TRIPOLI.

The following highly interesting paper on the Tripoli found in the cavities of the cherty limestone overlying coal seam K, near Ferdinand, Dubois county, Ind., and prepared for sale by the Anderson Valley Mining Company, has been kindly furnished by Dr. Jos. Gardner, whose skill as a microscopist is worthy of special note, since this material was submitted to other eminent microscopists, who were unable to find in it any trace of organic remains.

An account of the manner of preparing and use of this Tripoli will be found in Prof. Collett's report on Dubois county, p. 228, 3d vol. Geology of Indiana, 1872.

PROFESSOR E. T. COX:

State Geologist:

DEAR SIR:—The specimen of "commercial tripoli" sent me, the label of which stated that it was from the "pockets" in the cherty limestone, forming the roof of coal K, in Dubois county, has been submitted to microscopic examination, and I offer the following statement:

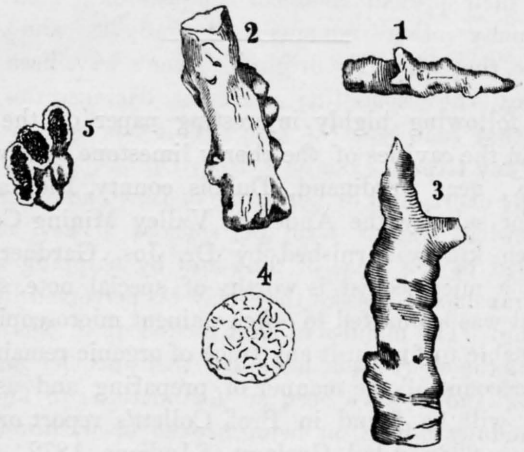
Tripoli is chemically allied to both the flints and sandstones. The ordinary tripoli of commerce consists of

Silicic acid	90. per cent.
Alumina	7. per cent.
Oxide of iron	3. per cent.

That from Dubois county appears to have about this composition. Its buff color is due to the presence of oxide of iron.

Tripoli differs from sandstone and sharp sand more in physical than in chemical constitution.

In sandstone the particles have been arranged according to the general laws governing the crystallization of inorganic bodies. Tripoli, on the contrary, has for its basis the silicified skeletons of organic bodies.



The figures 1, 2, 3 and 4, in the above cut, represent the prevailing forms of these skeletons, magnified about three hundred and fifty diameters. Nos. 1 to 3 are *spicules* having a more or less cylindrical form and generally terminate in a point. On some, may be seen, small tubercles or rudimentary branches and others show where the developed branches have been broken off.

Figure 4 shows a transverse section of one of the cylindrical *spicules*, as broken off.

Figure 5 is a fragment of a *foramenifero*us shell.

The general character of the remains, in this specimen of tripoli, shows that it is made up almost exclusively of the skeletons of sponges; these skeletons may have been, during the existence of the compound animal that formed the sponge, either the hornlike substance, called *chitine*, of which the claws, stings and other parts of insects are composed, or built up of carbonate of lime, deposited by the animal, like the shells of mollusks; or, they may have been

formed, like many of the sponges of the present age, of silicic acid with traces of iron and other elements. Sponges are found in the Caribbean sea, composed wholly of silica, and are as flexible as spun glass.

I incline to the opinion that the animalculæ, that secreted the *spicules* found in tripoli, deposited them with very nearly their present chemical composition. I have examined many other remains and find, in almost every instance, that where the original elements have been replaced by silica, the crystalline character demonstrates conclusively that such was the case. This has not been found true of any tripoli, examined, from Dubois county,

In the chert, flint or hornstone of Lawrence county I find a somewhat similar form of *spicules*. They are found imbedded in the mass of flint and by chipping off scales from translucent masses they may be perceived by careful handling. The nodules of flint picked up in the neighborhood of the chert beds have had their neuclei made up of sponges, and I have been so fortunate as to find one of these nodules which, on being broken open, shows the root by which the sponge was attached, and in a cavity, near its centre, I found a slight net work of the glassy filaments of the sponge, which under the micrescope, leaves no doubt of their origin. These filaments retain their flexibility and are readily separated from the parent mass. When mounted for examination under the microscope, and viewed, either as opaque or transparent objects, they are both beautiful and instructive.

It may be safely asserted that almost all the hornstone nodules found in chert are fossil sponges. It is hardly necessary to add that sponges grow only beneath the surface of water, and that there are both salt and fresh water varieties.

