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OPEN-FILE REPORT

Palynological Investigations in the Upper Cretaceous and Tertiary of the Mississippi Embayment Region - VI

by

Robert H. Tschudy

Denver, Colorado

1970

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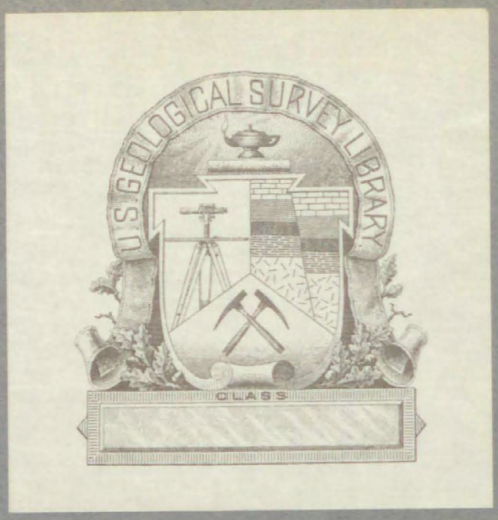
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OPEN-FILE REPORT

Palynological Investigations in the Upper Cretaceous and Tertiary of the Mississippi Embayment Region - VI

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Robert H. Tschudy

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U. S. GEOLOGICAL SURVEY
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20242

For release JANUARY 22, 1970

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1. Palynological investigations in the Upper Cretaceous and Tertiary of the Mississippi Embayment Region--VI, by Robert H. Tschudy. 29 p. USGS, 710 West High St., Lexington, Ky. 40508; Kentucky Geological Survey, 307 Mineral Industries Bldg., University of Kentucky, 120 Graham Ave., Lexington, Ky. 40506.

2. Preliminary structure map of the Blackford quadrangle, western Kentucky, by Dewey H. Amos. 1 sheet, scale 1:24,000. USGS, 710 West High St., Lexington, Ky. 40508; Kentucky Geological Survey, 307 Mineral Industries Bldg., University of Kentucky, 120 Graham Ave., Lexington, Ky. 40506. /Material from which copy can be made at private expense is available in the two Lexington offices listed. This map supersedes the version open-filed in June 1968 by the same author, entitled "Preliminary map showing faults in the Blackford quadrangle, western Kentucky."/

3. Availability of palynological material from Naval Petroleum Reserve No. 4, XIX: Umiat Test Wells Nos. 3 and 11, Simpson Core Tests 21, 27, 30, 30A, by Richard A. Scott. 2 p.

4. Remote detection of geochemical soil anomalies, by F. C. Canney. 6 p., plus 1 sheet tabular data.

5. Geology of the Bushrod Island-New Georgia clay deposit near Monrovia, Liberia, by Lawrence V. Blade. 35 p., including 7 figs., 4 tables.

6. Seismic-reflection records from a survey at the Rocky Mountain Arsenal near Denver, Colorado, by R. E. Mattick and D. B. Hoover. 4 p., 1 pl. /Material from which copy can be made at private expense is available in the USGS Library, Bldg. 25, Federal Center, Denver, Colo. 80225./

7. Digital computer terrain mapping from multispectral data, and evaluation of proposed Earth Resources Technology Satellite (ERTS) data channels, Yellowstone National Park: preliminary report, by Harry W. Smedes, Kenneth L. Pierce, and Roger M. Hoffer. 43 p., 19 figs., 1 colored photo. 1012 Federal Bldg., Denver, Colo. 80202; 8102 Federal Office Bldg., Salt Lake City, Utah 84111; Geological Survey of Wyoming, University of Wyoming, Laramie, Wyo. 82070 /P.O.Box 3008, Univ. Sta./.

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Introduction

As a part of the cooperative mapping project between the Kentucky Geological Survey and the U. S. Geological Survey, a study of Cretaceous and Tertiary spores and pollen assemblages has been undertaken to aid in distinguishing formations and to facilitate surface and subsurface correlation of strata.

Report completed from July 1, 1968 to November 1, 1969 are included in this report; others will be placed in open file as they are completed and released for general use.

REPORT ON REFERRED FOSSILS

P&S Branch, Denver Lab, U. S. G. S.
Bldg. 25, Federal Center, Denver, Colorado

Stratigraphic range: Eocene

General locality: Kentucky

Report prepared by: R. H. Tschudy
7/5/68

Referred by: W. W. Olive

Status of work: Complete

Kinds of fossils: Palynomorphs

Shipment No.: KG-68-5D

Date material received: 6/5/68

Quad or area: Barlow and Wickliffe quads.

KG-68-5D

Two samples were sent for palynological examination. Both were productive and were given USGS paleobotanical locality numbers as follows:

Sample	Locality	Number
CBW-1	½ mile E of N end of Twin Lake at southern edge of quadrangle; Kentucky coordinates 1,026,300 - 261,400; Barlow quad., Ballard Co., Kentucky.	D4175
OW-1	Mississippi River bluffs 2.2 miles from downtown Wickliffe; Kentucky coordinates 1,026,000 - 258,700; Wickliffe quad., Ballard Co., Kentucky.	D4176

The palynomorphs identified are shown on the accompanying chart.

Both of the samples yielded characteristic lower Claiborne assemblages. No evidence that would suggest a Wilcox age was found.

Sample CBW-1 (D4175) was probably deposited in a continental site. No dinoflagellates or hystrichospheres were found. The alga Pediastrum suggests a lake or pond deposit.

Sample OW-1 (D4176) yielded a very few specimens of dinoflagellates and hystrichospheres suggesting a slight marine influence. The deposition site may have been deltaic, near enough to the sea to permit occasional marine inundations.

