

FIELD NOTES ON STOP LOCALITIES

Stop #114

yellowish block of sandstone within soil on south side of road; fine-grained; quartz-rich; minimal mafics; a few sparkly micas; pretty good exposure of sandstone in ditch on north side of road; overlain by 3-4 ft of soil; sandstone looks pretty thinly-bedded; 3-5 cm thick; some are thicker (2-3 inches thick) on west side of ditch; took pictures; also, see float of limestone in ditch; saw one piece with black organic material on limestone; sandstone commonly pitted; saw one piece of float that has laminations

Stop #115

good exposure in creek bed; thinly-bedded sandstone interbedded/underlain by blue-gray calcareous shale; (wet) shale (5Y6/1) to (5GY 6/1); shale clayey when wet; exposed piece of sandstone is gray-white with abundant trace fossils; best color (10YR 8/2) to (10YR 7/4); fine-grained; a few mafics; some parts of outcrop are oxidized; the sandstone is ~1-2 ft thick; above that a more orange-colored zone that looks like incipient soil; up to ~3 ft thick; took pictures

Stop #132

sandstone at base of tree next to community center on hill; brown, weathered sandstone cropping out of western bank of stream; mollusc impressions; pretty bioturbated; took pictures; looked like maybe 1 ft soil on top of sandstone (or less)

Stop #133

stream bottom is sandstone; exposure of sandstone along the edges of stream as well; bottom contains a bunch of current direction marks; took pictures; trace fossils; not calcareous; fine-grained; maroon and orange Fe-oxide staining; rock mostly quartz-rich, whitish in some areas; bedding thickness variable; seems to grade upward to thinner beds; ex, bottom ~1 ft thick; middle 1/2 ft; top 1 inch or less in thickness

Stop #157

sandstone exposed in creek bed; trace fossils in some pieces; big flakes of muscovite in some; grain size pretty fine; oxidized; interference ripples; small fractures - look conjugate; cross lamination; carbonate cement at least in one sample; took pictures

Stop #166

adjacent to road, black, hydrocarbon-rich, sandstone; medium-grains; quartz, quite a few mafics; also sandstone that is orange-weathered, fine-grained; contains quite a few mafics, muscovite, quartz; in stream bank, saw what I thought was a coal seam (took picture); but then after looking more, looked like an organic-rich soil; not calcareous; in creek, most abundant rock is a thin silty-sandstone or sandy siltstone; no coherent outcrop, just broken-up pieces; the thin siltstones have trace fossils, contain quite a few mafics again; (5Y 7/2) to (5Y 6/1) dry surface; some surfaces (5Y 8/1); thicker pieces have carbonate cement (10YR 4/2) (orangish-brown) from Fe-oxide cement; walked down on east side of street; saw a couple blocks of limestone; one had clam shells; another really big block was of the silty sandstone; it had interference ripples (took picture) and was very hard to break (carbonate cement); the limestones were hard to break too

Stop #168

pebbles of sandstone (orange-colored, non-calcareous) and coal; silty shale, sometimes with organic material; crinoid stems in float; orange-colored limestone poking through grass in a few areas; contains crinoid stems, brachiopods

Stop #196

interlayered thin orange-brown clay Fe-stone and thin fissile gray-green shale; neither are calcareous; Fe-stone contains fossils; collected a couple pieces; look like leaf fossils; exposure ~8 ft thick; Fe-stone commonly pitted; took a couple pictures; reminds me a bit of the flags (the interlayering); looks like the shale-Fe stone at 159; clay Fe-stone pretty thin (~5 cm to 1 inch)

Stop #198

checked in stream cut; when first walked down there, looked like orange-weathering badlands-type weathering with pebbles on top; pebbles are both Fe-stone and sandstone; some look like rounded pellets; walked further south, into stream and looks like spot 166 on map - the thinness of rocks (took picture); looked closer and looks mostly like gray calcareous fissile shale either interlayered or overlain by orange-weathering sandstone; further up I saw some of the gray siltstones; the sandstone is not calcareous; didn't see any obvious fossils in the shale; most was wet and muddy

