Title: Blue Mounds

Location: Major mounds north of U. S. Highway 151 and centered in the NW$\frac{1}{4}$ of Section 1, T. N., R. E., Iowa County and the SW$\frac{1}{4}$, NW$\frac{1}{4}$, Sec. 6, T. N., R. E., Dane County (Blue Mounds 7.5-minute topographic quadrangle, 1962).

Author: M. E. Ostrom (modified from Black, 1970)

Description: (modified from R. F. Black, 1970): A log of the well in Blue Mounds State Park and at the top of West Blue Mounds indicates the rocks which occur beneath the ground surface (see attachment). West Blue Mound (1716 feet) and East Blue Mound (about 1490 feet above sea level) rise 300 to 500 feet above the general level of the surrounding upland cut in the Galena-Decorah-Platteville dolomites of Ordovician age (see diagram). West Blue Mound is capped with 85 feet of dolomite and chert of Niagaran (Silurian) age; all dolomite in the upper 75 feet is completely silicified (Thwaites, 1960, p. 26). Between the 1630-foot and 1380-foot contours the mound is ringed by gentle slopes on the Maquoketa Shale (upper Ordovician). The flat surface of East Blue Mound is developed in the Maquoketa Shale; only 80 feet remain according to one drill hole (Cline, 1965, Pl.4). Relatively few fragments, up to four feet across, of the younger silicified Niagaran unit are scattered over the top and flanks.

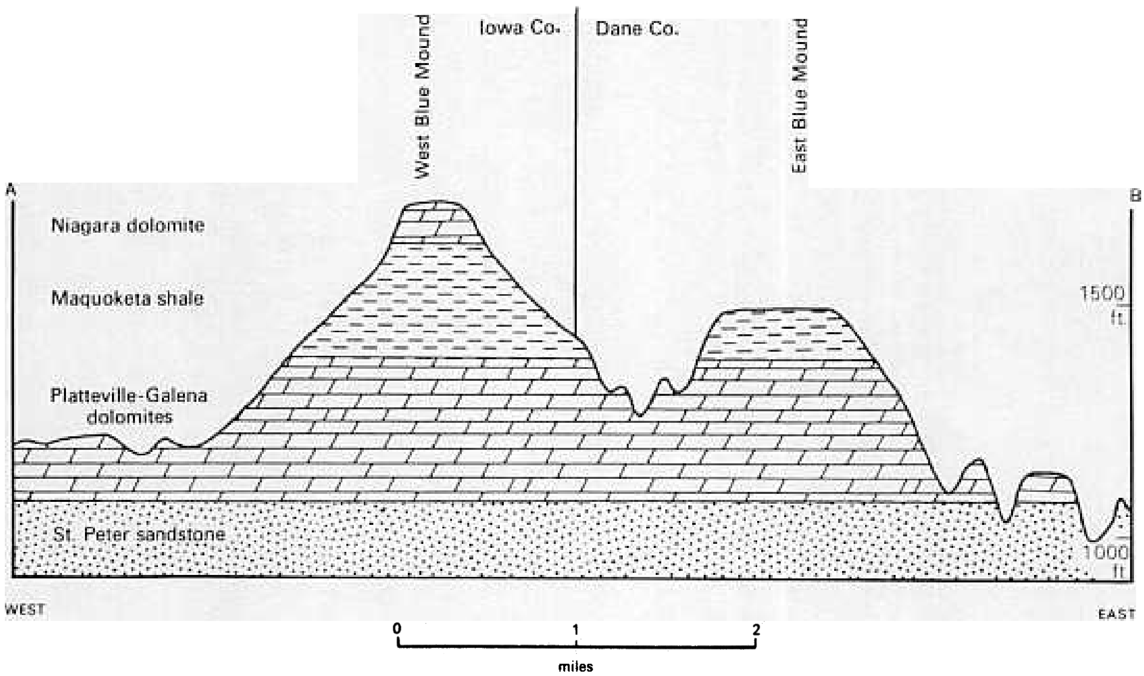
West Blue Mound is an outlier of the Niagaran escarpment that lies about 50 miles to the southwest in Illinois and Iowa and about 70 miles eastward in eastern Wisconsin. Other smaller and lower outliers in southwestern Wisconsin, closer to the escarpment, can be seen from the top of Blue Mound. None occurs in southeastern Wisconsin where Martin (1932, p. 65-66) thought glaciation had destroyed them.

