

the polariscope and the sky, will frequently show a neutral point which is otherwise invisible.

The normal polarity is often reversed by a stratum of clouds of uniform thickness, especially within the solar primary lemniscate.

Pending nominations 541, 547, 548, 549, were read.

On motion of Mr. Fraley, the subject of Dr. Genth's conditional donation of ten volumes of Leonhard & Bronn's *Jahrbuch für Mineralogie 1840-1851*, was referred to the Library Committee with power to act.

On motion of the Librarian it was resolved that the Secretaries be authorized to subscribe for the *Bulletin International de l'Observatoire Impérial de Paris*.

And the Society was adjourned.

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*Stated Meeting, April 20, 1866.*

Present, twenty-three members.

DR. WOOD, President, in the Chair.

A letter of envoi was received from the Geological Bureau of Sweden, dated Stockholm, November 6th, 1865.

Donations for the Library were received from the Geological Survey of Sweden, the Geographical Societies of France, the Royal Astronomical and Meteorological Societies of London, the Bombay Branch of the Royal Asiatic Society, the Boston Natural History Society, the Rhode Island and New Jersey Historical Societies, the Franklin Institute, and the Publishers of the Medical News, Philadelphia.

The Committee to which was referred "a Map representing five types of topography," reported in favor of its publication in the Transactions, which, on motion, was so ordered.

Dr. Le Conte exhibited a piece of lithographic stone found in Northern Alabama, similar to the hardest or blue variety of German stone, from a quarry used by the Rebel Government for printing its treasury notes, specimens of which accompanied the stone.



Mr. Lesley read extracts from letters respecting the discovery of oil on the Alleghany River at Brady's Bend, seventy miles above Pittsburg, and twenty miles below Franklin in Venango County, and exhibited a suite of specimens of the strata bored through, and the oil obtained.

The place of the Brady's Bend boring is shown in Plate 2 of this Volume of the Proceedings, and its relations to the Venango County Oil Sand Rocks described on pages 56, 57 above. A careful calculation, based upon observations at the locality in the spring of 1865, when the well was commenced, gave 700, 900 and 1100 feet for the respective depths of the three Venango County Oil Sand Rocks (if they extended so far as Brady's Bend) beneath the level of the river.

The depth of 700 feet was, however, reached and passed with no show of oil. The first sand rock therefore seemed to be absent beneath the Brady's Bend locality, or to be destitute of petroleum.

But at 940 feet oil was struck, and with a strong pressure of gas, January 3d, 1866. The bottles show that, from 908 to 1015, all the borings came up stained more or less with oil.

At a depth of 1015 feet the borings became clear again, and the well was stopped at 1089 feet. Seed bags at 381'6 and 425.

Pumping was resorted to and the well produced 25 barrels in 12 hours. It is now reported yielding regularly 12 barrels per day. "The crude oil will burn in a lamp as beautifully as refined oil does, and will continue to do so until the entire contents of the lamp is exhausted." (May 4th, reports 6 barrels per day.)

Whether this oil comes from the second or from the third horizon I do not know; but I suppose the latter. I judge that the oil-shows from 908 to 1015 came from the second horizon at say 900 feet, and that the present depth of 1089 feet marks with surprising accuracy the 1100 foot horizon of the Third or Great Venango Oil Bearing Sand Rock.

Having impressed upon the owners the utility of accurate records of the boring of this pioneer well, I have had the happiness to receive 61 bottles of borings, giving the appearance and condition of the strata from a depth of 142 feet (above which no record was kept) to the bottom of the well. From these bottles the following section has been prepared:

1. Sandstone; not very coarse; rising in pieces; yellowish; at	142 feet.
2. " " finer, orange,	22 to 164
3. " " finer, reddish orange,	4 to 168



