

C&A 569. J. Porter Heirs (Grace Schultz). Carter Oil Co. farm well 1A.
 File number: Pleas-475. 964.6 feet south of old well and pumping
 station on old road along ridge between Fish Pot and Wolf runs.
Union District, Pleasants County, W. Va. St. Marys Quad.

A. T. Cross
 and assistants

Depth Thickness
 Feet Inches Feet Inches

Top of hole, El. 964.6

0 82 6 No core taken driller reports only "sandstone and red shale". Washington coal undoubtedly occurs at about 60 - 70' from top of hole. Outcrops on hill.

Note: 6 units below form 10' interbedded shale zone

82 6 5 8 Shale, greenish-gray crumbly, non-bedded, weathers to dust, some limestone knots, and zones. Some grayish pink variegation toward base.

88 2 2 0 Shale, grayish red to moderate brown, non-bedded, very soft, crumbly, weathers to dust

90 2 0 2 Shale, clayey, light olive gray, weathered. Moderate yellow brown, sharply demarcated above and below.

90 4 1 5 Shale, dark greenish gray, even thin bedded to platy.

91 9 0 3½ Shale, greenish gray, somewhat clayey, very soft.

92 0½ 0 4½ Shale, greenish black to greenish gray, thin laminated with block of silty shale in middle.

Note: 9 units below form 22'8" double sandstone with shaly partings.

MANNINGTON SANDSTONE

92 5 6 0 Sandstone, very coarse grained, massive quartz, grains up to 1/8" seen; some impurities and iron causing considerable medium tan and very dark brown stain.

98 5 0 1 Shale, greenish gray, clayey

98 6 0 6 Shale, clayey, moderate yellow brown on weathered surface, light olive gray on fresh surface. Some plant traces.

| Depth | | Thickness | | |
|---|--------|-----------|--------|---|
| Feet | Inches | Feet | Inches | |
| 98 | 6 | | | |
| 99 | 0 | 0 | 5½ | Shale, light greenish gray, finely silty, even bedded. |
| 99 | 5½ | 1 | 3 | Sandstone, greenish gray, coarse grained impure, much coarse mica, clayey streak at base. |
| 100 | 8½ | 6 | 3 | Siltstone, dark to light greenish-gray and medium to fine grained sandstone interbedded in a somewhat shaly zone. |
| 106 | 11½ | 1 | 1½ | Siltstone, very dark gray, slightly micaceous. |
| 108 | 1 | 0 | 11 | Siltstone, shaly, light greenish-gray. |
| 109 | 0 | 6 | 1 | Sandstone, medium to coarse grained; gray above and at base, central zone dusky yellow, some fine mica. |
| WAYNESBURG A COAL HORIZON | | | | |
| 115 | 1 | 1 | 10 | Clay shale and lost coal. 6" recovery, no apparent coal blossom. |
| <u>Note:</u> Next 3 units below form 9'11" <u>soft</u> , greenish variegated shale. | | | | |
| 116 | 11 | 7 | 2 | Shale, variegated greenish gray and grayish red, crumbly, non-bedded. |
| 124 | 1 | 1 | 4 | Siltstone, gray to greenish gray parting in shale above and below. |
| 125 | 5 | 1 | 5 | Shale, same as next shale above |
| <u>Note:</u> Next 5 units below form 22' sandstone zone shaly toward top. | | | | |
| WAYNESBURG SANDSTONE ZONE | | | | |
| 126 | 10 | 1 | 9 | Siltstone, greenish gray. |
| 128 | 5 | 4 | 3 | Shale, greenish gray and grayish red, variegated, crumbly, soft in zones. |
| 132 | 8 | 2 | 9 | Siltstone, greenish gray, shaly in thin zones, finely micaceous. |
| 135 | 5 | 2 | 2 | Shale, silty, variegated, purplish red to greenish red |
| 137 | 7 | 11 | 3 | Sandstone, fine grained greenish gray, fine grained, greenish gray, fine grained black and white mica, thinly laminated, somewhat calcareous. |

Base of Dunkard Series

| Depth | | Thickness | |
|-------|--------|-----------|--------|
| Feet | Inches | Feet | Inches |
| 137 | 7 | | |

Top of Monongahela Series

WAYNESEBURG COAL HORIZON

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|--|----|---|----|---|
| 148 | 10 | 2 | 2 | Shale, gray to greenish gray, silty below and variegated at base. |
| <u>Note:</u> Nest 4 units below form 6'7" soft red shale zone. | | | | |
| 151 | 0 | 0 | 7 | Clay shale, mottled gray to pink to yellow brown, non-bedded, fragmented or brecciated, highly calcareous. |
| 151 | 7 | 3 | 1 | Shale, grayish red, highly calcareous, very soft, crumbly, some tiny limy grains about size of microgastropods. |
| 154 | 8 | 2 | 4 | Shale, variegated, greenish gray, to grayish red. |
| 157 | 0 | 0 | 7 | Shale, bright grayish red, very soft crumbly, weathers to dust. |
| 157 | 7 | 0 | 7 | Shale, light gray, clayey above, silty below. |
| 158 | 2 | 1 | 5 | Siltstone, gray, with clayey zone toward base and some limestone mottling. |
| 159 | 7 | 2 | 3 | Shale, interbedded grayish red and greenish gray, chippy, soft. |
| 161 | 10 | 2 | 8 | Siltstone, greenish gray with shaly zones and some variegated zones, somewhat calcareous. |
| 164 | 6 | 0 | 10 | Limestone or limy shale with lime nodules, grayish red, somewhat variegated. |
| 165 | 4 | 0 | 7 | Shale, grayish green, thin laminated, silty. |
| 165 | 11 | 0 | 11 | Siltstone, gray to greenish gray, thin laminated. |
| 166 | 10 | 3 | 2 | Shale, variegated and interbedded, greenish-gray and grayish red, zone limestone knots, crumbly below, platy above. |

Note: Next 10 units below form e layered 31' 10" multiple sandstone.

GILBOY SANDSTONE

| Depth | | Thickness | |
|-------|--------|-----------|--------|
| Feet | Inches | Feet | Inches |
| 166 | 10 | | |

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| 170 | 0 | 6 | 6 | Sandstone, fine grained, gray, to slightly greenish. Mostly thin laminated, finely micaceous, almost a siltstone in zones, some limy mottling. |
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Note: 2 units below form parting in sandstone.