Outliers if flat-lying strata or gently-dipping cuestas are common in many parts of the world. As isolated hills capped with resistant rocks readily correlated with those of the nearby units, they have been considered the result of normal but long-term erosion processes. However, remote outliers owe their existence to peculiarities in the development of the drainage network which in turn result commonly from unusual structures, properties of the rock, and position with respect to drainage divides. In this regard West Blue Mound seems entirely fit with its resistant cap and its position in a major drainage divide. However, East Blue Mound does not seem fit. It lies adjacent to West Blue Mound on the same drainage divide, but is capped with fissile shale with thin beds of dolomite at the very surface. Loess only 1 foot to 4 feet thick covers the shale. Soil profiles examined only in the field, suggest it is not older than Late Wisconsinan. The slopes established on the Maquoketa shale are similar for both mounds, yet East Blue Mound has a much larger and flatter top than West Blue Mound.

Southwestern Wisconsin, the Western Upland of Martin (1932, p. 41-80), long has been known as the Driftless Area (Chamberlin and Salisbury, 1885). There, seemingly subaerial erosion has been modifying the landscape continuously since Mesozoic times. Unfortunately, little agreement exists among investigators as to the ages of the present-day landforms or their significance in the evolutionary history of the region.

Evidence of glaciation comes from abundant but thinly and widely scattered Precambrian rocks and Paleozoic chert and sandstone that rest on younger formations under loess. A large drift deposit near Muscoda has been opened for aggregate since MacClintock (1922) identified it. It is in the center of the Driftless Area and is interpreted as evidence of a former front of ice that came from the northwest. Ice-contact deposits grade eastward into coarse deltaic deposits and into rhythmically bedded, clayey silt and sand. Those deposits were covered in part by fluvial sediments from the east up to levels of about 60 feet above the present Wisconsin River. They seem unquestionably to be early Pleistocene in age. Kame-like deposits with constituents of local materials topographically above source areas, anomalous clay minerals and rubbles and other features best explained by glaciation are relatively common north of the Wisconsin River (Akers, 1961 and 1964). Many of those deposits lie under loess apparently younger than 30,000 radiocarbon years old.

Around Blue Mounds the paucity or absence of coarse chert and silicified rubble in the streams and on the flatter divides is puzzling if the region has been undergoing long-continued down wasting only by processes now affecting the landscape (see Part A this guide). Both the Niagaran and Galena Dolomites are exceedingly rich in siliceous material. Abundant blocks of chert and of silicified dolomite of various sizes up to 25 feet across lie on the shale slopes of West Blue Mound, but fewer and smaller blocks flank East Blue Mound. Deployment of the blocks into fields as much as one mile downslope from the Niagaran cap is considered the result of former peri-glacial mass movements radially outward over the shale slopes of 3-7 degrees (Smith, 1949) (Fig. 5).



Cross section through Blue Mounds, from east to west

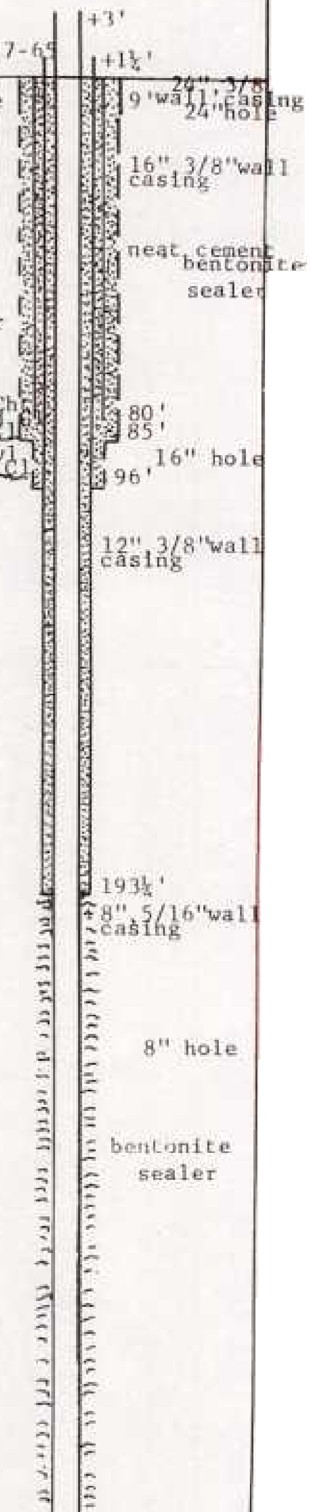
Significance: The origin of the Blue Mounds is not known for certain. The presence of thick sections of Maquoketa Shale and Silurian dolomite are historically important.