Yours Truly,

JOS. GARDNER, M. D.

Bedford, Ind., Dec. 1873.

ANALYSIS OF COALS—KNOX COUNTY.

COUNTY.	NAME OF MINE OR OWNER.	Specific gravity.	Weight of one cubic foot.	Fixed Carbon.	Ashes.	Coke.	Gas.	Water	Total Volatile Matter.	Color of Ash.
Knox	Curry L	1.319	81.87	57.00	4.50	61.50	34.50	4.00	38.50	White.
Knox	Hooper, John ..... M	1.261	78.81	51.50	6.50	58.00	38 50	3.50	42.00	Red.
Knox	Keith, Dr., upper ..... K	1.292	80.75	49.50	5.00	54.50	39.50	6.00	45.50	Gray.
Knox	Keith, Dr., middle ..... K	1.311	81.93	49.00	6.00	55.00	39.00	6.00	45.00	Gray.
Knox	Keith, Dr., lower ..... K	1.305	81.56	49.00	6.50	55.50	39.00	5.50	44.50	Brown.
Knox	McKenna			57.50	4.00	61.50	35.00	3.50	38.50	White.
Knox	Sanborn ..... K	1,287	80.43	48.00	3.50	51.50	44.50	4.00	48.50	Brown.
Knox	Sanborn, (cannel coal) ..... K	1.601	100.07	38.50	25.00	63.50	33.00	3.50	36.50	Brown.
Knox	Shepard & Hazlett ..... K	1.304	81.50	49.00	6.50	55.50	39.00	5.50	44.50	Blue.
Knox	Simonson, A., upper L	1.250	78.12	47.00	2.50	49.50	47.00	3.50	50.50	Fawn.
Knox	Simonson, A., middle L	1.244	77.75	45.50	3.50	49.00	47.50	3.50	51.00	Fawn.
Knox	Simonson, A., lower L	1.253	78.31	48.50	3.00	51.50	45.50	3.00	48.50	Pink
Knox	Simonson & Hulan, upper ..... K	1.281	80.06	45.50	5.00	50.50	45.50	4.00	49.50	White.
Knox	Simonson & Hulan, middle ..... K	1.276	79.75	49.00	3.50	52.50	43.00	4.50	47.50	White.
Knox	Simonson & Hulan, lower ..... K	1.286	81.00	52.00	7.00	59.00	37.50	3.50	41.00	Red.
Knox	Swick ..... M ?	1.276	79.75	46.00	5.50	51.50	45.50	3.00	48.50	Red.
Knox	Williams, J. D ..... M ?			54.00	4.00	58.00	38.50	3.50	42.00	Brown.
Knox	Weaver Coal Company (borings) ..... M ?			59.00	3.50	62.50	34.00	3.50	37.50	White.
Knox	Weaver Coal Company ..... M	1.277	79.81	52.00	4.50	56.50	48.50	5.00	43.50	Brown.
Knox	Weaver Coal Company L	1.286	80.37	53.00	5.00	58.00	38.50	3.50	42.00	Red.

ANALYSES OF COALS—WARREN COUNTY.