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|-----|---|---|---|---|
| 176 | 6 | 2 | 4 | Shale, variegated, dull grayish red to greenish gray, crumbly, some irregular lumps, silty below. |
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| 178 | 10 | 0 | 9 | Siltstone and shale interbedded, gray to grayish red. |
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| 179 | 7 | 5 | 8 | Sandstone, greenish gray, almost a siltstone above, fine grained below, highly micaceous with some black mica, thin laminated, fairly massive. |
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| 185 | 3 | 1 | 5 | Shale and siltstone interbedded, variegated, thin laminated, a parting in sandstone above and below, clayey at top |
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| 186 | 8 | 4 | 4 | Sandstone, same as next above except laminations are somewhat irregular. |
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Note: 2 units below form parting in sandstone.

| | | | | |
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| 191 | 0 | 2 | 2 | Shale and siltstone, interbedded, greenish gray to dull grayish red, thin laminated. |
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| 193 | 2 | 1 | 5 | Shale, bright grayish red, chippy, a conspicuous color break. |
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| 194 | 7 | 4 | 1 | Siltstone, intermottled with some variegated shaly zones, greenish gray to dull grayish red. |
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| 198 | 8 | 3 | 2 | Sandstone, greenish gray, thin-laminated fairly hard layer. |
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Bottom of Gilboy Sandstone

Position of LITTLE WAYNESBURG COAL ZONE.

Note: Top of 28'2" Little Waynesburg soft red shale zone.

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| 201 | 10 | 18 | 2 | Shale, predominately dusky red, some zones 6" - 1' moderate olive gray, highly calcareous, soft, weathers chippy to dust, soft red unit. |
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| Depth | | Thickness | | |
|-------|--------|-----------|--------|--|
| Feet | Inches | Feet | Inches | |
| 201 | 10 | | | |
| 220 | 3 | 2 | 3 | Shale, predominately moderate olive gray, mottled bluish gray. |
| 222 | 3 | 0 | 9 | Shale, dusky red, highly calcareous, mottled soft. |
| 223 | 0 | 1 | 9 | Shale, moderate olive green as above, highly calcareous. |
| 224 | 9 | 1 | 3 | Shale, dusky red, calcareous, soft calcareous. |
| 226 | 0 | 4 | 0 | Shale, moderate olive gray to bluish gray, slightly calcareous, weathers chippy. |
| 230 | 0 | 5 | 4 | Shale, dusky red, soft and crumbly, weathers chippy. |
| 235 | 4 | 6 | 10 | Shale, silty, moderate olive gray to dark gray, with stringer of grayish brown to dusky brown, clay-shale. |
| 242 | 2 | 1 | 4½ | Shale, medium brown to olive gray, moderate well bedded. |
| 243 | 6½ | 0 | 0½ | Shale, medium to dark gray, carbonaceous. |

COAL HORIZON

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| 243 | 7 | 0 | 5 | Shale, silty, micaceous, with carbonaceous, streak. |
| 244 | 0 | 1 | 11 | Shale (clayey), brownish gray to olive gray, weathers chippy. |
| 245 | 11 | 0 | 1 | Shale, dark gray, carbonaceous. |

Base of U. bench UNIONTOWN COAL HORIZON

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|-----|----|---|----|---|
| 246 | 0 | 2 | 10 | Clay-shale, grayish brown (at top) to medium olive brown (at bottom) |
| 248 | 10 | 2 | 0 | Shale to siltstone, medium dark gray to dark gray. |
| 250 | 10 | 2 | 5 | Shale, soft, well bedded, plant fragments, grayish brown to dusky brown; some stringers of siltstone as above |
| 253 | 3 | 2 | 4 | Shale to siltstone, medium dark gray to dark gray. |
| 255 | 7 | 1 | 0 | Shale, brownish gray to olive gray, weathers chippy. |
| 256 | 7 | 8 | 5 | Sandstone, fine, silty to shaly, micaceous, medium gray. |
| 265 | 0 | 0 | 6½ | Shale, medium dark to dark gray, well bedded. |

Top of UNIONTOWN COAL ZONE

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|-----|----|---|----|--|
| 265 | 6½ | 0 | 1½ | Shale, dark gray with grayish-black to black, high pyritic shale at top. |
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| Depth | | Thickness | | |
|-------|--------|-----------|--------|--|
| Feet | Inches | Feet | Inches | |
| 265 | 6½ | | | |
| 265 | 8 | 0 | 1 | Shale, black, carbonaceous |
| 265 | 9 | 0 | 0½ | Shale, dark gray, platy. |
| 265 | 9½ | 0 | 1 | Shale, black, carbonaceous |
| 265 | 10½ | 0 | 4½ | Shale, medium gray, well bedded |
| 266 | 7 | 0 | 2 | Shale, dark gray, well bedded |
| 266 | 9 | 1 | 0 | Shale, dark gray, high calcareous, hard with 2" parting of medium gray shale. |
| 267 | 9 | 3 | 11 | Shale, clayey, medium dark gray to olive gray with small limestone nodules. |
| 271 | 8 | 0 | 4 | No core |
| 272 | 0 | 1 | 0 | Shale, calcareous, as above |
| 273 | 1 | 4 | 0 | Clay-shale, grayish brown, variegated with dark greenish gray and dark gray, somewhat calcareous, poorly bedded. |
| 277 | 0 | 0 | 3 | Clay-Shale, as above. |
| 277 | 3 | 3 | 0 | Shale, medium dark gray to dark greenish gray, calcareous. |

Note: Top of Lower Uniontown sandstone zone.