What is the historical significance of the presence of Maquoketa Shale and Silurian Dolomite in the Mounds? What is the significance of their absence in the surrounding area? Explain. Noting that West Mound is capped by dolomite and East Mound by shale, how do you interpret their history of formation? You are in the "Driftless" area. What difference can you note in the topography to the east and west of the mound area? What evidence would you look for to indicate that the area was glaciated? That it was not glaciated? How was the Silurian dolomite removed? If by solution, what is the evidence? Where would you look for evidence? If by mechanical processes, what is the evidence? Where would you look for evidence? How do you explain the presence of the Cave of the Mounds at Blue Mounds Cave?

References: Chamberlain & Salisbury, 1885; MacClintock, 1922; Martin, 1932; Smith, 1949; Akers, 1961 & 1964; Cline, 1965; Black, 1970.

Wisconsin Conservation Dept., Blue Mounds State Park, Upper Area, Well "A",
NW ¼, Sec. 1, T 6N, R 5E
Ed Niffinegger, Jr. - 6-14-65
Sample Nos. 256270-256494A - Examined by Janet Olmstead, 9-17-65

SURFACE	0-4	4	Gvl,Mxd,VFn,VyAng,P,Snd,Cl
	4-8	4	Gvl,YlOrMxd,VFn,VyAng,P,QtzFe;Snd,Cl,St,Aggate
	8-12	4	Snd,GryOrMxd,VC,VyAng,P,Qtzt-Gvl,&SameAsAbove
	12-16	4	Snd,Same&DkYlOr,VC,Ang,P,QtztGvl,St,Cl,OxFe
	16-24	8	Snd,SameAsAbove,MchOrSt,LtlFnGvl Cl,TrAggate,LtYlGryQtz,TrM,Fn
	24-28	4	Snd,SameAsAbove,M,C,VC,MchFn,Cht,Aggate,WhQtzt
	28-36	8	Snd,PlYLGryOr,CVC,Ang,P,MchVFn,FnGvl,MchFnSnd,LtlSt,MchFn
	36-40	4	Snd,Same,M,C,Ang,P,St,Qtzt,Cht,Jasper,SndAggs,
	40-44	4	Snd,Same,C,VC,VAng,P,St;FnVFn,TrM,MchVFnGvl
	44-52	8	Gvl,DkYlOrSt,Fn,M,Ang,P,M,Fn,Snd,Qtzt,Cht,Cl
	52-56	4	Snd,GryOrSt,C,Ang,P,Gvl,Qtzt,Cht,MchSt,Gvl
	56-60	4	Snd,Sty,DkYlOr,M,C,Ang,P,Qtzt,Cht,MchCht,Jasper
	60-64	4	St,DkYlOrSt,M,C,Ang,P,LtlLim;MchFn,VFnAngQtz
	64-76	12	Cl,MdOrBn,Si:P,LtlLim,Cht;-C-VFn,TrRndSnd
	76-80	4	Dol?,DkYlOrMxd,Vfn,Fn,Ang,P,(Dolic)MchFn&MDol&Cht
	80-84	4	Cl,Same,Dolc:G,PorCht,Lim,DolGvl,Sh,Snd,Gvl,Cl
	84-88	4	Snd,Shly,OlGryMxd,C,VC,Sang,VP,PyrXls,Dol,Cht,CongSndGvl,Cl
96'	88-92	4	Cl,LtYlBn,Dolc:VP,Cht,Sh,LtlSnd
	92-96	4	Cl,Same,GryRdShPebs,LtlCht,TrPyr,Fn,M,Snd
MAQUOKETA	96-112	16	Sh,LtGnBlGry,Dolc:P
	112-124	12	Sh,LtOlGn,Dolc:P,Mch VFn DolXls
	124-128	4	Sh,LtOlGn,Dolc:P,Mch Mxd Dol
	128-132	4	Sh,LtOlGn,Dolc:P,Mch VFn Dol Xls
	132-140	8	Sh, Lt Gn Gry,Dolc:P,Mch VFn Dol Xls
	140-148	8	Sh, Lt Gn Gry,Dolc:P,Mch VFn Dol Xls
	148-152	4	Sh, Lt Yl Bn, Dolc:P,Mch VFn Dol Xls
	152-160	8	Dol,LtYlBn,M,Fn,Dolc:P,Por, Tr Sh, Pyr
	160-168	8	Dol,Lt Yl Bn Mot Lt Gry, por,TrSh, Pyr
	168-176	8	Sh, LtGnGry,MFn,Dolc:P, Mch Dol Xls
	176-236	60	Sh,LtGnGry,M,Fn,Dolc:P,Ltl Dol Xls
	236-240	4	Sh,LtYlGryBn,Dolc:P, Ltl Dol Xls
	240-244	4	Sh,Lt Yl Gry Bn, Dolc:P, Mch Dol Xls
	244-248	4	Dol, Mxd, M,Fn, Dns, Ltl Sh
	248-260	12	Dol, Mxd, M, Fn, Dns, Mch Sh
	260-264	4	Dol, Md Yl Bn, M, Fn, Dns, Mxd,MchSh,Pyr
	264-268	4	Sh, Mxd, Dolc:P, Mch Dol Xls
	268-272	4	Sh, Dk Bn Mxd, Dolc:P, Mch Dol Xls
	272-288	16	Sh, Dk Bn Mxd, Dolc:P
220'	288-316	28	Sh, Dk Bn
GALP	316-324	8	Dol, Lt Yl Gry Bn, M, Fn, Dns, Tr Sh
	324-328	4	Dol, Lt Yl Gry Bn, M, Fn,Dns,TrSh,Calc Xls
	328-344	16	Dol, Lt Yl Gry Bn, M, Fn,Dns, Tr Pyr