Robert H. Tschudy

R. H. Tschudy

Sample	OBW-1	OW-1
Number	D4175	D4176
Code species		
P_4-foss 1	X	X
CP_3-r25	X	X
P_6-sm5	X	X
P_3-sm30C	X	X
P_3-foss 1	X	X
C_3-rt36	X	X
P_3-sm55	X	
Pa_6-sm 1	X	X
Gothan 1	X	
$P\infty$-sm3B	X	X
Pa_5-sm 1	X	X
P_3-p 1	X	X
BCP_3-rt8	X	X
Ana^3	X	
Pa_3-sm25C	X	X
Pediastrum	X	
P_3-sm56	X	X
cf. P_3-sm75	X	
P_3-sm5B	X	X
CP_3-r38	X	X
V_2S/sm28	X	X
Peltate leaf hair	X	
cf. C_3-rt 39	X	
V_2L/r5	X	X
P_2-sp4	X	
C_3-rt40	X	X
P_1-sp2		X
P_3-r42		X
C_3-p 12		X
CP_3-sm34B		X
dinoflagellates		X
Pa_3-r5B		X
Gn-7C		X
Hystrichospheres		X

REPORT ON REFERRED FOSSILS

P&S Branch, Denver Lab, U.S.G.S.
Bldg. 25, Federal Center, Denver, Colorado

Stratigraphic range: Eocene

Kinds of fossils: Palynomorphs

General locality: Kentucky

Quad. or area: Milburn and Blandville quads.

Referred by: W. W. Olive

Shipment No.: KG-69-4D

Report prepared by: R. H. Tschudy
7/8/69

Date material received: 5/22/69

Status of work: Complete

Two samples were sent for palynological examination. Both were productive and were given USGS paleobotanical locality numbers as follows:

Sample	Locality	Number
OMn-1	49-57' deep in auger hole located 0.5 mi NNE Elsey Cemetery; Kentucky coordinates 1,057,400-213,100; Milburn quad., Carlisle Co., Kentucky	D4334
OBL-3	Altitude of 390' $\frac{1}{4}$ mi NW of Mayfield Creek Church; Kentucky coordinates 1,072,000-218,400; Blandville $7\frac{1}{2}$' quad., Carlisle Co., Kentucky	D4335

The following palynomorphs were identified from these samples.

Sample Number	OMn-1 D4334	OBL-3 D4335
Code species		
Peltate leaf hair	X	X
Tet-fov2	X	X
P_3-sm 16	X	X
P_3-r42	X	
CP_3-rt 14	X	X
M-p8	X	X
TT-sm38	X	
CP_3-r38B	X	
P_3-sm (new)	X	
C_3-sm 1B	X	
CP_3-sm 5	X	
C_3syn-rt	X	
cf.P_3-sm 1B	X	
C_3-rt36	X	X
CP_3-sm53	X	X
BCP_3-p 1	X	X
TO-p	X	
P_3-sm30C	X	X
P_4-sm6	X	X
BCP_3-rt5	X	X
P_3-sm72	X	
C_3-p 12	X	
P_∞-sm3	X	
CP_3-rt28	X	
M-p 16		X
Botryococcus		X
C_3-syn-r		X
P_1-sp		X
C_3-rt 16C		X
O-p5B		X
cf.S_1-rt 14		X
P_3-sm64		X

I believe both of these samples, in spite of differences, are virtually the same age. Both are closer, in their palynomorph content, to the Claiborne than they are to the Jackson, even though many of the forms found are common to both. Species that are present in and characteristic of our control Moodys Branch and Yazoo Clay material were not found in these samples. I believe these samples represent the upper Claiborne.

Robert H. Tschudy

R. H. Tschudy

RHK

REPORT ON REFERRED FOSSILS

P&S Branch, Denver Lab, U.S.G.S.
Bldg. 25, Federal Center, Denver, Colorado

Stratigraphic range: Paleocene-Holocene

Kinds of fossils: Palynomorphs

General locality: Kentucky

Quad. or area: Barlow, Wickliffe and Bondurant quads.

Referred by: W. W. Olive

Shipment No.: KG-68-6D

Report prepared by: R. H. Tschudy
9/18/68

Date material received: 8/7/68

Status of work: Complete

Eight samples were submitted for palynological examination. All yielded palynomorphs and were given USGS Paleobotanical Locality Numbers as follows:

Sample		Number
OBW-2	59-65' deep in auger hole at bend in gravel road, 0.8 mi. E. of Hunters Pond; Kentucky coordinates S 1,019,900-262,800; Barlow quad., Ballard Co., Kentucky.	D4190
OBW-3	56-60' deep in auger hole 0.8 mi. NE from N. end of Clear Pond; Kentucky coordinates S 1,031,400-303,550; Barlow quad., Ballard Co., Kentucky.	D4191
OBW-4	110-122' deep in auger hole 1.5 mi. NW from Old Hazelwood Cemetery; Kentucky coordinates S 1,033,950-287,500; Barlow quad., Ballard Co., Kentucky.	D4192
OBW-5	45-50' deep in auger hole 1.38 mi. NW of Watwood Cemetery; Kentucky coordinates S 1,042,800-266,900; Barlow quad., Ballard Co., Kentucky.	D4193
OBW-6	52-57' deep in auger hole 1.71 mi. NE of Watwood Cemetery; Kentucky coordinates S 1,050,400-268,700; Barlow quad., Ballard Co., Kentucky.	D4194
FW-1	1½ mi. SE of Wickliffe, Wesvaco site about 800' rt angle from RR tracks in fresh cut in hillside; Kentucky coordinates S 1,028,700-240,200; Wickliffe quad., Ballard Co., Kentucky.	D4195

FBO-2 Depth of 132-142' in drill hole USGS 6.10-7.05 2 3/4 mi. WNW of Sassafras Ridge; Kentucky coordinates S 946,100-107,050; Bondurant quad., Fulton Co., Kentucky. D4196

FBO-3 Depth 130-137' in drill hole USGS 3.65-6.35 on French Point; Kentucky coordinates S 953,650 - 116,350; Bondurant quad., Fulton Co., Kentucky. D4197

KG-68-6D

The palynomorphs identified from these samples are shown on the accompanying chart.