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| 280 | 3 | 11 | 2 | Sandstone, medium gray, fine, silty in upper part to a medium dark gray, shaly siltstone in the lower part. |
| 291 | 5 | 4 | 0 | Shale, dark greenish gray to dark gray, some grayish brown zones, well bedded, weathers chippy to platy. |

Top of Lower Uniontown Coal Horizon

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|-----|----|---|----|---|
| 295 | 5 | 0 | 0½ | Shale, dark gray, carbonaceous |
| 295 | 5½ | 0 | 1½ | Shale, olive gray to dark gray, carbonaceous. |
| 295 | 7 | 0 | 1 | Shale, dark gray to grayish black, carbonaceous |

COAL HORIZON

| | | | | |
|-----|----|---|----|--|
| 295 | 8 | 1 | 2 | Shale, dark gray with limestone nodules. |
| 296 | 10 | 0 | 11 | Shale, dark gray to moderate olive brown (Prominent mustard color) with limestone nodules. |

| Depth | | Thickness | | |
|---|--------|-----------|--------|---|
| Feet | Inches | Feet | Inches | |
| 296 | 10 | | | |
| 297 | 9 | 1 | 5 | Shale (Calcareous) to limestone (hard, argillaceous) dark gray. |
| 299 | 2 | 0 | 10 | Clay-shale, olive gray to dark gray, soft, crumbly |
| 300 | 0 | 1 | 8 | Limestone (argillaceous) to shale, calcareous, dark gray. |
| 301 | 8 | 0 | 6 | Shale, olive gray, poorly bedded, slightly calcareous |
| <u>Note:</u> Base of Arnoldsburg Horizon | | | | |
| Top of Benwood Limestone Zone | | | | |
| 302 | 2 | 8 | 4 | Shale, very dusky red, mottled with dark greenish gray, poorly bedded with small limestone nodules. |
| 310 | 6 | 5 | 3 | No core |
| 315 | 9 | 0 | 9 | Limestone, medium gray, argillaceous, flint fracture |
| 316 | 6 | 0 | 6 | Shale, brownish gray |
| 317 | 0 | 0 | 11 | Limestone, argillaceous, to a calcareous clay, medium dark gray. |
| 317 | 11 | 1 | 10 | Limestone, medium gray, hard, argillaceous in spots |
| 319 | 9 | 3 | 2 | Shale, moderate olive brown to olive gray, mottled with some brownish gray |
| 322 | 11 | 8 | 0 | Shale, very dusky red, poorly bedded |
| 330 | 11 | 14 | 1 | No core |
| 345 | 0 | 6 | 0 | Shale, very dusky red, clayey, crumbles (soft red unit) |
| 351 | 0 | 1 | 1 | Shale, medium dark gray, well bedded. |
| <u>Note:</u> Base of Benwood limestone and red shale zone | | | | |
| Top of Sewickley Sandstone | | | | |
| 352 | 1 | 16 | 11 | Sandstone, light gray, medium grained, argillaceous micaceous |
| 369 | 0 | 0 | 10 | Sandstone and shale, interbedded, sandstone, light gray, shale, medium, greenish gray. |

| Depth | | Thickness | | |
|-------|--------|-----------|--------|--|
| Feet | Inches | Feet | Inches | |
| 369 | 0 | | | |
| 369 | 10 | 3 | 8 | Shale, greenish gray, limestone nodules about 1-1½" in diameter present in upper 1'. |
| 373 | 6 | 0 | 10 | Shale, variegated, dusky red to medium greenish gray, fairly well bedded. |
| 374 | 4 | 0 | 8 | Shale, clayey, medium to roof shale dark gray, coaly stringers, towards bottom, poorly bedded. |

Note: Top of Sewickley Coal Horizon

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| 375 | 0 | 2 | 4 | Shale, medium to dark gray, coaly material throughout in some places stringer of blocky coal. Can be considered more of a carbonaceous shale. |
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Base of SEWICKLY COAL HORIZON

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| 377 | 4 | 2 | 4 | Clay shale, light to medium gray |
| 379 | 8 | 2 | 3 | Shale, light to medium gray, limestone streaks, throughout, poorly bedded. |
| 381 | 11 | 1 | 1 | Shale, medium gray, well bedded |
| 382 | 0 | 1 | 7 | Shale, greenish-gray, poorly bedded, numerous stringers and nodules of limestone, becomes sandy towards base |
| 383 | 7 | 0 | 8 | Siltstone, light gray |
| 384 | 3 | 11 | 9 | Shale, greenish-gray, limestone nodules throughout, towards lower 6" becomes somewhat sandy, clay zones are irregular in some places. |
| 396 | 0 | 3 | 2 | Shale, silty or siltstone shaly, greenish-gray limestone nodules present, sandy zones present. |
| 399 | 2 | 0 | 8 | Limestone, light gray, appears clastic, lots of micaceous grains. |

"Upper Fish Pot" Limestone

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| 399 | 10 | 0 | 9 | Siltstone, sandy, light to medium gray, limy in numerous places. |
| 400 | 7 | 1 | 8 | Shale, greenish gray well bedded, sandy towards base. |
| 402 | 3 | 1 | 2 | Shale, fine grained, light greenish gray, micaceous. |

| Depth | | Thickness | | |
|-------|--------|-----------|--------|--|
| Feet | Inches | Feet | Inches | |

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|-----|---|--|--|--|
| 402 | 3 | | | |
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|-----|---|---|---|----------------------------|
| 403 | 5 | 0 | 3 | Shale, clayey, medium gray |
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|-----|---|---|----|---|
| 403 | 8 | 0 | 10 | Shale, clayey, greenish gray, poorly bedded |
|-----|---|---|----|---|

Top of Lower Sewickley Sandstone

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| 404 | 6 | 8 | 6 | Sandstone, light gray, medium grained, highly micaceous, limy toward the top and the base. |
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| 413 | 0 | 7 | 6 | Sandstone, light gray, fine grained, becomes silty and shaly towards base, highly micaceous |
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| 420 | 6 | 0 | 6 | Shale, greenish-gray, well bedded. |
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| 421 | 0 | 0 | 10 | Shale, variegated, dusky red to light olive green, well bedded, 1/8" limestone nodules, plant fossils. |
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Top of Fish Pot Coal Horizon

| | | | | |
|-----|----|---|---|---|
| 421 | 10 | 3 | 2 | Clay shale, light to medium gray, limestone nodules towards base. |
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Top of Position of Fish Pot (L. Sewickley) Limestone.