4. Sandy shale ; in powder and pieces ;	gray,	12 to 180
5. Sand stone ; very fine ;	yellowish,	19 to 199
6. Sand stone ; muddy ; in pieces ;	yellowish,	2 to 201
7. Sand stone ; muddy ; in powder ;	orange,	1 to 202
8. Shale ; very fine ;	bluish gray,	15 to 217
9. Shale ; very fine and powdery ;	greenish gray,	9 to 226
10. Shale (like 4 above) fine, powdery ;	light bluish gray,	24 to 250
11. Shale ;	darker gray,	40 to 290
12. Shale ; fine and powdery ;	more greenish than 9,	6 to 296
13. Shale ; pretty fine ;	yellowish greenish,	12 to 308
14. Shale ; fine and powdery ;	bluish greenish,	11 to 319
15. Shale ; pieces and powder ;	olive,	8 to 327
16. Shale ; all powder ;	dove color,	41 to 368
17. Shale ; fine sandy (like 4) and large pieces, some powder ;	gray,	3 to 371
18. Shale ; (like 13) but finer ; no pieces ;	yellow greenish,	19 to 390
19. Shale ; (exactly like 17) but all in large pieces ;	gray,	15 to 405
20. Shale ; (same as last) finer and a good deal of powder ;	gray,	120 to 525
21. Shale ; (like 18) very fine ;	yellow greenish,	25 to 550
22. Shale ; (like 17) smaller pieces and some powder ;	gray,	5 to 555
23. Shale ; (like 17) larger pieces than 22 ;	gray,	10 to 565
24. Shale ; (like 10) but a little coarser and warmer ;	blue gray,	25 to 590
25. Shale ; a little warmer than last and very powdery ;		8 to 608
26. Shale ; (like 20 exactly) trifle finer ;	cold gray,	1 to 609
27. Shale ; silicious ; (like last) all in pretty large pieces ;	cold gray,	21 to 630
28. Shale ; muddy ; (like last) a little warmer ; pretty large pieces ;	cold gray,	10 to 640
29. Shale ; (like last) but fine ;	cold gray,	30 to 670
30. Shale ; (like 18) coarse ;	warm gray,	30 to 700
31. Shale ; (like last) finer, powdery ;	warmer gray,	5 to 705
32. Shale ; (not so fine as 31, nor so warm as 30) ;		10 to 715
33. Shale ; (like 25) fine ;	cool gray,	5 to 720
34. Shale ; (like 26) fine pieces ;	cold gray,	20 to 740
35. Shale ; very fine ; much powder ;	somewhat brickdust color,	5 to 745
36. Shale ; (almost like 3) ;	orange,	5 to 750
37. Shale ; (like 34) fine pieces ;	cold gray,	2 to 752
38. Shale ; (like 36) powdery fine ;	orange,	3 to 755
39. Shale ; (like 19) pieces ;	cold gray,	12 to 767
40. Shale ; very fine ;	greenish gray,	8 to 775
41. Shale ; very fine ;	warmer gray,	22 to 797
42. Shale ; fine and powdery ;	not quite orange,	3 to 800
43. Shale ; (like 40) ;	greenish gray,	20 to 820
44. Shale ; powder (containing large gray pieces) ;	orange,	3 to 823
45. Shale ; fine ;	gray,	27 to 850
46. Shale ; all in large pieces ;	blue gray,	12 to 862
47. Shale ; fine ;	greenish gray,	23 to 885



48. Shale ; powder holding pieces ;	towards orange,	4 to 889
49. Shale ; fine pieces ;	greenish gray,	1 to 890
50. Shale ; powder ;	dark orange,	18 to 908
51. Shale ; disguised with oil ;	dark purple,	10 to 918
52. Shale ; fine ; disguised with oil ;	purplish gray,	19 to 937
53. Shale ; fine ; " " "	dark green gray,	8 to 945
54. Shale ; fine ; " " "	purplish gray,	10 to 955
55. Shale ; sandy ; " " "	brownish green,	39 to 994
56. Shale ; sandy ; " " "	brownish green,	10 to 1004
57. Shale ; sandy ; " " "	brownish green,	9 to 1013
58. Shale ; sandy ; " " "	Spanish brown,	2 to 1015
59. Sandy shale ; " " "	very dark green gray,	9 to 1024
60. Sand stone ; soft, whitish, making a yellow sand,		41 to 1065
61. Sand stone ; hard, white, making a gray powder,		24 to 1089

It will be seen by comparing the above section with that of the Sligo Salt Well, furnished by Mr. W. W. Lyon (April 7th, 1865, page 63 above), that the opinion I expressed then was correct, viz.: that the reason of the non-productiveness of the Sligo Well, and of the Clarion River region generally, was merely due to the fact that the Sligo Well, although 992 feet deep, really has penetrated the Brady's Bend strata only 800 feet, and therefore has stopped short of the third and chief oil horizon of Venango County by nearly 300 feet. I believe that, were the Sligo Well to go down this additional distance, it would yield the same petroleum and in the same quantities that the Brady's Bend Well is said to yield.

I cannot say that any accurate identification of corresponding strata in the two wells has been made out. The record of the Sligo Well is from the report of the well master, who describes the look of his borings as they are brought up in the sand pump. The record of the Brady's Bend Well is from the dried sands and powder and fragments of borings preserved in bottles. To obtain a fair comparison and identification, there is but one way, viz.: to bray the borings in a mortar and ram them into a glass tube ; giving to each kind of borings as many tenths of inches of glass tube as the borer found feet of the rock ; and wiping out the tube after every fresh charge, so as to keep the inner surface transparent. If this be done carefully, and the charges are well rammed down to the exact depth (marked by an ink line on a longitudinal strip of paper pasted on the outside of the tube), two tubes can be laid side by side, and any real identifiability be instantly detected. There is no reason why every well-house should not keep one or more such permanent records of its well. Some of the tubes might be half-inch, for dried and powdered borings, to show the color, and others inch tubes, for the fresh wet borings, to show the



grain and fracture. As all the rocks of the Devonian system under the western coal measures are very argillaceous, it is not well to reduce to powder the borings which come from the more sandy layers, because then the prime distinction between sandstones and shales vanishes. And yet it is well to keep one record tube of powdered rocks, because the colored bands come out more plainly thus.