Stop #200

Nothing noted

Stop #210

siltstone-shale sequence; siltstone mostly gray, contains trace fossils; shale gray-green, weathers orange; neither calcareous; siltstone present near bottom of stream too, so sequence 10-20 ft thick (exposure)

Stop #214

tan-colored sandstone; clean; took couple pictures of prod marks; uphill, shale; badlands-like topography

Stop #236

shale exposed on west side of road; not calcareous; silty; looks like mica; don't see obvious fossils; fissile - looks more like thin pencils; float of orange-weathering sandstone and clay Fe-stone; in wet areas, shale looks blue-gray, otherwise looks dull green-yellow-gray

Stop #239

light-colored silty sandstone; thinly-bedded; trace fossils; took picture

Stop #245

looks like coal seam down near creek bed

Stop #247

limestone in ditch on west side; rounded knob sticking out; very hard to break; a couple veins (thin - 1 cm); rough surface; surface (5Y 8/4) grayish yellow to (10YR 6/6) dark yellowish-orange; contains fossils - see a lot of crinoid stems; fizzes with HCl; can't break off fresh surface but probably a wackestone - maybe near 10% fossils; nearby, see float of cobble-sized limestone

Stop #248

walk north a bit; still in west ditch; see thinly-bedded silty sandstone; looks dirty (gray in color); bubbles slightly with HCl; rock is fissile like shale; maybe a silty shale; contains appreciable mafics and muscovite; took picture; best color wet = moderate yellowish brown (10YR 5/4); ~2 ft exposed here; walk only a bit further, see shale and clay Fe-stone; looks similar to what I saw at 196; took picture

Stop #250

Nothing noted

Stop #255

Checkerboard in creek bottom; medium gray (N5) inside; looks coarsely crystalline; maybe mudstone; not many fossils; see some crinoid stems; relatively thin, irregular bedding, 1/2 inch to 6 inches thick approximately

Stop #265

walked down in gully; mostly shale; took a couple pictures of badland-like topography; walked further down, saw a light green shale maybe 3-4 ft thick; above that was a zone of sandstone/Fe-oxide pebbles; above that, further north, a black area that looked like a coal seam; above that and north is the badlands I took picture of

Stop #272

east side of stream, non-calcareous sandstone poking out of surface; bunch of blocks of sandstone in stream; ~1/2 - 3 ft thick; abundant trace fossils; some looked like burrows; ripples on one block; thought maybe shale exposed in stream cut, but looked like sandstone regolith, sandstone soil; some sand; in stream bottom, pebbles of sandstone; many of the blocks in area weather maroonish; (5YR 2/1) to (5YR 2/2); other surfaces looked whitish; took pictures

Stop #283

orange-weathering clay Fe-stone underlain by greenish-gray (light) shale; neither calcareous; clay Fe-stone looked like mudstone inside and siltstone-ish outside; took pictures; big blocks of sandstone up here used for landscaping; brown-weathering; ~1-3 ft thick; look pretty massive

Stop #284

good exposure of shale; ~15 ft thick; not calcareous; fissile; books; dry (5Y 5/2) to (5Y 4/1); wet more like (5Y 3/2); on top are the clay Fe-stone; not calcareous; (10YR 6/6) to (5YR 5/6); most are rounded; one looked like it had a trace fossil; also on top are the calcareous rocks; very thin; white in color; they look bioturbated or look like they have trace fossils; look like originally sandstone; upward, see contact with sandstone to north; sandstone has a bunch of cool trace fossils; can see contact well on west side of road as well; big blocks of sandstone everywhere downhill; took pictures