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| 425 | 0 | 8 | 0 | Shale, variegated, dusky red to greenish gray, small quartz pebbles, limestone nodules throughout and highly calcareous. |
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Top of Redstone Sandstone

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|-----|---|----|----|--|
| 433 | 0 | 15 | 10 | Sandstone, light gray, fine grained, highly micaceous, limy in spots throughout. |
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Note: Redstone Coal Missing

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| 448 | 10 | 0 | 3 | Shale, greenish-gray, limestone nodules. |
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| 449 | 1 | 3 | 10 | Sandstone, light gray, fine to medium grained, highly micaceous, limy throughout. |
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|-----|----|---|---|---|
| 452 | 11 | 0 | 8 | Shale, greenish gray, sandy towards top and bottom. |
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Top of U. Pittsburgh sandstone (?)

| Depth | Thickness | |
|-------|-----------|--------|
| | Feet | Inches |
| 452 | 11 | |

| Depth | Thickness (Feet) | Thickness (Inches) | Description |
|-------|------------------|--------------------|--|
| 453 | 7 | 16 | 10 Sandstone, light gray, fine to medium grained, highly micaceous, highly calcareous shaly zones in some place. |
| 470 | 5 | 1 | 2 Shale, variegated, dusky red to greenish gray, well bedded. |

Top of Redstone Limestone Horizon

| Depth | Thickness (Feet) | Thickness (Inches) | Description |
|-------|------------------|--------------------|--|
| 471 | 7 | 0 | 5 Limestone, reddish-gray, massive |
| 472 | 0 | 1 | 0 Limestone, dark gray, ostracod zone, weathers shaly |
| 473 | 0 | 0 | 11 Limestone, light gray, massive |
| 473 | 11 | 0 | 4 Limestone, medium gray, weathers shaly |
| 474 | 3 | 1 | 6 Limestone, light tan, massive |
| 475 | 9 | 0 | 9 Limestone, medium gray, ostracod zone, weathers shaly |
| 476 | 6 | 0 | 4 Limestone, light tan, massive |
| 476 | 10 | 1 | 1 Limestone, medium, gray, <u>ostracod zone</u> , weathers shaly |
| 477 | 11 | 0 | 3 Limestone, light tan, massive |
| 478 | 2 | 0 | 6 Limestone, medium gray, ostracod zones, weathers shaly |

Pittsburgh coal horizon, coal absent

BASE OF MONONGAHELA SERIES

TOP OF CONEMAUGH SERIES

| Depth | Thickness (Feet) | Thickness (Inches) | Description |
|-------|------------------|--------------------|--|
| 478 | 8 | 2 | 1 Shale, variegated, dusky red to greenish gray, highly calcareous |

Top of Bellaire (Lower Pittsburgh) Sandstone

| Depth | Thickness (Feet) | Thickness (Inches) | Description |
|-------|------------------|--------------------|--|
| 480 | 9 | 15 | 3 Sandstone, greenish gray, fine grained, in parts silty micaceous, cross-bedded towards bottom of core. |
| 496 | 0 | 4 | 3 Silty shale or shaly siltstone, greenish gray, limestone nodules towards base. |
| 500 | 3 | 1 | 5 Shale, silty, greenish-gray, well bedded. |
| 501 | 8 | 0 | 3 Clay shaly, coaly material throughout. |

Little Pittsburgh Coal Horizon

| Depth | | Thickness | |
|-------|--------|-----------|--------|
| Feet | Inches | Feet | Inches |
| 501 | 8 | | |

Top of Lower Pittsburgh (Summerfield) Limestone Zone

| | | | | |
|-----|----|---|---|---|
| 501 | 11 | 5 | 1 | Limestone, medium gray, weathers shaly |
| 507 | 0 | 3 | 0 | Limestone, variegated, dusky red to greenish-gray, weathers shaly |
| 510 | 0 | 7 | 4 | Shale, variegated, dusky red to greenish-gray. |

Top of 32'9" Connellsville Sandstone zone.

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|-----|---|----|----|--|
| 517 | 4 | 6 | 8 | Sandstone, silty, greenish-gray, micaceous, calcareous |
| 524 | 0 | 1 | 0 | Siltstone, shaly, greenish gray |
| 525 | 0 | 0 | 9 | Siltstone, medium, gray, weathers shaly. |
| 525 | 9 | 1 | 3 | Siltstone, greenish-gray, micaceous. |
| 527 | 0 | 1 | 9 | Sandstone, fine grained, greenish, gray, micaceous. |
| 528 | 9 | 0 | 9 | Siltstone, medium gray |
| 529 | 6 | 3 | 7 | Siltstone, and sandstone, interbedded, greenish gray. |
| 533 | 1 | 1 | 11 | Shale, greenish gray, moderate well bedded |
| 535 | 0 | 15 | 1 | Sandstone, light gray, fine grained towards top, medium grained towards base, highly micaceous, cross bedded, silty zones toward top |
| 550 | 1 | 1 | 4 | Sandstone and shale, interlaminated gray to greenish gray, a pellet zone in middle |

Base of Connellsville Sandstone

Little Clarksburg Coal Horizon

Note: Next 11 units below form intermixed roof shale and coal horizon sequence.

| | | | | |
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| 551 | 5 | 1 | 0 | Shale, grayish green with irregular pellets which weather grayish olive, one silty zone at base. |
| 552 | 5 | 0 | 1 | Shale, dark, organic, with tiny pellets. |
| 552 | 6 | 1 | 6 | Shale, variegated, greenish gray to grayish red, non-bedded, crumbly, weak zone. |