Wis. Conservation Dept., Blue Mounds State Park, Upper Area, Well "A",
Sample Nos. 256270-256494A

GALENA PLATTEVILLE	344-352	8	Dol,LtOr,M,Fn,Dns,TrC,TrPyr
	352-360	8	Dol,LtOr,M,Fn,Dns,TrC,TrSh
	360-364	4	Dol,LtOr,M,Fn,Dns,TrC,Sft
	364-372	8	Dol,LtRdOr,M,Fn,Dns
	372-436	64	Dol,LtYlBn,M,Fn,Dns
	436-448	12	Dol,LtYlBn,M,Fn,Dns,TrC
	448-456	8	Dol,LtYlBn,M,Fn,Dns
	456-488	32	Dol,LtYlBn,M,Fn,Dns, TrC
	488-504	16	Dol,LtYlBn,M,Fn,Dns,TrC,TrCh
	504-508	4	Dol,LtYlBn,M,Fn,Dns,TrC
	508-512	4	Dol,LtYlBn,M,Fn,Dns,TrC,TrPyr
	512-524	12	Dol,LtYlBn,M,Fn,Dns,TrC
	524-528	4	Dol,LtYlBnMxd,M,C,Dns,TrFn
	528-536	8	Dol,LtYlBnMotLtGry, M,Fn,Dns,TrC,TrPyr,Sh
	536-540	4	Dol,LtYlGryBn,M,Fn,Dns,RеC,TrPyr,Sh
	540-552	12	Dol,MdGryBn,M,Fn,Dns,MchSh,TrPyr
	552-560	8	Dol,LtYlGryBn,M,Fn,Dns,Ltl Sh,Pyr
	560-564	4	Dol,LtYlRdBn,M,Fn,Dns,TrSh
	564-576	12	Dol,LtYlRdBn,M,Fn,Dns,TrSh,Pyr
	576-580	4	DolLtYlRdBn,M,Fn,Dns,LtlSh,Pyr
	580-592	12	Dol,LtYlGryBn,M,Fn,Dns,LtlSh,Pyr
	592-596	4	Dol,MdGryBn,M,Fn,Dns,MchSh,Pyr
	596-604	8	Dol,MdYlBn,M,Fn,Dns,LtlPyr,Sh
	604-616	12	Dol,MdYlBn,M,Fn,Dns,TrPyr,Sh
608'	616-620	4	Dol,MdYlBn,M,Fn,Dns,LtlPyr,Sh
	620-624	4	Dol,LtYlGryBn,M,Fn,Dns,TrPor,TrPyr,Sh,Ss
ST PETER	624-628	4	Ss,LtGryBn,M,C,Rnd,P,TrVC,TrPyr,"caved" Dol
	628-632	4	Ss,LtGryBn,M,C,Rnd,P,TrFn,TrPyr
	632-640	8	Ss,LtGryBn,M,Fn,Srnd,P,TrVFn,TrPyr
	640-652	12	Ss,LtOrBn,M,Fn,Srnd,TrVFn,TrPyr,Stnd Lim
	652-656	4	Ss,LtOrBn,M,Fn,Srnd,TrC,TrPyr,Stnd Lim
	656-664	8	Ss,LtYlBn,M,Fn,Srnd,TrC,TrPyr
	664-668	4	Ss,LtYlBn,M,C,Srnd,P,TrFn,TrPyr
	668-676	8	Ss,MdYlBn,M,Fn,Srnd,P,TrC,VFn
	676-684	8	Ss,LtOrBn,M,Fn,Srnd,P,TrC,VFn
68	684-688	4	Ss,LtOrBn,M,Fn,Srnd,P,TrC,LtlSh,Dol
PduC	688-692	4	Ss,LtOrBn,M,Fn,Srnd,P,TrC,Mch Dol, Sh
	692-696	4	Ss,Dol,LtYlBn,M,Fn,Dns,TrSh