Stop #287

pretty good exposure of gray-green shale along north side of road; a big ditch and mass wasting; sandstone exposed at top of hill; probably same shale-sandstone sequence I saw yesterday; shale present near bottom of hill; fissile; (5Y 5/2) dry; light olive gray; none of the rocks here are calcareous; see some orange-weathering rounded clay Fe-stone rocks on top; a few inch thick layer that is silty-sandy, oxidized to orange but contains slivers of gray-green like the shale; walked up hill a bit; I see the clean white siltstone I saw at 285 yesterday; quite a few trace fossils; rocks are perched on top of shale like the clay Fe-stone; (5Y 7/2) siltstone dry, outer surface; inside surface some oxidation to orange while some remained white; not calcareous; sandstone layers (~1 ft, ~4 inches thick) interbedded with shale; seems like gradually gets sandier upwards

Stop #290

I'm seeing same units; sandstone looks the same as last stop (289); here it is underlain by a layered fissile silty shale like at stop 287; shale immediately beneath the sandstone at 287 was silty-sandy like here; both places, only ~1 ft thick; sandstone here looks more massive; I don't see the 3-4 layers; just ~one bed 2-3 ft thick here; further down in elevation, see the light-colored siltstone perched on shale; it starts just below the 1 ft thick fissile silty-sandy shale; took some pictures; in sandstone float here, saw cool trace fossils

Stop #305

drove further west, little hill made of sandstone; this is where the coarse-grained sandstone was coming from; looks like it is just above the medium-grained maroon-weathering sandstone; took some pictures of coarse-grained rock; not all that thick, maybe 3-4 ft; contains trace fossils; looked like mostly quartz; saw

3 beds, ~same thickness (<1 ft); looked fairly parallel; saw some nodular-looking maroon-weathering sandstone that was finer-grained; hard to break open; haven't been any calcareous rocks; above the coarse-grained sandstone was a more fine-grained sandstone-siltstone; perhaps interbedded with a green-gray shale; at top near surface became oxidized and orange; maybe 3 ft or so of this before top of hill; strange features to rocks; the coarse-grained sandstone commonly contained slivers or balls or pillow-looking pieces of chert; some of the coarse-grained stuff looks very heterogeneous; variable grain sizes

Stop #306

sandstone; most rocks look laminated, brown-orange and red-orange colors from oxidation; fine-grained; some mafics; some muscovite; trace fossils; took picture of rock with ripples; one piece looks crystalline, calcareous, no fossils; looks like a carbonate-cemented sandstone; best color (10YR 8/6) to (10YR 7/4) but not quite either

Stop #312

fine- to medium-grained noncalcareous sandstone pieces at base of power pole; sandstone exposed in ditch as well; clean, few mafics, some muscovite; further east, pieces of coarse-grained sandstone and coal; some of the sandstone looks black, like hydrocarbon saturated; further east, coal underlain by fine-grained sandstone with mudcracks; took pictures; coal seam appears to be at most 1 ft thick, usually less; ~2-3 ft of the sandstone is exposed; sandstone looks clean/white on surface, inside oxidized; north side of road

Stop #321

gray shale underlain by orange-weathering sandstone; shale is non-calcareous; fissile; forms books; (N5) to (5Y 6/1) best colors dry; took picture; not much shale exposed; 1-2 inches; what sandstone there is is mostly all sand; also see float of noncalcareous gray mudstone; ~1 inch thick; (5Y 6/1); also see clay Fe-stone and medium-grained sandstone in float

Stop #327

orange-weathering sandstone; fine- to medium-grained; not calcareous; subrounded grains mostly; a few micas and mafics; took a couple pictures