| Depth | | Thickness | | |
|--|--------|-----------|--------|---|
| Feet | Inches | Feet | Inches | |
| 552 | 6 | | | |
| 554 | 0 | 2 | 0 | Shale, greenish gray finely silty; darker gray and more pure below, chippy, thin laminated. |
| 556 | 0 | 0 | 2 | Carbonaceous, shale or dark organic shale with carbon flecks |
| 556 | 2 | 0 | 3 | Shale, greenish to olive gray, non bedded |
| 556 | 5 | 0 | 1 | Carbonaceous shale or dark organic shale |
| 556 | 6 | 0 | 8 | Siltstone, dark gray to greenish gray, abundant fine block, mica |
| 557 | 2 | 1 | 5 | Shale, dark greenish gray, chippy even bedded. |
| 558 | 7 | 2 | 5 | Shale, dark gray above, and dark grayish brown below; weathers gray above and olive gray below and chippy; thin bedded. Some plant fossils. |
| 561 | 0 | 0 | 3 | Shale, dark organic or carbonaceous crumbly |
| Bottom of Coal Horizon. | | | | |
| Top of "Upper" Clarksburg Limestone Zone | | | | |
| 561 | 3 | 1 | 5 | Shale, clayey gray to greenish gray, crumbly, silty. |
| 562 | 8 | 1 | 4 | Shale, grayish red, chippy to crumbly |
| 564 | 0 | 0 | 4 | Shale and limestone, dark greenish gray to brownish gray. Limestone appears a hard irregular zone, or knot. very few ostracodes seen. |
| Top " Upper" Clarksburg "Red" shales | | | | |
| 564 | 4 | 5 | 2 | Shale, grayish red, some green mottling, interbedded with siltstone, greenish gray. Shale, crumbly, non-bedded, slickensided, siltstone crumbly non-bedded. |
| Lower Connellsville Sandstone zone | | | | |
| <u>Note:</u> Next 7 units below form multiple sandstone, 12'10" thick. | | | | |
| 569 | 6 | 2 | 1 | Sandstone, or siltstone, gray hard, thin laminated by black mica. |

| Depth | | Thickness | | |
|--|--------|-----------|--------|--|
| Feet | Inches | Feet | Inches | |
| 569 | 6 | | | |
| 571 | 7 | 1 | 3 | Siltstone, shaly, dark gray to yellowish gray, even bedded. |
| 572 | 10 | 1 | 6 | Shale, dark grayish red, chippy, Numerous plant fossils. |
| 574 | 4 | 1 | 7 | Siltstone, gray, dark, micaceous. |
| 575 | 11 | 1 | 9 | Sandstone, shaly, transitional from bed below, greenish gray. |
| 577 | 8 | 3 | 7 | Shale, gray, silty weathers grayish yellow. Some silty zones, very even bedded interlaminated. |
| 581 | 3 | 1 | 1 | Sandstone, gray, shaly, thin laminated. |
| <u>Note:</u> Next 4 units below form 3'2" roof shale zone | | | | |
| 582 | 4 | 2 | 2 | Shale, gray above, dark grayish red below, even bedded, platy chippy. Pelecypods and estheria. (2 bags of sample) in lower 4". |
| 584 | 6 | 0 | 2 | Limestone, silty, hard gray, non-fossiliferous |
| 584 | 8 | 0 | 2 | Siltstone, gray, shaly |
| 584 | 10 | 0 | 8 | Shale, grayish to brownish gray silty, poorly bedded. |
| 585 | 6 | 0 | 1 | Shale, dark, with carbon flecks. |
| Normantown Coal Horizon. | | | | |
| Top of "Lower" Clarksburg Limestone Zone. | | | | |
| 585 | 7 | 1 | 5 | Limestone shaly, or shale, calcareous, with limestone knots, olive green to yellow green, crumbly <u>Spirorbis</u> |
| 587 | 0 | 3 | 1 | Shale, variegated, green, yellow, green, brownish gray, and dark gray, crumbly, non-bedded, clayey and non-calcareous above, calcareous below. |
| <u>Note:</u> Next 4 units below form 10' interbedded andstone and siltstone. | | | | |
| 590 | 1 | 5 | 9 | Sandstone and siltstone, highly calcareous with some gray limestone nodules and zones, hard light gray, m/c _{ca} intergraded from sandstone to siltstone, fine to medium grained. |

| Depth | | Thickness | | |
|---|--------|-----------|--------|---|
| Feet | Inches | Feet | Inches | |
| 590 | 1 | | | |
| 595 | 10 | 0 | 7 | Siltstone, gray, shaly. |
| 596 | 5 | 1 | 3 | Shale, grayish red and greenish clayey below. non bedded to poorly bedded. chippy, a parting in sandstone. |
| 597 | 8 | 2 | 5 | Siltstone, almost fine sandstone in middle, shaly at base, greenish gray, fairly hard. |
| Top of 31' 10" "Lower" Clarksburg "Red" Shale Unit | | | | |
| 600 | 1 | 1 | 8 | Shale, dark grayish red, variegated, non-bedded, slickensided. |
| 601 | 9 | 0 | 2 | Shale, yellow green, clayey, soft. |
| 601 | 11 | 0 | 5 | Limestone, gray to olive gray, weathers grayish yellow hard, few ostracodes. |
| 602 | 4 | 0 | 10 | Shale, variegated dark greenish to brownish gray, soft. |
| 603 | 2 | 0 | 4 | Limestone, somewhat finely conglomeratic gray. weathers yellow gray. Boulder or large nodule. |
| <u>Note:</u> 3 units above are bouldery limestone in shale. | | | | |
| 603 | 6 | 4 | 8 | Shale, variegated, grayish brown to yellow green, non-bedded, crumbly, slickensided. |
| 608 | 2 | 1 | 5 | Siltstone, clayey and shaly, greenish gray, thin bedded. |
| 609 | 5 | 1 | 6 | Sandstone, and siltstone, interbedded dark greenish gray |
| 611 | 1 | 5 | 11 | Shale, purplish mottled, variegated, dark brownish gray or red, with dark yellowish brown zones. some limestone knots and dark gray limy zones. |
| 617 | 0 | 0 | 6 | Siltstone, greenish gray, crumbly to chippy. |
| 617 | 6 | 0 | 8 | Shale, variegated brownish gray, purplish and greenish gray, silty. |
| 618 | 2 | 0 | 10 | Siltstone gray, hard, non-calcareous. |

| Depth | | Thickness | | |
|-------|--------|-----------|--------|---|
| Feet | Inches | Feet | Inches | |
| 618 | 2 | | | |
| 619 | 0 | 1 | 0 | Clay shale grayish green; some limestone knots hard and gray. |
| 620 | 0 | 1 | 8 | Shale, gray, below, purplish above with numerous hard limestone knots considerable pyrite. Some Spirorbis and ostracodes, sample taken. |
| 621 | 8 | 1 | 5 | Shale, variegated, dark brownish gray, purplish and yellow green non-bedded. |
| 623 | 1 | 0 | 3 | Shale, dark gray, non-bedded. |
| 623 | 4 | 1 | 5 | Limestone, hard, dark, greenish gray, weathers yellow green to tan with dark greenish shale matrix, in boulders or irregular beds. |
| 624 | 9 | 2 | 11 | Shale, variegated, yellow green to purple and grayish brown crumbly soft, a few limestone knots some highly calcareous zones, weathers to dust. |
| 627 | 8 | 1 | 8 | Core lost, probably same shale as above and below. |
| 629 | 4 | 2 | 2 | Shale, same as next above |
| 631 | 6 | 0 | 5 | Limestone knots in shale as above and below |
| 631 | 11 | 4 | 7 | Shale, same as next above more purplish and grayish red. Some ostracodes, some slickenside. |

Note: 20 unit from 601' 1" to 636' 6" comprise a thick soft variegated reddish and greenish shale zone with occasional limestone knots, and layer of siltstone and 2 thin bouldery limestone knot zones. It is separated from the next grayish red zone above, the Elk Lick Limestone at 664' by about 15' of siltstone.