To make a glass-tube record perfectly useful for the study of strata, it is needful to cleanse such borings as come up disguised in color and consistency by oil. After oil is struck (however slight may be its show) all the borings from further down, for many feet and even fathoms, are stained and clotted with the oil, and should be cleansed before being charged into the tube.

Returning to the Brady's Bend Well, the glass-tube record shows belts of orange from 142 to 202; from 371 to 390; from 525 to 550; from 740 to 755; at 797; and from 890 to 908; all the intervals being filled with olive and gray shales:

Supposing the conglomerate at the river bank to be not over 50 feet thick, then the following are the probable identifications of these orange bands:

From 142 to 202 = 60 feet of red rock representing Formation XI.	
From 371 to 390 = 19 " " "	} representing Formation IX; and the Red Band or Mansfield ore, of Formation VIII.
From 525 to 550 = 25 " " "	
From 740 to 755 = 15 " " "	
From 797 to 800 = 3 " " "	
From 890 to 908 = 18 " " "	

It is impossible to identify these bands more carefully, because we cannot be sure that they represent what are called red shale strata. They may represent comparatively high-colored rocks charged with nodular iron ore, and giving flows of iron rust water. This much is certain; there is no resemblance whatever between this scheme of orange bands in the B. B. Well, and the so-called red rocks in the Sligo Well section.

Plate IV will show the distance and direction from one another of these two wells, and their geographical relations to the Oil Creek region and to Pittsburg.

At the bottom of the map close to the Pennsylvania and Virginia State line will be seen the wells of Dunkard's Creek, sunk through the lower part of the Upper Coal Measures, into the upper strata of the Middle or Barren Measures, below the Pittsburg Coal; as the following record, by Mr. Robert Collyer,\* of the Amber Oil Company's (now Amber Gold Mining Company) "Kener Well," on Deer



Run, a branch of Dunkard's Creek, four miles from Greensborough, county town of Greene County, will show :

"Soapstone," [meaning fire clay shale], . . . . .	25 feet.
Sandstone, . . . . .	10 to 35
COAL BED, . . . . .	7 to 42
Soapstone, [fire clay, or under clay], . . . . .	23 to 65
Sandstone, . . . . .	6 to 71
Soapstone, 16 ;—and again, 19 = . . . . .	35 to 106
Sandstone, . . . . .	3 to 109
Soapstone and sandstone, . . . . .	8 to 117
Sandstone, . . . . .	4 to 121
Soapstone, . . . . .	10 to 131
Sandstone, 8 ;—and again, 33 = . . . . .	41 to 172
Soapstone, . . . . .	9 to 181
LIMESTONE, . . . . .	5 to 186
Soapstone and sandstone, 12 + 17, . . . . .	29 to 215
Sandstone, . . . . .	19 to 234
Soapstone, . . . . .	18 to 252
Sandstone and soapstone, . . . . .	9 to 261
COAL BED, . . . . .	13 to 274
Sandstone, 34 ;—and again, 14 = . . . . .	48 to 322
LIMESTONE, . . . . .	39 to 361
Sandstone, . . . . .	31 to 392
BLACK CLAY, . . . . .	14 to 406
Soapstone, . . . . .	6 to 412
LIMESTONE, . . . . .	26 to 438
Soapstone and sandstone, . . . . .	5 to 443
Soapstone, 6 ;—and again, 8 = . . . . .	14 to 457
LIMESTONE and soapstone, . . . . .	28 to 485
Soapstone, . . . . .	13 to 498
Sandstone, . . . . .	4 to 502
LIMESTONE and soapstone, . . . . .	10 to 512
Soapstone and sandstone, . . . . .	18 to 530
Sandstone, . . . . .	99 to 629
"Leather-clay," . . . . .	23 to 652
Soapstone and leather-clay, . . . . .	23 to 675
Soapstone and leather-clay, . . . . .	27 to 702
<i>Sandstone containing gold</i> , . . . . .	33 to 735
Soapstone, . . . . .	23 to 758
Sandstone and soapstone, . . . . .	40 to 798

the present depth of the well, April, 1866, producing no petroleum.

\* Mr. Ben. Long, resident superintendent, lives near the well.



Supposing the 13 foot coal bed at 261-264 to be genuine (and not a false reading of some small seams of black slate), it can only represent the Pittsburg bed, with a thickness exceeding even its fine proportions at Connellsville. The limestone (322-361) will be then in its nominal place at the top of the Barren Measures; and the bottom of the well will have descended (798-274 =) 524 feet beneath the Pittsburg bed without striking either the Elk Lick or the Upper Freeport Coalbeds; showing the Barren Measures more than 500 feet thick.