Sample OBW-2 (D4190) threw me for a temporary loss. I was later able to engineer a touchdown. The sample yielded hystrichospheres and dinoflagellates, Wilcox and Claiborne fossils, as well as latest Cretaceous fossils (Wodehouseia, Aquilapollenites, Proteacidites, Kurtzipites, Tricolpites interangulus) from the Rocky Mountain region. It was only after finding Recent Tsuga, Chenopodiaceous and Compositae pollen that light finally dawned. You couldn't have provided a better example of "Pollen Conglomerate" if you had tried deliberately. Mixed metaphors aside, this sample must represent recent alluvium with redeposited species from several areas and ages.

Sample OBW-3 (D4191) yielded abundant hystrichospheres and dinoflagellates as well as a characteristic assemblage of Porter's Creek pollen. This sample is undoubted Paleocene, and represents Porter's Creek Clay. Marine deposition is indicated.

Sample OBW-4 (D4192) yielded a poor, somewhat corroded assemblage. The assemblage presented some difficulties; however several of the species identified have not been seen above the Wilcox. I believe, with slight reservations, that this sample is from the lower Eocene Wilcox. Dinoflagellates and hystrichospheres were rare, indicating a very slight marine influence.

Sample OBW-5 (D4193) yielded a good assemblage that clearly pertains to the upper Claiborne. Lack of dinoflagellates and the presence of Azolla suggests fresh water deposition.

Sample OBW-6 (D4194) yielded an assemblage species commonly found in the Cockfield and Cook Mountain Formations. This sample pertains to the Claiborne.

Sample FW-1 (D4195) yielded several species not seen before. The remainder of the species identified are characteristic of the Claiborne.

Sample FBO-2 (D4196) yielded Claiborne and Jackson species. I believe this sample is from the lower part of the Jackson. Very slight marine influence is indicated by a few dinoflagellates and hystrichospheres.

Sample FBO-3 (D4197) yielded an assemblage of species characteristic of the Yazoo Clay. I believe that this sample represents the Jackson. Dinoflagellates, hystrichospheres, and Tasmanites suggest marine, probably near shore, deposition.

Robert H Tschudy

R. H. Tschudy

RHTK

Sample	OBW-2	OBW-3	OBW-4	OBW-5	OBW-6	FW-1	FBO-2	FBO-3
Number	D4190	D4191	D4192	D4193	D4194	D4195	D4196	D4197
Code species								
Liquidambar	X							
Compositae	X							
Chenopodiaceae	X							
Tsuga	X							
Pinus	X							
Juglans	X							
P_5-foss 1	X				X	X		X
Tax-sm 1	X	X	X				X	X
P_3-sm 64	X							
P^3-sm30A	X		X	X	X		X	X
P^3_∞-sm3B	X							
M-sm 1	X							
Aquila 14	X							
P_1-sp 1	X							
Pa_6-sm 1	X							
C_3-sm 19	X							
C_3-sm 22	X							
Pa_3-sm 16	X		X	X				
Charonisporites	X							
Wodehouseia	X							
Proteacidites	X							
P_3-foss 1	X							
Dinoflagellates	X	X	X				X	X
Hystrichospheres	X	X	X	X			X	X
Classo-1		X						
GN 11B		X						
Pa_3-sm30		X	X					
Pperi-sm5		X						
P_3-sm60		X	X					
P^3-sm56C		X						
P^3-r29		X						
P^3_4-foss 1		X	X	X	X		X	X
P^3-sm 1B		X						
P^3-sm57C		X						
P^3-sm60B		X						
S_1-rt8B		X						
Sequoia			X					
P_3-sm30B			X	X		X		
P^3-sm56			X					
P^3-p 1			X	X				
TO-p7B			X			X		
Pa_5-sm 1			X	X		X		X
P^3-sm 16D			X		X	X		X
Pa^3-sm25C			X					
Pperi-r3			X					

Sample	OBW-2	OBW-3	OBW-4	OBW-5	OBW-6	FW-1	FBO-2	FBO-3
Number	D4190	D4191	D4192	D4193	D4194	D4195	D4196	D4197
Code species								
P_5-sm3			X	X			X	X
BCP_4-r 1			X					
C_3syn-rt 1			X					
CP_3-sm36			X					
P_∞-sm3				X	X	X		
Pa_4-sm 1				X		X		X
cf. P_3-rt3D				X				
Tet-fov 1				X	X	X		
?Gothan 1				X	X			
Azolla				X				
BCP_3-rt				X				
BCP_3-rt2D				X				
Pa_3-r5B				X				
CP_4-sm2				X	X	X	X	
P_3-sm97				X				
P_3-sm98				X	X		X	
Peltate leaf hair					X	X		X
P_3-sm 16					X			X
P_3-sm 106B					X			X
BCP_3-rt2B					X		X	
C_3-rt36					X			
CP_3-rt 14					X	X		
CP_3-sm5					X			
C_3-rt 16B					X			
CP_3-r25					X		X	X
P_3-sm 109					X		X	X
C_3-p 12					X			
CP_3-sm53					X		X	X
CP_3-r38					X	X	X	
P_4-sm 16					X			
Micrhystridium						X		
M-sm8						X		
Pa_3-sm						X		X
M-p8						X		
P_3-r						X		
CP_3-rt (new)						X		
P_1-r (new)							X	
Gn-7C							X	
S_1-rt23							X	
Ana-2							X	
M-p 16							X	
CP_3 syn-rt							X	
P_3-sm30C							X	
P_3-p							X	
C_3-p4C							X	
C_3-rt36							X	