Top of Morgantown sandstone zone

| | | | | |
|-----|----|---|---|---|
| 636 | 6 | 7 | 2 | Sandstone and siltstone, greenish gray, thin laminated, some limestone nodules and zones. |
| 643 | 8 | 0 | 2 | Limestone, gray, silty, many ostracodes and a parting in siltstone. sample taken |
| 643 | 10 | 1 | 2 | Siltstone, same as next above. |
| 645 | 0 | 0 | 7 | Shale, variegated, clayey, green to grayish red. |
| 645 | 7 | 1 | 7 | Siltstone, shaly, greenish gray, crumbly, poorly bedded. |

| Depth | | Thickness | | |
|-------|--------|-----------|--------|---|
| Feet | Inches | Feet | Inches | |
| 645 | 7 | | | |
| 647 | 2 | 0 | 9 | Shale, grayish red, thin bedded, chippy. Some poorly preserved pelecypods. |
| 647 | 11 | 3 | 1 | Shale, greenish gray and brownish or reddish gray interlaminated and a siltstone zone near middle, thin bedded. |

Elk Lick Coal Horizon

| | | | | |
|-----|---|---|---|--|
| 651 | 0 | 0 | 5 | Limestone, gray, thinly varved or laminated hard, much pyrite. Sample taken. |
|-----|---|---|---|--|

Note: 6 units next below constitute 12' 10" soft red zone, weathers to dust.

| | | | | |
|-----|---|---|----|--|
| 651 | 5 | 0 | 11 | Shale, greenish, very irregular, crumbly, some ostracodes. |
| 652 | 4 | 5 | 2 | Shale, grayish to brownish red, variegated with some greenish gray zones and yellow green mottling crumbly, weathers to dust, calcareous in zones. |
| 657 | 6 | 1 | 6 | Core lost, same as above and below. |
| 659 | 0 | 2 | 3 | Shale, variegated, same as next above. |
| 661 | 3 | 0 | 9 | Core lost, same as above and below. |
| 661 | 9 | 2 | 3 | Shale, same as next above. |

Top of Elk Lick Limestone zone including
Elk Lick Red Shale

| | | | | |
|-----|---|---|---|--|
| 664 | 0 | 7 | 0 | Limestone, light gray to olive gray, hard with some irregular greenish shaly limestone zones. Very hard conspicuous, weathers grayish yellow in several beds. Sample taken Elk Lick(?) |
| 671 | 0 | 1 | 6 | Shale, greenish gray, crumbly, some ostracodes and hard pellets, pyrite, crumbly. |
| 672 | 6 | 1 | 9 | Core missing |
| 674 | 3 | 4 | 9 | Shale, greenish gray, weathers yellow gray, with abundant limestone pellets or mottlings, crumbly. |
| 679 | 0 | | | |

| Depth | | Thickness | | |
|-------|--------|-----------|--------|---|
| Feet | Inches | Feet | Inches | |
| 679 | 0 | 0 | 11 | Shale, dusky red, brown (obscured) with 2" lime zone in center. |
| 679 | 11 | 0 | 10 | Shale, medium olive gray, green, poorly bedded, slickensided, calcareous near top. |
| 680 | 9 | 2 | 0 | Limestone, medium gray brown, hard, dense, pyritic. |
| 682 | 9 | 1 | 1 | Shale, medium, gray with some red, about like unit below, but lighter in color. |
| 683 | 10 | 0 | 5 | Shale, variegated, dusky red and medium olive gray, weathers chippy, poorly bedded. |
| 684 | 3 | 0 | 3 | Shale, medium grayish brown, contains pyrite, poorly bedded, looks like limestone, but does not effervesce. |
| 684 | 6 | 1 | 1 | Limestone, medium grayish brown, hard, dense, contains pyrite, apparently fresh water. |

Note: The unit between 664'0" and 685'7" is a 22' thick sequence of limestone and interbedded limy shale and limestone boulders and knots. May include upper part of Birmingham shales, Lower hard limestone may equal Skelly of Ohio.

Top of Birmingham Red Shale Zone. (May be equal only to lower part of Birmingham)

| | | | | |
|-----|----|---|---|---|
| 685 | 7 | 1 | 1 | Shale, same as next below but lighter |
| 686 | 8 | 0 | 5 | Shale, variegated, dark dusky red to dark olive gray, poorly bedded. |
| 687 | 1 | 3 | 9 | Shale, medium olive gray, poorly bedded, weathers chippy, highly calcareous, slickensided. |
| 690 | 10 | 6 | 3 | Shale, same as unit second below. |
| 697 | 1 | 2 | 4 | Core missing, probably same as units above and below. |
| 699 | 5 | 1 | 7 | Shale, variegated, dusky red and medium olive gray green, poorly bedded, weathers chippy, slightly calcareous. |
| 701 | 0 | 7 | 0 | Shale, medium gray, almost fissile in lower 6", generally weathers chippy, poorly bedded, tends slightly toward dusky red near top. |

| Depth | | Thickness | |
|-------|--------|-----------|--------|
| Feet | Inches | Feet | Inches |
| 701 | 0 | | |