The "sandstone containing gold" (702 to 735) 33 feet thick may then be the upper member of the Mahoning Sandstone; and the sandstone and soapstone (758-798) 40 feet thick may be its lower member. Perhaps a few yards further the borer would have struck the Upper Freeport Coalbed. I have seen two small fragments of gold ore, about the size of a pea and hazelnut respectively, with a button of gold, and a certified assay of similar fragments at the U. S. Mint, giving in one case over \$80.00 to the *pound* of ore. These fragments were said to have come, with many others, out of this well at the depth indicated. They consisted of cubical crystals of iron pyrites sunk in translucent quartz, over which was spread irregular plates of native gold, and in the interstices of the quartz appeared galena, not in any well-formed crystal that I could find. The ore, from whatever region it came, was evidently of extraordinary richness. The well-master reports that he went through three feet of such rock, but did not recognize its value (!) and threw the fragments, with a few exceptions, into the tip heap. Two of the owners\* tell me that they collected a barrel-full of this tip-stuff and had it analyzed at the U. S. Mint for gold, and it yielded \$3.00 to the ton. They say moreover that the "Cowell Well" on Meadow Run (which lies between Whitely and Dunbar Creeks), say three miles to the N. or N. W. of the Kener Well, passed through the same gold-bearing sandstone at the depth of only 550 feet. Very uncertain accounts of similar strata are reported from one or two other wells in the same district.

The ease with which an infinite variety of deceptions have been played upon well-owners, company managers, and landholders, both by wandering sharpers and respectable speculators, is of itself sufficient to condemn this whole story of the discovery of gold ore in an

\* Mr. Groves and Mr. S. W. Corinth, 350 N. 2d St., Philadelphia.



oil well. Geologically speaking, it is, of course, an impossibility; certainly an incredibility. The outcrops of the Mahoning Sandstone along the Laurel Hill, Chestnut Ridge and Alleghany, Savage, Wills, Broad Top and other mountains, extend in the aggregate to thousands of miles; and the common constitution of the rock is so well known that none but an insane person would now look for a gold quartz pebble in it anywhere, even a hundred miles nearer to the gold-bearing belt of the Atlantic seaboard, much less here in the heart of the bituminous coal area. Nothing but an iceberg from the gold region of Eastern Canada could have deposited a collection of nuggets in Greene County, Penna. But we know the Mahoning sandstone was a shore deposit, filling in the bed of an exceedingly shallow and even-bottomed sea like Lake Erie, but many times larger, which had just before been created by the slow settling of the whole coal area a few yards under water-level; as is shown by the immense extent and regularity of the Upper Freeport Coalbed. In fact I think we must rather regard this water area as a marshy rolling prairie country submerged enough to receive about a hundred feet of sand and pebbles mixed with mud, irregularly but universally dropped into it, by the erosion of the tops of its own low hills or ridges, still standing out of water; in fact an immense archipelago of very soft rocks through which currents carried also material brought from afar. It even looks as if the parallel anticlinal mountains of Westmoreland and Fayette and Somerset Counties to the eastward were already raised and suffering erosion; and such was Dr. R. M. S. Jackson's opinion when he studied this part of the State under the direction of Prof. H. D. Rogers, chief of the State survey, in 1839.

It is inconceivable therefore how pieces of gold-bearing quartz, iron pyrites and galena, should find a resting-place among these submerged hummocks of coal measures; much less be deposited in a stratum three feet thick. Nor can we suppose a gold-bearing vein ascending from the floor of Lower Silurian to within five hundred feet of the surface of the top of the Middle or Barren Coal Measures; for such a phenomenon is unheard of; and if such were by any chance to be struck in one well, there would be thousands of millions to one against the repetition of the accident within a radius of three miles.

When we recall therefore the discovery of a quarter keg of ten penny nails at the depth of six hundred feet in one of the wells on Two Mile Run, Venango County, and the discovery of butter of antimony in a well in Western Virginia, we may quietly wait until



the Amber Gold Company sink their proposed shaft and report their first dividend from what they find.

To show the difference between the rough statement of so many yards of "soapstone," sandstone, limestone, "leather clay," and coal, made by common well-masters, or even between the record made out by careful treatment of bottled borings by an expert geologist, and the complete and accurately minute section which a well-trained civil engineer or mining superintendent has a chance to make during the sinking of a shaft, I will add an unpublished and important section of the air shaft of the Pennsylvania Railroad tunnel through the summit of the Alleghany Mountain, copied from Dr. Jackson's MS. notes of February 18th, 1858,