Sample	OBW-2	OBW-3	OBW-4	OBW-5	OBW-6	FW-1	FBO-2	FBO-3
Number	D4190	D4191	D4192	D4193	D4194	D4195	D4196	D4197
Code species								
Schizaea							X	
CP_3-rt44							X	X
BCP_3-p 1							X	
BCP_3-r							X	
C_3-rt 16C							X	X
$P\infty$-sm7B								X
M-r6								X
C_3-p20B								X
$P\infty$-sm8								X
C_3-rt35								X
P_4-sm 1								X
Gothan (new)								X
S_1-rt8C								X
C_3 syn-r9								X
Tasmanites								X

KG-63-6J

REPORT ON REFERRED FOSSILS

P&S Branch, Denver Lab, U.S.G.S.
Bldg. 25, Federal Center, Denver, Colorado

KG-68-7D

Stratigraphic range: Eocene-Oligocene

Kinds of fossils: Pollen

General locality: Kentucky

Quad. or area: Dublin quadrangle

Referred by: John Sims

Shipment No.: KG-68-7D

Report prepared by: R. H. Tschudy
Nov. 1, 1968

Date material received: Sept. 18, 1968

Status of work: Complete

The following sample was examined palynologically.

Si DNa-30 from 2 mi west of Dublin, B-10 auger test hole, from 13-27 ft below surface, Kentucky coordinates 1,102,150-143,800, Dublin quad., Graves County, Kentucky. It was given USGS Paleobotanical locality number D4214.

The following pollen code species were recognized:

Pperi-rlB Liquidambar	$-CP_4$-sm2	CP_3-rt44
$-P_3$-sm30C var Carya	$P\infty$-sm7B	P_3-sm 106B
$-BCP_3$-rt8?	$-P_3$-sm72	C_3^3-r
$-P_4$-foss large	$-BCP_3$-rt2	C_3^3-rt
$-P_5$-foss large	$P\infty$-sm8	$-C_3^3$-st (new)
Pa_3-sm 16D	BCP_3-r (new)	Pperi-sm (new)
$-BCP_3^3$-large (new)	C_3-r (new)	

This sample of purported Claiborne age did not yield a Claiborne assemblage. Although our control for the upper part of the Jackson and the Oligocene is sketchy, I believe that the sample cannot be older than Jackson. Several of the species found are not present in our control material below the Bucutunna Clay. I think it probable that this sample is of upper Jackson (late Eocene) or Oligocene age with a preponderance of evidence pointing to the Oligocene.

Robert H. Tschudy

R. H. Tschudy

KG-68-10D

REPORT ON REFERRED FOSSILS

P&S Branch, Denver Lab, U.S.G.S.
Bldg. 25, Federal Center, Denver, Colorado

Stratigraphic range: Eocene

General locality: Kentucky

Referred by: John Sims, 11/12/68

Report prepared by: Robert H. Tschudy, 11/27/68

Status of work: Complete

Kinds of fossils: Palynomorphs

Quadrangle or area: Milburn quad.

Shipment No.: KG-68-10D
Regional Geology in Kentucky

Date material received: 11/13/68

One sample, SiMN-1 from Kentucky Clay Products Pit (new dark clay cap); Kentucky coordinates 1,082,150 E, 194,800 N, Carlisle Co., Kentucky was sent for palynological examination. It was given USGS Paleobotanical Locality number D4243.

The following code species were identified:

Gothan-1
P3-sm30C
P3-sm106B
P3-sm16
M-p6
M-p8
P3-sm109
BCP3-p1
P4-sm1
BCP3-rt2B
Tet-fov2
P6-sp1
CP4-sm2B
C3-p4C
P4-sm11B
C3-rt16C
S1-p (new)
CP3-rt44
C3-rt36
P4-foss 1
C3-rt40
cf BCP3-rt3
P3-sm70

The assemblage shows the closest resemblance to assemblages from the Moodys Branch. I believe this sample represents the lower Jackson but the possibility still exists that it may be from the uppermost Claiborne. Control pollen floras near the Claiborne-Jackson boundary are similar. In the absence of certain species, distinction of the two units is difficult.

Robert H. Tschudy

REPORT ON REFERRED FOSSILS

P&S Branch, Denver Lab, U.S.G.S.
Bldg. 25, Federal Center, Denver, Colorado

Stratigraphic range: Eocene-Holocene? Kinds of fossils: Palynomorphs

General locality: Kentucky Quad. or area: Bondurant Quadrangle

Referred by: W. I. Finch Shipment No.: KG-68-8D

Report prepared by: 11/25/68 Date material received: 10/23/68

Status of work: Complete

Ten samples were submitted for palynological evaluation. All were productive and were given USGS paleobotanical locality numbers as follows:

Sample	Locality	Number
FBO-4	Depth 112-114', drill hole FB-5, USGS 2.55-3.0; Kentucky coordinates 962,550-83,000; Bondurant quad., Fulton Co., Kentucky.	D4225
FBO-5	Depth 178-181', drill hole FB-6, USGS 8.0-4.9; Kentucky coordinates 968,000-84,900; Bondurant quad., Fulton Co., Kentucky.	D4226
FBO-6	Depth 130-137', drill hole FB-7, USGS 8.1-6.0; Kentucky coordinates 958,100-86,000; Bondurant quad., Fulton Co., Kentucky.	D4227
FBO-7	Depth 83-92', drill hole FB-9, USGS 6.7-4.5; Kentucky coordinates 956,700-94,500; Bondurant quad., Fulton Co., Kentucky.	D4228
FBO-8	Depth 170-182', auger hole FB-10, USGS 1.45-5.4; Kentucky coordinates 951,450-95,400; Bondurant quad., Fulton Co., Kentucky.	D4229
FBO-9	Depth 173-180', auger hole USGS 2.0-4.15; Kentucky coordinates 942,000-84,150; Bondurant quad., Fulton Co., Kentucky.	D4230
FBO-10	Depth 140-147', auger hole USGS 0.9-8.2; Kentucky coordinates 940,900-98,200; Bondurant quad., Fulton Co., Kentucky.	D4231
FBO-11	Depth 168-169?', auger hole USGS 2.0-8.5; Kentucky coordinates 952,000-108,500; Bondurant quad., Fulton Co., Kentucky.	D4232

