy Missouri Geological Survey, Rolla; Jerry D. Vineyard, 1974).

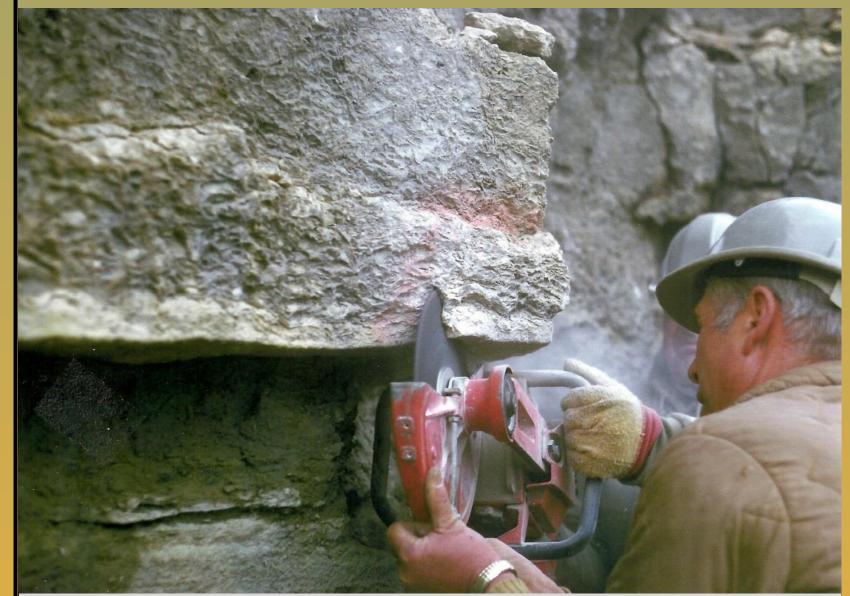
7. Argentine Limestone Member	4. Chanute Shale
Quindaro Shale Member	3. Cement City Limestone Membe
Frisbee Limestone Member	2. Quivira Shale Member
6. Liberty Memorial Shale	Nellie Bly Formation
5. Raytown Limestone Member	1. Westerville Limestone Member
Muncie Creek Shale Member	
Paola Limestone Member	



Unklesbay and Vineyard, 1992).

PALEONTOLOGY **COLLECTING FOSSIL SPECIMENS FROM THE ROCK STRATA EXPOSED IN THE EXCAVATION** FOR CONSTRUCTION OF THE CROWN CENTER COMPLEX

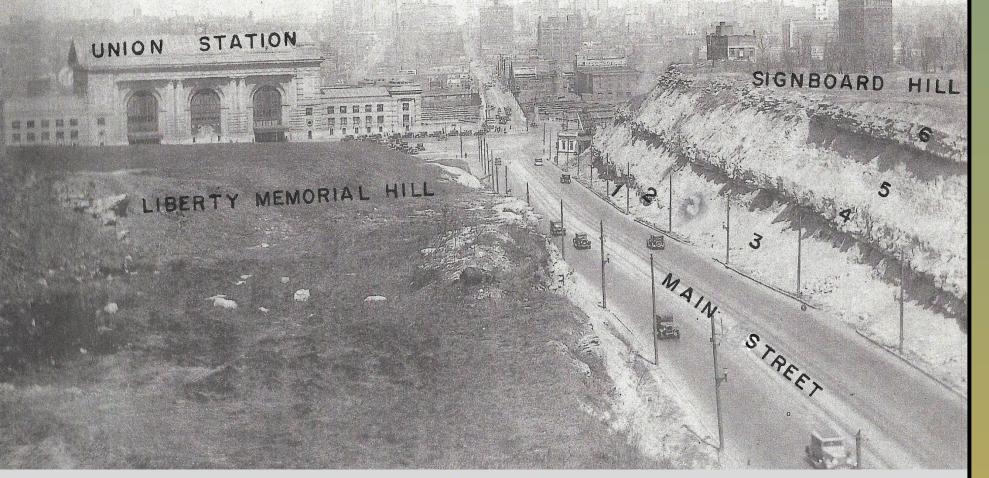
A paleontological study of Signboard Hill was initiated and funded by the late Joyce C. Hall; founder of Hallmark Cards, Inc. Mr. Hall envisioned the history of Signboard Hill as an exhibit to be housed in Union Station that was being considered as a science museum. The senior author was hired by Mr. Hall to conduct a detailed paleontologic investigation of Signboard Hill. An assemblage of about 35 fossil specimens were collected from the rock strata exposed during construction of Signboard Hill. The collection included nine phyla of invertebrate organisms, most of them marine, and the tooth of a ray-like fish; plants included marine algae. The terrestrial rocks yielded specimens of fern fronds, bark and roots of scale trees and the leaves of ancient scouring rushes. Unfortunately, Union Station in the early 1970's was in a sad state of disrepair with an unknown future and the project never materialized.