Clay, yellow, a little stony,	. . . . .	6.3	feet.
Slate, soft brown,	. . . . .	9.7 to	16.0
Sandstone, hard,	. . . . .	.4 to	16.4
Slate, bluish,	. . . . .	3.0 to	19.4
Sandstone, soft shelly,	. . . . .	11.4 to	30.8
Slate, black,	. . . . .	16.5 to	47.3
Sandstone, coarse, much sulphur in first inch,	. . . . .	1.7 to	49.0
Slate, black, with frequent S.S. strata,	. . . . .	20.8 to	69.8
Sandstone,	. . . . .	2.0 to	71.8
Slate, black,	. . . . .	.5 to	72.3
COAL,	. . . . .	.5 to	72.8
Fireclay, hard at top, soft at bottom,	. . . . .	11.5 to	84.3
Slate, hard, blackish,	. . . . .	5.0 to	89.3
Sandstone,	. . . . .	2.0 to	91.3
Fireclay,	. . . . .	9.7 to	101.0
Slate, hard,	. . . . .	11.8 to	112.8
Sandstone, hard,	. . . . .	4.0 to	116.8
Slate, black, hard,	. . . . .	16.4 to	133.2
Sandstone, solid,	. . . . .	1.0 to	134.2
Slate, black, rocky,	. . . . .	4.0 to	138.2
Fireclay,	. . . . .	7.6 to	145.8
Slate, bluish, hard,	. . . . .	19.4 to	165.2
Sandstone, hard,	. . . . .	2.0 to	167.2
Slate, black, hard, micaceous,	. . . . .	7.6 to	174.8
Slate, blue,	. . . . .	1.0 to	175.8
Slate, black, one inch at bottom soft,	. . . . .	5.7 to	181.5
COAL, bituminous,	. . . . .	5.0 to	186.5
Fireclay,	. . . . .	.5 to	187.0



Sandstone, brown, hard, with sulphur,	3.0 to 190.0
Slate, shelly,	1.0 to 191.0
LIMESTONE, rotten,	1.5 to 192.5
Sandstone,	1.0 to 193.5
Slate, shelly,	6.0 to 199.5
COAL,	1.0 to 200.5
Fireclay, hard,	1.0 to 201.5
Fireclay, calcareous,	1.5 to 203.0
LIMESTONE rock,	2.0 to 205.0
Fireclay, hard,	2.0 to 207.0
LIMESTONE,	1.0 to 208.0
Fireclay,	1.0 to 209.0
LIMESTONE and small seams of F. C.,	3.5 to 212.5
Slate, decomposing in air,	2.0 to 214.5
LIMESTONE,	1.0 to 215.5
Fireclay,	2.5 to 218.0
LIMESTONE,	.5 to 218.5
Slate and fireclay,	11.0 to 229.5

which cannot be many feet above the Great Bed cut by the tunnel in its upward grade of  $1^{\circ}$  westward, the bed itself descending with a dip of  $1^{\circ}$  westward. The above 229.5 therefore represents the middle portion of the Lower Coal Measures. The entire absence of workable coal beds above the tunnel bed is due to the fact, that the top of the section is not high enough to take in the Freeport Series, which underlie the Mahoning Sandstone.

Pleasant Unity is a village nine miles south-southwest from Latrobe, on Sewickley Creek. West-northwest of this village two and a half miles is Pauf Graff's oil well, begun October, 1864, which commences 50 feet beneath the Pittsburg Coal-bed, and reached a depth of 550 feet in May, 1865, in a mass of sandrock. It reported "shows of oil at 450, 510, and 550; and pumped at each, getting several gallons."

Three hundred yards due north of this well, is the Old Oneida Salt Well, bored in 1840, 800 feet deep, a tradition being in existence that it flowed a hundred barrels of oil per day. On the strength of this tradition it was reamed out in 1858, with no result beyond passing a show of oil at 538 feet, and after that coming (at a depth not stated) to a coal-bed from 12 to 14 feet thick; which, if not fabulous, must be an exaggerated estimate of the Upper Freeport Coal-bed, the outcrop of which is not three miles away, at the foot of the Chestnut Ridge. It is probably the 7 feet coal-bed of the following section, and a good illustration of the unreliability of the thickness



of coal-beds in oil well records. The interesting point of this section is the limitation of the Barren Measures to about  $50 + 538 + ? =$  say 600 feet.

The following is a record of 844 feet of St. Mary's Well, on Sewickley Creek, about a mile from Chestnut Ridge, in Mt. Pleasant Township, Westmoreland County, Pennsylvania, furnished by Mr. S. S. Jack, of Pleasant Unity.

Mouth of well, geologically, about 50 feet below Pittsburg Coal-bed; and a quarter mile east of its outcrop.

Slate rock, . . . . .	40 feet.
Reddish rock, . . . . .	12 to 52
Soapstone, . . . . .	10 to 62
Hard rock, . . . . .	12 to 74
Soft rock (water crevice at 86 feet), . . . . .	12 to 86
Reddish rock, . . . . .	14 to 100
Hard blue rock, . . . . .	70 to 170
Block slate or shale; (1st oil-show at 184), . . . . .	14 to 184
First sand rock, hard, white, . . . . .	96 to 280

(Very large water vein at 280.)