FBO-12	Depth 116-120', auger hole USGS 4.65-2.05; Kentucky coordinates 954,650-102,050; Bondurant quad., Fulton Co., Kentucky.	D4233
FBO-13	Depth 130-135', auger hole USGS 7.0-0.3; Kentucky coordinates 947,000-90,300; Bondurant quad., Fulton Co., Kentucky.	D4234

Code species identified from these samples are shown on the attached chart.

Sample FBO-4 (D4225) was calcareous and yielded a sparse but diverse flora consisting of palynomorphs from the Mississippian (Triquitrites), probable Devonian (Tasmanites), Late Cretaceous of Western United States (Kurtzipites, Wodehouseia, Aquilapollenites, Umbosporites, and Pemphixipollenites), Paleocene (Pistillipollenites, Carya), and late Oligocene or younger (Pinus, Chenopodiaceae and Compositae pollen). Most of the palynomorphs were redeposited. The sample certainly cannot represent the Jackson. It probably represents the Holocene with redeposited older palynomorphs.

The remainder of the samples yielded pollen and spore floras characteristic of the upper Eocene Jackson Group. The only evidence of marine deposition was a single hystrichosphere in sample FBO-8 (D4229). This specimen probably was redeposited. The presence of massulae of Azolla in samples FBO-5 (D4226), FBO-7 (D4228), and FBO-13 (D4234) suggests continental lacustrine deposition.

Robert H. Tschudy

R. H. Tschudy

Sample	FBO-4	FBO-5	FBO-6	FBO-7	FBO-8	FBO-9	FBO-10	FBO-11	FBO-12	FBO-1
Number	D4225	D4226	D4227	D4228	D4229	D4230	D4231	D4232	D4233	D4234
Code species										
Triquitrites	X									
Tasmanites	X									X
C_3-sm 19 (Kurtzipites)	X									
Wodehouseia	X									X
Pinus	X									
Chenopodiaceous pollen	X									
Aquilapollenites	X									
Pistillipollenites	X									
Carya (small)	X									
Ulmus	X									
Juglans (small)	X									
Umbosporites	X									
Alnus	X									
Pemphixipollenites	X									
Compositae	X									
dinoflagellates	X									
Azolla massula w/o glochidia		X		X						X
P_3-sm30A		X		X	X		X	X		X
P_3-sm30C		X	X	X	X	X	X	X	X	X
CP_4-sm2B		X	X	X	X	X		X	X	X
P_3-rt4A		X								X
P_3-sm 16		X	X	X	X	X	X	X	X	X
Pa_4-sm 1		X								
CP_3-r25		X		X	X	X				
M-r6		X	X	X	X	X	X	X	X	
P_3-sm 106B		X	X	X	X	X	X	X	X	X
CP_3-sm53		X	X	X	X	X	X	X	X	X
C_3-rt36		X	X	X	X	X	X	X	X	X
CP_3-rt44		X	X	X	X	X	X	X	X	X
P_4-foss 1		X	X	X	X	X	X	X	X	X
BCP_3-rt3		X		X			X		X	
P_3-sm 109		X		X	X	X	X	X	X	X
Peltate leaf hair		X	X	X		X	X	X		X
CP_3-sm5		X	X	X	X	X	X	X	X	X
M-p8		X	X	X	X	X	X	X	X	X

Sample	FBO-4	FBO-5	FBO-6	FBO-7	FBO-8	FBO-9	FBO-10	FBO-11	FBO-12	FBO-13
Number	D4225	D4226	D4227	D4228	D4229	D4230	D4231	D4232	D4233	D4234
Code species										
P_5-sm3		X					X			
C_3-rt 16C		X	X		X	X	X	X		
BCP_3-rt (fine ret.)		X		X				X	X	
C_4-sm8		X								
P_3-sm98		X	X	X	X	X	X		X	X
P_∞-sm8		X				X			X	X
C_3-P20B		X	X	X	X			X	X	
V_2^2L/r		X						X		X
V_2^2S/sm		X	X	X	X			X		
C_3^2-p4C			X		X	X				
P_3-sm70			X	X	X	X	X	X	X	
BCP_3-p 1			X	X	X		X	X	X	X
M-p 16			X	X	X	X	X	X	X	X
P_4-sm 1			X	X	X	X	X	X	X	X
CP_3-r47			X				X			
P_5-foss 1			X	X		X				X
P_3-sm72			X			X	X		X	
S_1-rt23				X	X	X	X	X	X	
CP_4-sm2					X		X			
Hystrichosphere					X					
P_1-fov2					X	X	X		X	
CP_3syn-sm3						X				
P_6-sp 1						X				X
BCP_3-r 12							X	X		X
Liquidambar								X		
CP_4-sm51									X	X
P_4-sm 11B										X
P_∞-sm7B										X
Appendicisporites										X
Wilsonites										X

KG-68-9D

REPORT ON REFERRED FOSSILS

P&S Branch, Denver Lab, U.S.G.S.
Bldg. 25, Federal Center, Denver, Colorado

Stratigraphic range: Eocene

General locality: Missouri-Kentucky

Referred by: W. I. Finch, 11/7/68

Report prepared by: Robert H. Tschudy, 11/27/68

Status of work: Complete

Kinds of fossils: Palynomorphs

Quadrangle or area: Bondurant & Blandville quads.