8" hole

642'

680' water lvl

Wis. Conservation Dept., Blue Mounds State Park, Upper Area, Well "A"
Sample Nos. 256270-256494A

PRAIRIE du CHIEN	696-712	16	Dol, LtYlBn, M, Fn, Dns, TrSh, Cht	
	712-724	12	Dol, VyLtYlBn, M, Fn, Dns, TrPor, MchSs, TrSh	
	724-728	4	Dol, VyLtYlBn, M, Fn, Dns, TrPor, MchSs, TrSh, TrPyr	
	728-732	4	Dol, VyLtYlBn, M, Fn, Dns, TrPor, LtlSs, Sh	8" hole
	732-736	4	Dol, VyLtYlBn, M, Fn, Dns, LtlStndPyr, TrSs	
	736-740	4	Dol, VyLtYlBn, M, Fn, Dns, TrC, TrSh	
	740-744	4	Dol, VyLtYlBn, M, Fn, Dns, TrC, TrSh, Pyr, Cht	
	744-748	4	Dol, VyLtYlBn, M, Fn, Por, TrSh, Pyr	
	748-752	4	Dol, VyLtYlBn, M, Fn, Por, LtlSs, Sh	
	752-776	24	Dol, LtYlBn, M, Fn, Dns, LtlCht, TrSh	
	776-788	12	Dol, LtYlGryBn, M, Fn, Dns, TrCht, TrSh	
	788-792	4	Dol, LtYlGryBn, M, Fn, Dns, TrSh	
	792-804	12	Dol, LtYlBn, M, Fn, Dns, TrSh, Cht	
	804-812	8	Dol, LtYlBn, M, Fn, Dns, LtlSh	
	812-820	8	Dol, LtYlBn, M, Fn, Dns, TrSh	
	820-840	20	Dol, LtYlBn, M, Fn, Dns	
	840-844	4	Dol, LtYlBn, M, Fn, Dns, TrPor	
	844-848	4	Dol, LtYlBn, M, Fn, Dns, TrPor, TrCht	
164'	848-856	8	Dol, LtYlBn, M, Fn, Dns, TrSs	
TREMP	856-872	16	Ss, VyLtRd, M, Fn, Srnd, P, Si:P, TrC, TrOols, Dol, (Cvd)	
	872-880	8	Ss, VyLtRd, M, Fn, Srnd, P, Si:P, TrC, LtlDol	
	880-888	8	Ss, VyLtRd, M, Fn, Srnd, P, Dolc:E, LtlSh, Dol	
	888-904	16	Dol, LtGryBn, M, Fn, Dns, TrSh, Ss, Pyr	903

Formations: Surface, Maquoketa, Galena-Platteville St Peter
Prairie du Chien, Trempeleau.

Well tested for 24 hours at 130 gpm with 7 feet of drawdown
Specific capacity = 18 + gpm per foot of drawdown.
Driller reports total depth of only 903'.
Driller reports grout to depth of 642'.