Gray rock (2d oil show and gas at 427), . . . . .	147 to 427
Black rock, . . . . .	46 to 473
Limestone, . . . . .	70 to 543
Second sand rock, . . . . .	15 to 558
Horseback, . . . . .	7 to 565
Coal-bed [Elk Lick coal?], . . . . .	7 to 572
Third sand rock, white, . . . . .	30 to 602
Hard gray rock [Mahoning S. S.?), . . . . .	65 to 667
Coal-bed [Upper Freeport?], . . . . .	2 to 669
Fourth sand rock, white, . . . . .	30 to 699
Dark rock, . . . . .	16 to 715
Soapstone, . . . . .	16 to 731
Fifth sand rock, white, . . . . .	24 to 755
Limestone [Freeport], . . . . .	23 to 778

(Salt water crevice at 778, gas very strong.)

Sand rock, very hard, . . . . .	66 to 844
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The rest of the record of this well is not at present obtainable. Mr. Jack was good enough to forward 14 samples of both rock and coal; adding: "We expected to find a small bed of coal within the first hundred feet; but it was not noticed; although found in a well bored a short distance, say 70 rods, southwest; and also in gigging



for water 14 feet under the surface, at a point a quarter of a mile to the south."

There is always at least one small bed of coal near the top of the Barren Measures, under the Pittsburg bed.

"There is a great flow of water and gas from the well, the gas acting periodically with force sufficient to eject the water from the mouth of the tubing (laid horizontally 6 feet from the ground) to a distance of 50 feet." The strong dip from the anticlinal of the Chestnut Ridge makes all the wells along its western foot artesian. "This well has never been properly tested for salt or oil, because the fresh water has never been exhausted."

The following is the record of Governor Johnson's oil well, bored in the centre of the gorge of the Loyalhanna River through Chestnut Ridge, about six miles east of Latrobe. The mountain rises 800 or 900 feet above the bed of the river, and is capped with the bottom coal measures. The well commences at a point about thirty rods up stream from where the axis of the great anticlinal of the Ridge crosses the river. It is therefore nearly on the crown of the arch. White and red sandrocks belonging to the Upper Devonian system (IX and X) form crags overhanging the river banks.

"Soil,"	.	.	.	.	.	.	.	.	14 feet.
Slate, blue, to a vein of fresh water,	.	.	.	.	.	.	.	.	25 to 39
"Bluestone,"	.	.	.	.	.	.	.	.	25 to 64
Soapstone,	.	.	.	.	.	.	.	.	4 to 68
Bluestone,	.	.	.	.	.	.	.	.	10 to 78
Sandstone,	{	white to salt water vein,	.	.	.	.	.	.	24 to 102
		gray to where "tools dropped, ten inches,"	.	.	.	.	.	.	22 to 124
		"black,"	.	.	.	.	.	.	30 to 154
small show of gas, borings of black slate, perhaps coal; water-vein white as milk.									
Black slate, pretty soft,	.	.	.	.	.	.	.	.	60 to 214
"Bastard blue stone,"	.	.	.	.	.	.	.	.	26 to 240
Sandstone,	{	white to a grand spring of fresh sulphur water,	.	.	.	.	.	.	74 to 314
		pebble rock,	.	.	.	.	.	.	2 to 316
		quartz rock,	.	.	.	.	.	.	45 to 361
		white,	.	.	.	.	.	.	43 to 404
Black slate,	.	.	.	.	.	.	.	.	*18 to 422
Sandstone; to a vein of gas,	.	.	.	.	.	.	.	.	10 to 432

\* Omitted, and perhaps justly, in S. M. Wickersham's letter, No. 124 First St., Pittsburg, June 14th, 1865.



Soapstone,	. . . . .	75 to 507
Blue slate,	. . . . .	35 to 542
Blue stone,	. . . . .	15 to 557
Gray stone,	. . . . .	35 to 592
Brown, very hard, red in centre, the rest blue,	. . . . .	43 to 635
Sandstone,	{ red ; with blue stone ; salty, . . . . .	*68 to 703
	{ gray, . . . . .	10 to 713
	{ red ; with blue stone, . . . . .	20 to 733
	{ blue ; salty, . . . . .	22 to 755

the depth of the well July 20th, 1865, when the manager wrote, "We have lots of gas and soot, and the rock is very oily and salty."

Record of Borings on the Clarion Coal and Oil Company's tract, Wilcox, Elk County, Pa., sunk by Adams & Babcock, communicated by Mr. O. N. Adams. The well is situated on West Branch of Clarion (West Toby), on Warrant No. 2676, near and inside of the south line of McKean County, Pennsylvania.

"Coal crops out about 370 feet above well mouth, in the surrounding hills."