County.	Name of Mine or Owner.		Specific gravity.	Weight of one cubic foot.	Fixed Carbon.	Ashes.	Coke.	Gas.	Water	Total Volatile Matter.	Color of Ash.
Warren	Briggs, Jno	K	1.212	75.75	48.50	2.00	50.50	44.75	4.75	49.50	Flesh.
Warren	Briscoe, J. T., upper	L	1.223	76.44	57.50	7.00	64.50	32.00	3.50	35.50	Gray.
Warren	Briscoe, J. T., middle	L	1.267	79.18	54.70	8.00	62.70	33.80	3.50	37.30	Blue.
Warren	Briscoe, J. T., lower	L	1.350	84.37	52.25	16.00	68.25	28.75	3.00	31.75	Blue.
Warren	Claypool, R. W., upper	L	1.246	77.87	48.50	10.00	58.50	38.50	3.00	41.50	Red.
Warren	Claypool, R. W., middle	L	1.204	75.87	55.50	2.50	58.00	38.00	4.00	42.00	White.
Warren	Claypool, R. W., lower	L	1.205	75.31	54.50	8.50	63.00	34.00	3.00	37.00	Brown.
Warren	Claypool, R. W	M			48.00	3.50	51.50	45.00	3.50	48.50	Brown.
Warren	Goodrick	M	1.343	83.93	45.00	9.50	54.50	39.50	6.00	45.50	Red.
Warren	Goodrick, upper	L	1.304	81.50	46.50	8.50	55.00	42.00	3.00	45.00	Purple.
Warren	Goodrick, lower	L	1.262	78.87	46.00	4.50	50.50	46.50	3.00	49.50	Flesh.
Warren	Hooper & Barringer, upper	L	1.238	77.37	59.00	2.50	61.50	34.50	4.00	38.50	White.
Warren	Hooper & Barringer, lower	L	1.236	77.25	56.00	2.50	58.50	35.00	6.50	41.50	White.
Warren	Harold & Co., upper	L	1.282	80.15	54.00	6.50	60.50	36.00	3.50	39.50	Red.
Warren	Harold & Co., lower	L	1.252	78.25	56.00	3.50	59.50	31.00	9.50	40.50	White.
Warren	Harold & Co., middle	L	1.290	80 62	49.50	7.50	57.00	38.50	4.50	43.00	White.
Warren	Jarvis, upper	K	1.243	77.68	50.50	6.50	57.00	38.00	5.00	43.00	Red.
Warren	Jarvis, middle	K	1.251	78.18	53.50	3.00	56.50	40.75	2.75	43.50	White.
Warren	Jarvis, lower	K	1.348	84.25	51.50	12.00	63.50	33.00	3.50	36.50	White.

ANALYSES OF COALS—WARREN, GIBSON, CLAY COUNTIES, AND OTHER LOCALITIES.

County.	Name of Mine or Owner.	Specific gravity.	Weight of one cubic foot.	Fixed Carbon.	Ashes.	Coke.	Gas.	Water	Total Volatile Matter.	Color of Ash.
Warren	Luppoldt, upper.....L	1.222	76.37	49.00	9.50	58.50	37.00	4.50	41.50	Red.
Warren	Luppold', middle.....L	1,254	78.37	52.50	9.00	61.50	33.50	5.00	38.50	Red.
Warren	Luppoldt, lower.....L	1.256	78.50	57.00	4.50	61.50	35.50	3.00	38.50	White.
Warren	Schoonover, upper.....K	1.284	80.25	49.40	9.50	58.90	37.60	3.50	41.10	Red.
Warren	Schoonover, lower.....K	1.229	76.81	55 25	6.25	61.50	34.00	4.50	38.50	Red.
Warren	Thomas, Jno.....M	1.415	88.43	49.50	12.50	62.00	33.50	4.50	38.00	Red.
Warren	Tinker & Co., upper.....L	1.257	78.56	50.00	3.50	53.50	43.50	3.00	46.50	Red.
Warren	Tinker & Co., middle.....L	1.282	80.12	47.00	3.00	50.00	44.50	5.50	50.00	Blue.
Warren	Tinker & Co., lower.....L	1.244	77.75	50.50	5.00	55.50	42.50	2.00	44.50	Red.
Gibson	Finney.....	1.307	81.68	51.50	6.50	58.00	36.00	6.00	42.00	Brown.
Gibson	MeGregor.....N	1.249	78.06	52.50	3.50	56.00	39.50	4.50	44.00	Yellow.
Gibson	Oakland City, upper.....L?	1.391	86.93	43.50	18.50	62.00	32.00	6.00	38.00	Red.
Gibson	Vanada, G S.....M	1.275	79.68	54.00	5.50	59,50	35.50	5.00	40.50	Red.
Clay	Markland Mining and M'fg Co.....	1.211	75,69	52.00	2.00	54.00	41.50	4.50	46.00	White.
State Missouri.	Benj. Ruffner, Link mine.....	1.318	82.37	55 00	7.50	62.50	30.50	7,00	37.50	White.
State Missouri.	Benj. Ruffner, Upsom mine.....	1.074	67.12	55.50	2.00	57.50	36.50	6.00	42.50	White.
Tennessee	McGill's Gulf, Chattanooga.....	1.345	84.06	65.00	9.50	74.50	23.00	2.50	25.50	White.
Tennessee	Soddy mine, Chattanooga.....	1.283	80.18	75.00	4.00	79.00	17.50	3.50	21.00	Red.
Colorado	Canon City.....			53.00	4.50	57.50	38.00	4.50	42.50	Yellow.