Shipment No.: KG-68-9D
Regional Geology in Kentucky

Date material received: 11/12/68

Five samples were submitted for palynological examination. Sample OBL-3, a white siltstone was barren. The remainder were given USGS Paleobotanical Locality numbers as follows:

Sample	Locality	Number
FBO-15	Drill hole on Island No. 7, USGS 2.4-8.45, depth 114-132'; Kentucky coordinates 962,400-118,450; Bondurant quad., Mississippi Co., Mo.	D4239
FBO-14	Drill hole USGS 9.95-3.9, depth 123-132'; Kentucky coordinates 959,950-123,900; Bondurant quad., Mississippi Co., Mo.	D4240
FBO-16	Drill hole USGS 6.8-3.9, depth 145-147'; Kentucky coordinates 966,800-113,900; Bondurant quad., Mississippi Co., Mo.	D4241
OBL-2	0.44 mi. SW of BM 457 at Blandville; Kentucky coordinates 1,059,400-236,200; Blandville quad., Ballard Co., Ky.	D4242

Code species identified from these samples are shown on the following chart.

Code Species \ Sample Number	FBO-15 D4239	FBO-14 D4240	FBO-16 D4241	OBL-2 D4242
P3-sm30A	x	x		
P3-sm30C	x	x	x	x
P3-sm16	x	x	x	x
P3-sm106B	x	x	x	x
P3-sm70	x	x		
CP3-sm5	x	x	x	
CP3-rt44	x	x	x	
C3-rt16C	x	x		
M-p16	x	x	x	
C3-rt36	x		x	x
CP3-r25	x	x	x	
Peltate leaf hair	x	x		x
CP3-sm53	x	x	x	x
M-r6	x	x		
P5-foss1	x			
BCP3-rt3	x			
P4-foss1	x	x	x	x
C3-p4C	x	x	x	
CP4-sm2B	x	x	x	x
M-p3	x	x		x
P3-sm98	x	x	x	x
P3-sm2B	x	x		
BCP3-rt2B	x	x		x
CP4-sm2	x			
P∞-sm8	x	x		
P3-sm72	x	x		
C3-p20B	x	x		
BCP3-p1	x	x	x	
V2L/r	x	x		
V2S/sm	x	x		
S1-rt23	x	x	x	
P4-sm11B	x	x	x	
Gothan 1	x			x
BCP3-rt (fine ret)	x	x		
CP3-r (new)	x	x	x	
P4-sm1		x		x
P∞-sm7B		x		
C3-sm1B		x	x	
Liquidambar		x		
Charonisporites		x		
BCP3-r12		x		
C4-r (new)		x	x	
Tasmanites		x		
Triquitrites		x		

Code Species \ Sample Number	FBO-15 D4239	FBO-14 D4240	FBO-16 D4241	OBL-2 D4242
Lycospora		x		
P3-sm109			x	
P3-r47			x	
P∞-sm3				x
P3-sm56				x
CP3-p				x
P3-rt14				x
CP3-r (new)				x
Pet-fov2				x
P3-p20				x
P3-r				x
P3-r38				x
P3-sm60				x
P1-p (new)				x

Samples FBO-15 (D4239), FBO-14 (D4240), and FBO-16 (D4241) all yielded Jackson assemblages. Sample FBO-16 was poorer than the others. Abundant trash and tissue fragments tended to obscure the palynomorphs. Sample FBO-14 yielded a few specimens from the Paleozoic (Tasmanites, Triquitrites, Lycospora) indicating a slight amount of redeposition.

Sample OBL-2 (D4242) yielded an assemblage that has attributes of both the upper Claiborne and the lower Jackson. Gothanipollis (Gothan-1) has been found in control material only in the Cockfield and Moodys Branch Formations. The code species P3-sm56 has been found above the Claiborne only rarely. I believe this sample represents the upper Claiborne. It is from definitely higher in the section than Wilcox or lower Claiborne.

Robert H. Tschudy

RHT:k

KG-68-11D

REPORT ON REFERRED FOSSILS

P&S Branch, Denver Lab, U.S.G.S.
Bldg. 25, Federal Center, Denver, Colorado

Stratigraphic range: Upper Cretaceous

Kinds of fossils: Palynomorphs

General locality: Kentucky

Quadrangle or area: Livingston County

Referred by: R. W. Swanson

Shipment No.: KG-68-11D
Regional Geology in Kentucky

Report prepared by: R. H. Tschudy, 2/19/69

Date material received: 12/9/68

Status of work: Complete

Two samples, presumed to have been from the Tuscaloosa Formation, were sent for palynological examination. They both yielded excellent assemblages and were given U.S. Geological Survey Paleobotanical Locality Numbers as follows:

Sample	Locality	Number
SGR-1	From Hwy. 453 road cut, 1/3 mi. NW of Grand Rivers, Livingston Co., Ky.; Kentucky coords.: 1,271,500 E., 254,200 N.; about middle of 10 foot black clayey silt in Tuscaloosa Formation.	D4268-A
SGR-2	Same locality as sample SGR-1, immediately above middle of 10 foot black clayey silt in Tuscaloosa Formation.	D4268-B

Palynomorphs identified from these samples are shown on the following chart:

KG-68-11D

Code Species	Sample Number	SGR-1 D4268-A	SGR-2 D4268-B
P3-sm67		x	x
P3-sm58		x	x
P3-sm75 var		x	
Pa3-sm26		x	x
S1-sm12		x	x
C3-rt29B		x	x
P3-sm84		x	x
CP3-sm30		x	x
P3-r22 (Trudopollis)		x	x
C3-rt (new)		x	x
Trisectoris costatus		x	x
Gleich. 2B		x	x
CP3-rt8		x	
P3-r26 (Oculopollis)		x	x
C3-rt (large lacunae)		x	x
Tet-sm3		x	x
Pa3-r (new)		x	
Pa3-r (new)		x	
Tet-sm (new)		x	x
P3-sm51		x	x
P3-sm60		x	
CP3-sm14		x	
S1-rt19		x	x
P3-r35		x	x
P3-r22C		x	x
S1-r10		x	x
P3-sm (new)		x	
P5-sm (new)		x	
CP3-rt (detached reticulum)		x	x
App-1			x
Hemi 1A			x
Fdens-sm6B			x
Fdens-sm3			x
C3-rt (heavy muri)			x
V2L/rug 5			x
Fmem-rt2			x
C3-sm31			x
Fmem-sm6B			x
TO-rug 13			x
Fmem-rt1			x
TO-rug 15			x
S1-rt11			x
C3-rt13B			x
Schizocystia			x
S1-r18			x

KG-68-11D

Code Species	Sample Number	SGR-1 D4268-A	SGR-2 D4268-B
M-rt2			x
Sl-p8			x
Sl-p4			x
Fmem-sm (new)			x
Ea-rug 2			x

The composition of the assemblages from these two samples is such that they cannot possibly represent the Tuscaloosa Formation. There is no doubt concerning the Late Cretaceous age of the samples, but the angiosperm pollen content is much more advanced evolutionarily, and much more diverse than that found in the Tuscaloosa. For example, the genus Trudopollis (P3-r22) is first seen in Mississippi Embayment control samples in the Coffee and Cusetta sands; and the stratigraphic range of the genus Oculopollis (P3-r26) ranges from the upper Campanian through the Maestrichtian and into the Paleocene.

Sample SGR-2 (D4268-B) yielded a characteristic McNairy assemblage. The ample SGR-1 (D4268-A) yielded many of the same species that were present in SGR-2 and also many species that have not been seen before in McNairy control material. I am sure that both of these samples represent strata younger than Tuscaloosa, and probably represent the McNairy Formation.

If it is possible I would appreciate receiving additional material from these Cretaceous localities. I would like to examine the material more intensively and evaluate the new species that are present. Any further stratigraphic interpretations that you can provide also will be appreciated.

Robert H. Tschudy

R. H. Tschudy

RHT

KG-69-2D

REPORT ON REFERRED FOSSILS

P&S Branch, Denver Lab, U.S.G.S.
Bldg. 25, Federal Center, Denver, Colorado

Stratigraphic range: Eocene

Kinds of fossils: Pollen & spores

General locality: Kentucky

Quadrangle or area: Blandville quad.

Referred by: W. W. Olive, 2/3/69

Shipment No.: KG-69-2D
Regional Geology in Kentucky

Report prepared by: R. H. Tschudy, 4/7/69

Date material received: 2/6/69

Status of work: Complete; report by R. M. Kosanke accompanying this report.

The sample OBL-2 from 0.45 miles SW of Circle Park at Blandville, Kentucky coordinates 1,059,450-236,150, Ballard Co., Kentucky was given USGS Paleobotanical Number D4285.

The following code species were identified from this sample:

BCP3-rt5	P3-sml6	Peltate leaf hair
P4-fossl	M-p8	Sl-rt23
Tet-fov2	cf. P3-rt3D	Ana-2
P3-sm98	CP4-sm2	CP3-r25
Sl-r24	CP3-rl2	P3-sm56D
CP3-r38	CP-rtl4	Gothan-1
M-pl6	CP3-sm5	P3-sm30C
C3-rt36	P4-sml6	CP3-sm53
C3-pl2	CP3 sym-sm2	

This assemblage represents the Claiborne. More specifically it pertains to the upper Claiborne, having closest resemblance to assemblages from the Cockfield and Cook Mountain Formations. The assemblage did not yield any marine palynomorphs. The fossils indicate continental deposition, removed from any marine influence.

Robert H. Tschudy

REPORT ON REFERRED FOSSILS

P&S Branch, Denver Lab, U.S.G.S.
Bldg. 25, Federal Center, Denver, Colorado

Stratigraphic range: Eocene

Kinds of fossils: Palynomorphs

General locality: Kentucky

Quad. or area: Milburn and Blandville quads.

Referred by: W. W. Olive

Shipment No.: KG-69-4D

Report prepared by: R. H. Tschudy 7/8/69

Date material received: 5/22/69

Status of work: Complete

Two samples were sent for palynological examination. Both were productive and were given USGS paleobotanical locality numbers as follows:

Sample	Locality	Number
OMn-1	49-57' deep in auger hole located 0.5 mi NNE Elsey Cemetery; Kentucky coordinates 1,057,400-213,100; Milburn quad., Carlisle Co., Kentucky	D4334
OBL-3	Altitude of 390' ¼ mi NW of Mayfield Creek Church; Kentucky coordinates 1,072,000-218,400; Blandville 7½' quad., Carlisle Co., Kentucky	D4335

The following palynomorphs were identified from these samples.