Conducting pipe through gravel,	. . . . .	41 feet.
Slate ; (at 60 feet from surface heavy water-course,)	. . . . .	30 to 71
Shale ; red,	. . . . .	137 to 208
Sandstone ; blue,	. . . . .	8 to 216
Slate ;	{ "These red shales are hard and	. . . . . 26 to 242
Shale ; red,	{ compact like sandstone." }	. . . . . 64 to 306
Sandstone ; micaceous,	. . . . .	21 to 327
Sandstone ; blue,	. . . . .	5 to 332
Shale ; red,	. . . . .	31 to 363
Slate,	. . . . .	13 to 376
Sand ; blue,	. . . . .	8 to 384
Shales ; red (salt water),	. . . . .	31 to 415
Sandstone ; blue,	. . . . .	14 to 429
Slate,	. . . . .	85 to 514
Sandstone ; micaceous,	{ ("mica and iron pyrites	. . . . . 47 to 561
	{ abundant,") }	
Slate, ("often called black sand,")	. . . . .	77 to 638
Sandstone ; blue,	. . . . .	20 to 658
Slate,	. . . . .	43 to 701
Sandstone ; micaceous,	{ (gas and black soot abundant	. . . . . 48 to 749
	{ for 100 feet downward, ) }	

\* 100 feet in S. W. Wickersham's letter of July 22d, 1865.



Shales; olive, . . . . .	65 to	814
Sandstone; micaceous, . . . . .	21 to	835
Shales; olive; very soft; "putty rock," . . . . .	11 to	846
Sandstone; micaceous, . . . . .	18 to	864
Shales; olive, . . . . .	7 to	871
Sandstone; micaceous, . . . . .	5 to	876
Shales; olive, . . . . .	5 to	881
Sandstone; micaceous; chocolate hue, . . . . .	9 to	890
Shales; olive; black gas from here downward, . . . . .	23 to	913
Sandstone; micaceous, . . . . .	6 to	919
Shales; olive, { six inches of sandrock inter- } . . . . .	6 to	925
Shales; red, { posed between 6 and 6, } . . . . .	6 to	931
Sandstone; micaceous; very hard; olive, . . . . .	5 to	936
Shales; olive, . . . . .	2 to	938
Sandstone; micaceous; silicious; hard; compact, . . . . .	10 to	948
Shales; olive, . . . . .	6 to	954
Shales; red and olive, . . . . .	2 to	956
Shales; olive, . . . . .	38 to	994
Sandstone; gray; light; very hard; iron pyrites, . . . . .	3 to	997
Shales; very soft, { a few inches of hard sand rock } . . . . .	6 to	1003
Clay; blue, { interposed between these. } . . . . .	6 to	1009
Shale; olive; more compact; 3 divides, . . . . .	65 to	1074
Sandstones; micaceous; dark soft, { (strong smell in } . . . . .	36 to	1110
	{ derrick lifting } . . . . .	
	{ tools, )	
Soapstone or mud vein, . . . . .	2 to	1112
Sandstone; gray; very hard, . . . . .		1114
Sandstone; light gray; very hard, . . . . .		1116
Sandrock; bottom very hard and very fine, . . . . .	28 to	1140
Slate rock; very hard with quartz intermixed, . . . . .	25 to	1165
Sandstone; very hard; fine; soft in streaks; at 1172 feet occurs mud and soft spot 4 inches; here a gas vein spouted five times twenty feet high; and again, but not so strong, at 1202 feet, March 27th, . . . . .	36 to	1201
Sandstone; very hard; fine; soft in streaks, . . . . .	26 to	1227
Slate rock with scales of hard sand, . . . . .	10 to	1237
Slate rock; gas in sand-pump, . . . . .	11 to	1248
Sandstone hard, and slate soft; black soot and smell on tools, April 6th, . . . . .	21 to	1269
Slate with sand; red and white; very small pebbles, April 13th, . . . . .	25 to	1294
Slates with sand, . . . . .	8 to	1302



Record of No. 2 well on Hyner Run, half a mile above its junction with Pithole Creek, Venango County, Pa., furnished through the kindness of General Tyndall, of Philadelphia.

Length of conductor to solid rock, . . . . .	9 feet.
Soapstone, . . . . .	
Sandrock, hard white; layers of gray; large water-course, . . . . .	71 to 80
Slate, . . . . .	48 to 128
Sandrock ("2d"), about . . . . .	4 to 132
Slate, . . . . .	68 to 200
Sandrock; about . . . . .	5 to 205
Soft slate, . . . . .	4 to 209
Sandrock; hard and then with . . . . .	6 to 215
Hard and soft streaks, . . . . .	24 to 239
Slate, . . . . .	220 to 459
White sandrock, . . . . .	31 to 490
Slate, . . . . .	50 to 540
Sandrock ("4th"), . . . . .	16 to 556
Crevice, "with a very good show of oil and gas," . . . . .	2 to 558
Sandrock, . . . . .	3 to 561
Slate, . . . . .	39 to 600
Reddish slate in thin layers and hard sand rock gradually becoming soft with a fine show of oil and some gas, . . . . .	12 to 612
Slate; hard to the bottom, . . . . .	22 to 634

The well at this depth pumped 50 to 75 barrels of oil per day for some months.