COLLECTING FOSSIL SPECIMENS Workmen using a circular-blade cutting saw to remove a specimen of the calcareous green algae Archaeolithophyllum missouriensis from the Raytown limestone. A. missouriensis is a common fossil found in the Raytown throughout the Greater Kansas City area.



The specimen is removed from the limestone ledge.



THE MAIN STREET CUT A skyline view from the Liberty Memorial Hill shows the section of Pennsylvanian strata exposed in the excavation for Main Street. Photo is undated but it was probably taken circa 1929. The Main Street cut is well exposed in the photograph and accessible to geologists. (Photo Kansas City Star, 2015).

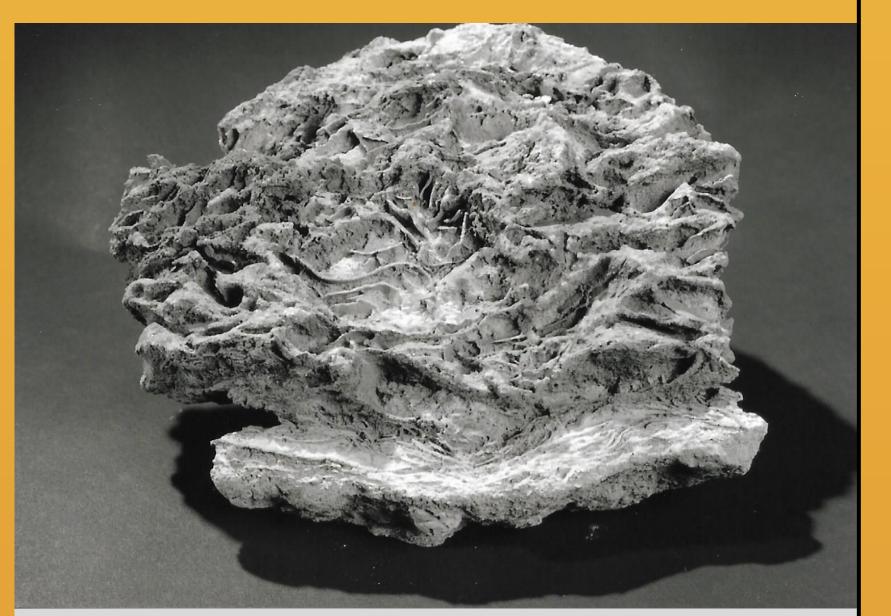
Index to numbered rock units labeled in photo: 6. Argentine Limestone Member 5. Liberty Memorial Shale 4. Raytown Limestone Member 3. Chanute Shale 2. Cement City Limestone Member 1. Wea Shale Member, Nellie Bly Fm., Quivira Shale Member



THE MAIN STREET CUT AND THE CREATION OF SIGNBOARD HILL, 1913 The excavation for Main Street divided a northwest-facing hill into two hills, Signboard and Hospital Hill on the east and Liberty Memorial Hill to the west. The cut through the bluff for the location of Main Street gave access to Union Station. Construction of the Liberty Memorial Tower on Memorial Hill is over 10 years in the future. (Photo courtesy Kansas City Star Archives, 2015).



On a freshly fractured surface the thalli appear as ribbon-like stringers of clear, recrystallized calcite with shades of white, grey, and red that give the rock an aesthetic appearance. The Raytown Limestone was used as dimension stone for building purposes in the early days of Kansas City.



The blade-like thalli of *A. missouriensis* stand-out in relief on a weathered surface and resemble potato chips, hence the informal name potato chip algae is commonly applied to the fossil.

SIGNBOARD HILL, 1948 An unsightly assemblage of signs greeted passengers disembarking from trains at Union Station; hence the derisive name "Sign Board Hill". The cut on the east side of Main Street is overshadowed in the photograph but was accessible to geologists. (Photo courtesy Kansas City Star Books, 2000).

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