Same as p. 4 Dupl

Sample Number	OMn-1 D4334	OBL-3 D4335
Code species		
Peltate leaf hair	X	X
Tet-fov2	X	X
P_3-sm 16	X	X
P_3-r42	X	
CP_3-rt 14	X	X
M-p8	X	X
TT-sm38	X	
CP_3-r3SB	X	
P_3-sm (new)	X	
C_3-sm 1B	X	
CP_3-sm 5	X	
C_3syn-rt	X	
cf.P_3-sm 1B	X	
C_3-rt36	X	X
CP_3-sm53	X	X
BCP_3-p 1	X	X
TO-p	X	
P_3-sm30C	X	X
P_4-sm6	X	X
BCP_3-rt5	X	X
P_3-sm72	X	
C_3-p 12	X	
P∞-sm3	X	
CP_3-rt28	X	
M-p 16		X
Botryococcus		X
C_3-syn-r		X
P_1-sp		X
C_3-rt 16C		X
O-p5B		X
cf.S_1-rt 14		X
P_3-sm64		X

I believe both of these samples, in spite of differences, are virtually the same age. Both are closer, in their palynomorph content, to the Claiborne than they are to the Jackson, even though many of the forms found are common to both. Species that are present in and characteristic of our control Moodys Branch and Yazoo Clay material were not found in these samples. I believe these samples represent the upper Claiborne.

Robert H. Tschudy

R. H. Tschudy

RHTK

KG-69-6D

REPORT ON REFERRED FOSSILS

P&S Branch, Denver Lab, U.S.G.S.
Bldg. 25, Federal Center, Denver, Colorado

Stratigraphic range: Not determined

Kinds of fossils: Palynomorphs

General locality: Kentucky

Quadrangle or area: Dublin quad.

Referred by: John D. Sims

Shipment No.: KG-69-6D
Regional Geology in Kentucky

Report prepared by: Robert H. Tschudy, 9/15/69

Date material received: June 11, 1969

Status of work: Complete

Your sample SiDNa-21 from B-10 auger hole 60-67' below the surface, 1 mile E. of Fulgham, Kentucky; Kentucky coordinates E. 1,098,600-N. 132,900, Dublin quadrangle, Hickman County, Kentucky was processed and given USGS Paleobotany locality number D4339. This sample was very poor. I was able to identify only a few palynomorphs, and some of these I could not identify to species (code). The following list includes all the forms found:

CP3-sm	P4foss 1	C3-r
PCP3-rt2	cf BCP3-r25	CP3-r
C3syn-sm	cf P3-sm68	P3-sm3CC
Carya (new)		

This assemblage is too poor on which to base a determination. The suggestion of Jackson or even lower Oligocene is indicated. Species to verify this suggestion were not found.

Concerning your queries, I compared sample D4214 with D1898. Although sample D1898 yielded the more diverse flora, sample D4214 contained at least 8 species in common with D1898. Furthermore both assemblages yielded species which we do not have in our Jackson Control Material. I have no reason to change the original determination sent you.

Neither sample D1898 nor sample D4214 yielded palynomorphs indicative of a marine or brackish water deposition site. The same is true of sample D4339, although this latter sample was too poor to provide good evidence.

Robert H. Tschudy

KG-69-7D

REPORT ON REFERRED FOSSILS

P&S Branch, Denver Lab, U.S.G.S.
Bldg. 25, Federal Center, Denver, Colorado

Stratigraphic range: Eocene

General locality: Kentucky

Referred by: John D. Sims, 6/25/69

Report prepared by: Robert H. Tschudy, 9/15/69

Status of work: Complete

Kinds of fossils: Palynomorphs

Quadrangle or area: Dublin and Wickliffe quads.

Shipment No.: KG-69-7D
Regional Geology in Kentucky

Date material received: 1969

Three samples were sent for palynological examination. Sample SiFF-2 was barren. The remaining two samples were given USGS Paleobotany locality number as follows:

Sample	Locality	Number
SiFF-1	B-40 auger sample, from a depth of 42-57 ft; 1.1 mi. SE of intersection of Carlisle, Hickman and Graves County lines; Kentucky coordinates 1,138,300-172,600, Dublin quadrangle, Graves County, Kentucky.	D4340
OW-2	From right bank of Cane Creek, 1.29 mi. NW of Ballard Church; altitude 380 ft; Kentucky coordinates 1,042,250-257,000, Wickliffe 7½' quadrangle, Ballard County, Kentucky.	D4341

Palynomorphs identified from these samples are shown on the following chart:

Sample number / Code species	SiFF-1 D4340	OW-2 D4341
Peltate leaf hair	x	
P3-sm56	x	x
P3-sm72	x	
P3-sm300 (Carya)	x	x
M-p8	x	

Sample number	D4340	D4341
Code species		
P3-sm16	x	
P3-sm106	x	
P4-foss 1	x	x
V2S/	x	
CP3-st	x	
CP3syn-rt	x	
ECP3-r	x	
Pa5-sm1	x	x
P∞-sm7B	x	
Pa4-sm1	x	x
Tet-fov2	x	x
CP3-rt14	x	
cf ECP3-rt3	x	
CP3-sm53	x	
ECP3-rt7B	x	
CP4-sm2	x	
CP3-rt19C	x	
grass	x	
Hystrichospheres	x	x
Dinoflagellates	x	x
P3-p1		x
CP3-r25		x
CP3-p4B		x
ECP3-r11		x
P6-sm5		x
P∞-sm3B		x
ECP3-rt10		x
ECP3-rt8		x
Pa3-sm21		x
P3-sm98		x
CP3-r38		x
CP3-r26		x
Pa3-sm25C		x
Pa3-sm16		x
P3-fov		x
Gothan 1		x

Sample SiFF-1 (D4340), on the basis of the fossils identified, bears the closest resemblance to our control material from the Cook Mountain Formation. This sample is undoubtedly from the upper part of the Claiborne Group. A few hystrichospheres and dinoflagellates were seen. These suggest a slight marine influence at time of deposition.

Sample OW-2 (D4341) yielded a good Claiborne assemblage. I found no conclusive evidence that might suggest a Wilcox age. The sample, I believe, is from the lower to middle part of the Claiborne Group. The upper part of the Claiborne is definitely excluded. The presence of a very few hystrichospheres and dinoflagellates suggests a slight marine influence at time of deposition.

Robert H. Tschudy

Robert H. Tschudy