Stop #335

sandstone east of stream; took picture

Stop #337

took picture of sandstone exposed where area had been dug to put pond in

Stop #347

drove down hairpin; get a pretty good view of sandstone-shale contact; took pictures; interlayering of sandstone-shale; sandstone exposed here ~13 ft thick; top part thinly-bedded; beds a few cm thick to 7 inches or so; beds seem to get thinner and more planar upwards; seems like thicker and more wavy-bedded downward; looked at some of the thicker wavy-bedded rocks down lower; not calcareous; very fine-grained to silt-sized; black-white in color; black looks like organic matter that is horizontally aligned to form a lamination; looks bowl-shaped, like trough-cross lamination; some areas (layers) orange-weathering, thought they might be mud, but not; organic material in these zones don't seem to be aligned as much; looked at some of the wavy-bedded rocks, had soft sediment deformation features (flame structures); took pictures; more planar-bedded rock upward didn't have the organic material in it; shale not calcareous; exposed along northwest side of street to bottom of hill

Stop #354

driving up slope, see sandstone; looked in stream to west, didn't see shale; looked like orangish-colored alluvium; sandstone here, ~3 ft exposed in ditch on north side of road; don't see it on south side; fine-grained, clean, quite friable; very few mafics; laminated; took picture

Stop #358

thin-bedded sandstone in creek bottom; took pictures

Stop #373

sandstone cropping out, south side of road; thinly-bedded; ripples; dark brown weathering; inside clean, yellowish-colored; took pictures

Stop #377

sandstone in ditch, overlain by ~7 ft of silty-shaley sandstone; top is a ~2-3 inch thick sandstone; see only one zone that looks like it could be a gray shale; nothing calcareous here; in between top and bottom, another thin cohesive sandstone bed; took pictures

Stop #379

thin-bedded sandstone extends all the way down to stream; laminated; saw mud layer in one sample; took pictures

Stop #389

sandstone; shale seems to be right above this

Stop #390

thin-bedded sandstone, <1 inch to 7 inches; parallel bedded; some clay/shale interbeds; some Fe nodules; underlain by shale; some parts of shale fissile, some more blocky, some more silty-sandy; not calcareous; (5Y 5/2) dry; took some pictures

Stop #392

silty to fine-grained sandstone with calcareous cement; Fe-oxide specks; laminated/cross-laminated; some layers black; saw a muscovite speck - quite a few; sandstone looks gray and kind of dirty; (10YR 5/4) best color; see other pieces that are maroon-weathering, rather coarse-grained (medium-coarse) sandstone; not calcareous; looks like silica cement; conglomeratic - looks like very coarse quartz sometimes and also clay pebbles

Stop #396

sandstone; very friable; not calcareous; must be clay cement; pretty clean; some Fe-oxide specks, but not a lot; fine-grained; see some clay Fe-stone on top; (10YR 8/2) to (5Y 7/2); mostly quartz; saw a few muscovite specks; some pits on surface; saw one piece of float that looked like trace fossils (burrows)

Stop #398

clay Fe-stone pebbles in little gully

Stop #404

pieces of limestone; no good outcrop; some have fractures, very hard; mudstone - don't see any fossils; best color inside (5Y 5/2); best outside surface (5Y 6/4); pieces are not very thick, ~1-1.5 inches and kind of silty; as I walk up hill a bit, still see limestone pieces, but they seem to be lighter in color, siltier-sandier;

gastropod in one; one piece looked kind of woody; took pictures; on top of hill is a fine-grained, non-calcareous, oxidized (maroon-orange) sandstone

Stop #405

around stream looks like the Checkerboard again; silty (slightly) but crystalline; cross section of a mollusc; pretty thin again ~2 inches; found a cool piece in float with gastropod fossils

Stop #407

non-calcareous orangish-brown dirt, west side of street; badlands topography; took picture

Stop #408

sandstone poking through grass; hard; carbonate and silica cement; fine-grained; oxidized; not sure if in place; doesn't seem to be extensive; took picture

Stop #423

gray-green shale; pieces of clay Fe-stone, sandstone on top; some sandstone are trace fossils or contain trace fossils; shale nor sandstone calcareous; shale (5Y 7/2); forms books; fissile

Stop #425

orange-weathering limestone on north side of road just north of house; not sure if in place - only one block; look around a bit, on little hill I see small pellets of the limestone - gray inside, orange outside; took a couple pictures of pellets