Record of the Old United States Well (Frazier Well) on Pithole, Venango County, Pa.

Slates; variegated, . . . . .	95 feet.
1st Sandrock, . . . . .	40 to 135
Slates; variegated, . . . . .	215 to 350
2d Sandrock, . . . . .	30 to 380
Slates; variegated, . . . . .	85 to 465
3d Sandrock, . . . . .	20 to 485
Slates; variegated, . . . . .	110 to 595
4th Sandrock; to bottom, . . . . .	12 to 607

This well is said to have yielded originally 800 barrels, and now to yield from 20 to 100 barrels per day, according to different authorities.

The record of No. 47, or Burchell Well, which is said to flow 150 to 200 barrels per day, does not vary over two or three feet in the



tops and bottoms of its sandrocks, from the record of the Frazier Well, given above.

Record of Glade Well, or Well No. 7, Sugar Camp branch of Stewart's Run (half mile up the branch), two miles from Alleghany River, and about the same distance east of Pithole. Stewart's Run is in the next valley east of Pithole, descending southward to the River, Venango County, Pa.

Slate and crevice of water, . . . . .	50 feet.
Slate (common), . . . . .	20 to 70
Sandstone; hard, and gas, . . . . .	5 to 75
Slate, . . . . .	20 to 95
Sandstone and gas, . . . . .	2 to 97
Soapstone, . . . . .	21 to 118
Soft clay slate, . . . . .	78 to 196
Red slate, . . . . .	50 to 246
Soapstone slate, . . . . .	20 to 266
Red slate and water crevice, . . . . .	21 to 287
Red slate, . . . . .	31 to 318
Sandstone; white, and gas, . . . . .	37 to 355
Slate, . . . . .	40 to 395
Sandstone and slate, . . . . .	12 to 407
Sandstone; hard, and gas, . . . . .	25 to 432
Slate; mud vein, . . . . .	20 to 452
Slate and sandstone, . . . . .	15 to 467
Sandstone; hard; white, . . . . .	10 to 477
Sandstone; gray, and gas, . . . . .	10 to 487
Slate (common), . . . . .	53 to 540
Sandrocks; coarse, . . . . .	4 to 544
Soapstone and water crevice, . . . . .	20 to 564
Sandstone; gray, . . . . .	8 to 572
Slate, . . . . .	10 to 582
Flintrock, . . . . .	2 to 584
Sandstone with crevices, . . . . .	4 to 588
Slate, . . . . .	10 to 598
Sandstone, . . . . .	2 to 600
Slate, . . . . .	12 to 612
Sandstone and red slate, . . . . .	4 to 616
Slate; to bottom, . . . . .	15 to 631

Actual depth of well when abandoned 610 feet, the discrepancy being left unexplained.



Mr. Lea exhibited specimens of *Eozoon Canadense*, received from Mr. Billings, of Montreal, in rough, polished and dissected states. A discussion ensued, in which Prof. Hayden, Dr. Le Conte, Mr. Barnes, Judge Hare, and Mr. Lesley took part.

Pending nominations Nos. 541, 547, 548, 549, were read and balloted for, and there being no further business, the presiding officer announced the following persons duly elected members of the Society.

Dr. Pliny Earle, of Northampton, Massachusetts.

Dr. Owen Jones Wister, of Germantown, Pennsylvania.

Mr. Thomas Davidson, of Brighton, England.

Dr. Fridolin Sandberger, of Wurtzburg, Bavaria.

And the Society was adjourned.

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*Stated Meeting, May 4, 1866.*

Present, sixteen members.

Vice-President Prof. CRESSON, in the Chair.

A letter accepting membership was received from Dr. O. J. Wister, dated Germantown, April 25th.

A letter from Mr. J. R. Snowden, Secretary of the Historical Society of Pennsylvania, requesting facilities for Mr. Edw. Armstrong to examine sources of information on the subject of the life of the late Mr. Duponceau, was read, and on motion of Dr. Wood the request was granted.

A letter respecting the publication of a treatise upon the laws of the French Language was received from Prof. E. Taliaferro, dated College of William and Mary, Williamsburg, Va., April 25th.

A photograph of Prof. S. S. Haldeman was presented by Dr. Le Conte, for the Album.

Donations for the Library were received from Sig. Lombardini, Dr. Schinz, the Bureau of Mines, the Royal Astronomical Society, the Rhode Island Society for the Encouragement of Domestic Industry, Dr. B. A. Gould, Prof. W. A. Norton,





1866. "Stated Meeting, April 20, 1866." *Proceedings of the American Philosophical Society held at Philadelphia for promoting useful knowledge* 10(75), 226–242.

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