Top of Grafton Sandstone Zone (May include both upper and lower Grafton)

| | | | | |
|-----|----|----|----|---|
| 708 | 0 | 10 | 2 | Sandstone massive, coarse grained, light gray to white, micaceous. |
| 718 | 2 | 0 | 1 | Shale, very light gray, feels greasy, foliated. |
| 718 | 3 | 23 | 1 | Sandstone, massive, coarse grained, light gray to white, micaceous. |
| 741 | 4 | 2 | 1 | Siltstone, medium olive gray green, becomes less coarse near top. |
| 743 | 5 | 1 | 8 | Shale, light olive gray green, very well bedded, 1" in middle has dusky red zone with organic remains. |
| 745 | 1 | 2 | 10 | Siltstone, light medium gray, slightly micaceous, thin bedded, very slightly calcareous. |
| 747 | 11 | 2 | 3 | Shale, light, medium gray, slightly micaceous, well-bedded. |
| 750 | 2 | 4 | 3 | Sandstone, fine grained, light greenish gray, micaceous (muscovite and biotite) becomes calcareous toward top |
| 754 | 5 | 10 | 7 | Siltstone, exactly like unit second below. |

Top of Gaysport Limestone (or U. Ames)

| | | | | |
|-----|---|----|---|--|
| 765 | 0 | 0 | 5 | Limestone, gray, hard, dense, medium gray, with marine fossils (<u>Chonetes</u> seen) |
| 765 | 3 | 11 | 8 | Siltstone, medium gray, micaceous, very thin bedded, has zones of coarser (fine sand) size and zones of calcareous material. (marine fossil 2' from base) both randomly scattered. |

Top of Ames Limestone zone.

| | | | | |
|-----|----|---|----|---|
| 776 | 11 | 1 | 10 | Limestone, hard, light to medium gray, crystalline, rich in pyrite; numerous marine fossils (crinoids, brachiopods, etc) sandy towards base some streaks of dark material. samples saved. |
|-----|----|---|----|---|

Ames Marine Shale.

| Depth | | Thickness | | |
|--|--------|-----------|--------|--|
| Feet | Inches | Feet | Inches | |
| 776 | 11 | | | |
| 778 | 9 | 5 | 3 | Limestone, fairly hard, medium to dark gray to black, somewhat shaly in zones, and shale-like bedding. Richly fossiliferous, marine. samples saved. |
| 784 | 0 | 1 | 0 | Limestone, very dark, shaly, abundant gastropods. |
| Base of Ames Limestone | | | | |
| 785 | 0 | 0 | 5½ | Coal 2½" mac 1825, cc 2235 3" mac 1826, cc 2236 |
| HARLEN COAL, EL. | | | | |
| 785 | 5½ | 0 | 4½ | Shale, dark, coaly |
| 785 | 10 | 0 | 10 | Shale, medium gray, poorly bedded, calcareous |
| 786 | 8 | 0 | 3½ | Siltstone, olive gray green, slightly micaceous, thin-bedded. |
| 786 | 11½ | 0 | 1 | Shale, medium gray to dark gray, contains small plant fossils and definite coal streaks of minute size |
| COAL HORIZON | | | | |
| 787 | 0½ | 1 | 0 | Shale, light gray, poorly bedded, clay-like fractures, non-calcareous. |
| Top of 30' upper "Pittsburgh Red shale (Round knob of Ohio) | | | | |
| 788 | 0½ | 10 | 7 | Shale, light gray, poorly bedded, contains small (max 1/8") pebbles(?) mostly in upper 3', entire unit is calcareous, more so near base. There is much pyrite in the lower 2/3 of the unit, clayey fracture generally present. |
| 798 | 7½ | 4 | 6 | Shale, variegated, dusky red and olive gray green poorly bedded, upper 1'6" calcareous. |
| 803 | 1½ | 7 | 0 | Core missing, probably same as units above and below |
| 810 | 1½ | 6 | 8½ | Shale, variegated, dusky red and olive gray green with the lower part being almost entirely red material, probably a continuation of the second unit above. |

| Depth | | Thickness | | |
|---|--------|-----------|--------|--|
| Feet | Inches | Feet | Inches | |
| 810 | 1½ | | | |
| 816 | 10 | 0 | 6 | Shale, peculiar green, calcareous on weathered surface, appears to be breccia (max,diam. 1/8") contains coherent lumps which aside from their "strength" cannot be distinguished from the rest of the unit. |
| 817 | 4 | 0 | 7 | Shale, peculiar green, weathers to dust and is soft slightly calcareous. |
| Top of Ewing Limestone | | | | |
| 817 | 11 | 10 | 11 | Limestone, shale, olive green, with occasional dusky red splotches, contains coherent lumps which appear to be brecciated or conglomerates. These lumps are limy and below the top 2' of the unit make up fairly good limestone layers about 2" to 6" thick. |
| Top of "Lower" Pittsburgh Red beds. | | | | |
| 828 | 10 | 10 | 4 | Shale and calcareous material interbedded with the unit appearing olive gray green on a fresh surface. Below the top 6' of the unit, the shale grades to silt of similar color, etc. The limy material makes up about 30% of the unit and on a weathered surface appears buff colored. |
| 839 | 2 | 3 | 6 | Core missing |
| 842 | 8 | 1 | 0 | Shale, olive gray green, poorly bedded, calcareous, clay fracture. |
| Top of 17'5" Cow Run Sandstone (equal Thomas of W. Va.) | | | | |
| 843 | 8 | 4 | 3 | Siltstone, olive gray green to light gray, interbedded with limy layers and several zones of slightly more coarse calcareous sandstone. The whole unit is generally calcareous. |
| 847 | 11 | 0 | 7 | Core gap, probably same as units above and below. |
| 848 | 6 | 5 | 11 | Siltstone and fine sandstone interbedded, light gray, micaceous, unit becomes more coarse toward base and somewhat conglomeratic at base. |
| 854 | 5 | 5 | 1 | Sandstone, medium to coarse grained, conglomeratic, light tan (Main "Cow Run Pay"). |