Stop #434

micaceous silty sandstone/silty-sandy shale above and at same level as clay Fe-stone; occupies this whole area around pond; one sandstone relatively clean, trace fossil; gray silty micaceous sandstone commonly has ripple marks

Stop #436

pretty good exposure in ditch on south side of road; looks like sandy shale interlayered with the flaggy clay Fe-stone; took picture of clay Fe-stone; ~2 ft of sandy shale exposed above flag, but probably more; flag only <1/2 ft thick; walked to top of hill; a pond up there; sandstone had been excavated and stacked in front; sandstone slabs 1-1 1/2 ft thick, ripples; sandstone dirty, fine-grained

Stop #443

big blocks of Checkerboard in yard; took picture; dug up from 3 1/2 ft down

Stop #452

float of limestone; blue-gray in color, sometimes weather orange-yellow; crystalline; mudstone; a few calcite areas that were fossils; one piece has quite a few fossils; some with gastropod fossils; silty; best colors inside (5Y 6/1, slightly altered) to (N5); good outside color (10YR 6/6); rocks look flaggy; usually <1 inch thick; some look like they may have concretions; Glenpool

Stop #453

prominent sandstone ledge; ~2-3 ft thick; kind of rounded and knobby; fine-grained; non-calcareous; contains some Fe-oxide cement, some clay cement (a little); mostly quartz, see some muscovite specks; see little slivers of slightly calcareous mud; some surfaces look pitted; (10YR 5/4) - oxidized sandstone; uphill is sandstone; downhill from road, hill made of sandstone too; took picture

Stop #454

~4-5 ft of thinly-bedded sandstone exposed; ripple marks; beds ~3-6 inches thick; took picture

Stop #462

float of limestone and crinoid stem; see Glenpool; it seems to occupy layer near road; saw one piece with abundant brachiopods

Stop #473

checking out hill; looks like transition to sandstone; interlayered sandstone and shale; took pictures; sandstone here is thin-bedded, 1-2 inches; shale interval may be 3 inches; downhill, alluvium filling in ditch so can't see what is going on; sandstone is indurated; non-calcareous; fine to very fine-grained; white (5Y 7/2) and orange (10YR 6/6 to 5YR 5/6) on weathered surface, oxidized on inside surface (10YR 6/6); on east side of street; good exposure; rock looks laminated/cross-bedded; took picture; Fe-oxide specks in this one; rest of rock fairly light (10YR 7/4); sandstone here thicker 1-2 ft thick; may actually have thinner, wavy bedding

Stop #482

thinly-bedded sandstone exposed on south side of street; walk down to lowest point along north side of road, see a gray fissile shale exposed; not calcareous; took picture; looks like alluvium covering shale in some areas

Stop #486

drove north down hill; interesting rocks exposed on both east and west sides; siltstone (5Y 7/2) best color; thinly-bedded; overlain by gray fissile clay shale (5Y 6/1); nothing calcareous; ~3 ft exposed; shale contains eggplant-colored concretions (5RP 4/2); ~ 4 ft thick shale; shale overlain by sandstone; sandstone thinly-bedded, ripple marked

Stop #496

sandstone very cool; soft sediment deformation features; took pictures; shale below it; at bottom of hill is the siltstone

Stop #499

sandstone at top of hill; not calcareous; laminated; defined by Fe-oxide; Fe-oxide specks; fine-grained; mostly quartz; see some muscovite flakes; make up slabs ~1-2 ft thick; slumping down hill; took a couple pictures

Stop #501

good exposure of shale near lake; ~10-12 ft exposed; 2-3 inch sandstone layer within non-calcareous gray shale; Fe-stone nodules; took picture

Stop #502

contact of sandstone and shale; soft sediment deformation and linguoid ripples in sandstone; alternating sandstone and shale for a bit; took pictures

Stop #504

bunch of shale; contact with overlying sandstone; took pictures

Stop #522

Nothing noted

Stop #534
Nothing noted