| Depth | | Thickness | | |
|---|--------|-----------|--------|---|
| Feet | Inches | Feet | Inches | |
| 854 | 5 | | | |
| 859 | 6 | 1 | 7 | Sandstone, fine grained, micaceous, probably continuation of 2 units above, and siltstone, medium gray, micaceous. |
| Top of Bakerstown coal horizon (equal Anderson of Ohio and L. Bakerstown of W. Va.) | | | | |
| 861 | 1 | 0 | 6 | Shale, medium gray, slickensided, highly calcareous with good limy zones |
| 861 | 7 | 0 | 5 | Siltstone, medium gray, micaceous, contains plant fossil fragments and tiny carbonaceous streaks. |
| Top of Albright Limestone (?) zone | | | | |
| 862 | 0 | 0 | 11 | Limestone in two 3" layers separated by medium gray poorly bedded chippy shale. |
| 862 | 11 | 1 | 11 | Shale, light olive gray green, weathers chippy in upper 1/3 lower 2/3 is more silty, has more massive fracture and is slightly micaceous |
| 864 | 10 | 7 | 9 | Sandstone, fine grained, light gray, slightly micaceous slightly calcareous in zones with one 2" limy layer in approximately center of unit--apparently cross bedded. |
| 872 | 7 | 1 | 6½ | Siltstone, medium olive gray green, slightly micaceous has one zone of about 1" which is dusky red (as unit below) in middle of unit. |
| 874 | 1½ | 3 | 3 | Siltstone, dusky red gray, grading into a good dusky red shale which is strikingly slickensided. |
| 877 | 4½ | 0 | 10½ | Limestone, dusky brownish-red gray has darker reddish splotches with regular outlines (max. about 1/2" x 1/8") hard, dense. |
| 878 | 3 | 0 | 6 | Shale, variegated dusky red and medium olive gray green, calcareous in upper portion. |
| 878 | 9 | 3 | 0 | Shale, dusky red brown, poorly bedded, strikingly slickensided, silty in zones. |
| Top of Cambridge Limestone Horizon. | | | | |
| 881 | 9 | 1 | 1 | Shale, olive gray green, slickensided; platy fracture slightly calcareous near bottom, minute fossils at 881'3". |

| Depth | Thickness | | |
|-------|-----------|------|--------|
| Feet | Inches | Feet | Inches |
| 881 | 9 | | |

Top of Cambridge Limestone

| | | | | |
|-----|----|---|----|--|
| 882 | 10 | 0 | 10 | Limestone, dark gray, sandy, slightly, micaceous, abundant marine fossils. |
|-----|----|---|----|--|

| | | | | |
|-----|---|---|-----|--------------------------------|
| 883 | 8 | 0 | 3/4 | Carbonaceous shale to vitrain. |
|-----|---|---|-----|--------------------------------|

Top of Wilgus Coal (?) Sample taken

| | | | | |
|-----|-------|---|-------|---|
| 883 | 8 3/4 | 0 | 6 1/2 | Shale, dark, olive gray, slightly calcareous, slickensided, small knots and zones of pyrite crystals. |
|-----|-------|---|-------|---|

| | | | | |
|-----|---|---|---|---|
| 884 | 3 | 0 | 8 | Shale, light gray, poorly bedded, weathers chippy to dusty contains small pebbles or inclusions of some sort (maximum 1/8") |
|-----|---|---|---|---|

| | | | | |
|-----|----|---|---|--|
| 884 | 11 | 3 | 0 | Core missing, probably unit above (soft shale) |
|-----|----|---|---|--|

| | | | | |
|-----|----|----|---|--|
| 887 | 11 | 14 | 1 | Sandstone, fine grained, micaceous (slightly) massive, slightly calcareous in upper portion. |
|-----|----|----|---|--|

| | | | | |
|-----|---|---|---|--|
| 902 | 0 | 8 | 6 | Siltstone, medium olive gray green, slightly micaceous very thin bedded, pelecypod fossil found 58" below top of unit. Lime layers come in toward base and at bottom, this unit is mostly lime for about 1'. |
|-----|---|---|---|--|

Top of thick marine shale and limestone zone
"Upper" Brush Creek Marine shale and limestone zone (?)

| | | | | |
|-----|---|---|---|--|
| 910 | 6 | 1 | 2 | Siltstone, contains lime knots and zones, and is generally calcareous, light olive gray green, has odd pressure markings along joint surfaces (see sample 911'6") fossil remains (small shells and crinoid stems) at 911'4", highest fossils found here. |
|-----|---|---|---|--|

| | | | | |
|-----|---|---|---|---|
| 911 | 8 | 2 | 4 | Shale, variegated, dusky red and dusky green, slightly calcareous with occasional small lime knots silty, and in zones a variegated siltstone at 912' 9" ostracods (?) and a small ridged shell fragment at 912'0", poor small shell. |
|-----|---|---|---|---|

| | | | | |
|-----|---|---|---|---|
| 914 | 0 | 4 | 9 | Siltstone, light olive gray green, numerous limestone knots (light tan brown, hard) some several inches thick, a good limestone, marine fossils branchiopods at 914'0", 914'6", 915'5", branchiopods and crinoid stem 916'0", chonetes, 818'8", spicule, 817' 7". |
|-----|---|---|---|---|

| Depth | | Thickness | | |
|-------|--------|-----------|--------|---|
| Feet | Inches | Feet | Inches | |
| 914 | 0 | | | |
| 918 | 9 | 0 | 3 | Core gap |
| 919 | 0 | 0 | 4 | Same as below, but becoming slightly calcareous and some green tinted, at top a questionable fossil, good bryozoans. |
| 919 | 4 | 2 | 2 | Siltstone, light gray, muscovite and biotite, laves, some local concentrations, slightly clayey fracture, non calcareous. |
| 921 | 6 | 0 | 5 | Shale, variegated dusky red and medium olive gray, poorly bedded, slickensided. |
| 921 | 11 | 11 | 5 | Siltstone or fine sandstone, medium gray, micaceous (muscovite and biotite, contains fine stem-like, light gray "fossils" which are non-calcareous as is the entire unit. |

" Middle" Brush Creek Marine Zone (?)

| | | | | |
|-----|----|---|----|--|
| 933 | 4 | 0 | 2½ | Shale, medium gray, poorly bedded marine fossiliferous, <u>Chonetes</u> , etc. |
| 933 | 6½ | 0 | 6 | Limestone, gray, hard, dense, marine fossils (crinoids, etc.) |
| 934 | 0½ | 0 | 3½ | Limestone, silty, gray, with marine fossils, crinoids. |
| 934 | 4 | 0 | 4 | Siltstone, gray, micaceous. |

Bottom of test hole