

Notice of Coal Mines in Illinois. By a CORRESPONDENT.

TO THE COMMITTEE ON PUBLICATIONS.

GENTLEMEN—I have received the following information in relation to a locality of coal in Illinois, from Mr. Hall Neilson, of Richmond, Virginia, and consider it of sufficient importance to ask you to place it on the pages of your Journal for permanent reference. The coal alluded to is a dry bituminous coal, of which specimens have been placed in the Cabinet of the Franklin Institute, and of the American Philosophical Society.

The Mount Carbon Coal Mines are on the margin of Big Muddy River, near Brownsville, Jackson County, Illinois, a short distance from its junction with the Mississippi River. The upper stratum of coal which is now opened, and has been worked on a limited scale for many years, is about six or seven feet thick, and lies in a horizontal position above high water mark, leaving room for wharfage between the river and the mines. This coal combines the qualities of the *anthracite* with *pure charcoal*, with a remarkable freedom from sulphur, slate, and other impurities; makes an open fire, ignites very easily, and burns with much flame, and a strong heat, producing little smoke, cinder, or ashes. These rare qualities render this coal of great value and importance in the manufacture of iron and steel, and particularly so, in the production of *steam*. Coal must ere long, be generally adopted for the use of steam-boats, and sugar plantations, on the Mississippi, and for foundries, steam-mills, sugar refineries, cotton presses, and other works at New Orleans; there would, besides, if this coal were in the market, be a large demand for the outward bound shipping from that port, and as ballast for those in the Havana and South American trade, indeed the demand may be considered almost unlimited.

It is understood that the present proprietor of these mines wishes that their working should be undertaken by a company, to form which he has made arrangements.

A CORRESPONDENT.

Table of the Properties, &c., of the Metals, taken from a table by M. Chaudet, of the Paris Mint. By FRANKLIN PEALE, Melter and Refiner of the U. S. Mint.

TO THE COMMITTEE ON PUBLICATIONS.

GENTLEMEN,—The following table contains an abstract of the more important and interesting particulars relating to the metals. It is offered for publication under the belief that it will be useful as a matter of reference. The headings of the various columns are believed to be sufficiently explicit to guide the reader. A few of the less important, or more recently discovered, metals, are not inserted; their names are, however, given at the close of the table.

Yours, &c.

FRANKLIN PEALE.

	Names of the metals.	Dates of Discovery.	Names of the Discoverers.	Names of the places where the principal mines are situated.
1	Antimony,	15th cent'y.	Basil Valentine describes the process for extraction.	In France, at Altemont; in Sweden, at Alteberg; in Hungary, in the mines of Cremnitz, and Chemnitz; in Bohemia, in Saxony, in Tuscany, &c.
2	Silver,	Earliest antiquity.		In France, at Altemont, St. Marie aux Mines; Saxony, at Freiberg; in Norway, Spain, Peru, Mexico, Siberia, &c.
3	Arsenic,	1733	Brandt.	In France, at St. Marie aux Mines; Saxony, at Freiberg; Bohemia, England, in the mines of Cornwall, &c.
4	Barium,	1807	Indicated by Davy.	In France, at Royut, (Puy de Dome;) England, "Anglesarcke;" Saxony, near Freiberg; Siberia, Schlangenbergl, &c.
5	Bismuth,	1520	Described in the treatise by Agricola.	In France, in Brittany, the Pyrenees; Bohemia, at Gonchienstatt; Saxony, at Freiberg; Sweden, Transylvania, near Salatna, &c.
6	Cadmium,	1818	Herman, or Stromeyer.	In Hungary, in the "Bleude Rayonne" of Gazibram.
7	Calcium,	1807	Indicated by Davy.	In France, at Montmartre near Paris; Vizelle near Grenoble; England, in the county of Cumberland; Scotland; Spain, in the province of Estremadura.
8	Cerium,	1804	Hysinger and Berzelius.	In Sweden at Reddarhyta, in the mines of copper of Bastnais; Greenland, &c.
9	Chromium,	1797	Vauquelin.	In Peru, United States, Siberia, &c.
10	Cobalt,	1753	Brandt.	In France, in the Pyrenees, at Altemont; Sweden, at Tauxberg; Saxony, at Amaberg; Bohemia, at Joachienstat; Hesse; Spain, in the valley of Gistan, &c.
11	Columbium or Tantalum,	1802	Hatchet.	In Sweden, America.
12	Copper,	Antiquity.		In France, at St. Bel, near Lyons, Chessy; Spain, Piedmont, England, Germany, Hungary, Sweden, Siberia, North and South America, &c.
13	Tin,	Antiquity.		In Spain, near Monterey; England, co. of Cornwall; Bohemia, Saxony, East Indies, Banca, Malacca, &c.
14	Iron,	Antiquity.		In France, at the foot of the Pyrenees; Formoot in Vosge, Normandy, Burgundy; in Germany, Elba, Italy, Siberia, America, &c.

	Names of the substances with which the ore is united in the mine.	State in which they are found	Principal processes of reduction.
1	Sulphur and oxygen.	Native and mineralized.	After purifying the sulphuret, it is roasted with charcoal, "sel du soude," soda, and melted.
2	Antimony, arsenic, sulphur, mercury, oxygen, chlorine.	Native and mineralized.	The sulphuret is roasted with salt, heated with mercury and iron, and the amalgam distilled.
3	Oxygen, sulphur, several metals in the state of arseniates.	Mineralized.	By the calcination of the minerals which contain arsenic, this metal sublimes.
4	Oxygen, sulphuric and carbonic acids.	Mineralized.	By means of the voltaic pile, but obtained in very small quantity.
5	Oxygen, sulphur, and arsenic.	Mineralized.	Mineral bismuth is simply melted, and kept hot some time, to drive away the arsenic.
6	Oxide of zinc.	Mineralized.	The mineral zinc extracted by sulphuric acid, the Cadmium alone is precipitated by hydrochloric acid.
7	Sulphuric, carbonic, fluoric, and phosphoric acids.	Mineralized.	By means of the voltaic pile, but obtained only in very small quantities.
8	Oxygen, silica, and oxide of iron.	Mineralized.	The oxide is mixed with soot and oil, and melted in a strong fire.
9	Oxygen, oxygen and lead, forming the chromate of lead. Oxygen and oxide of iron.	Mineralized.	The oxide is mixed with soot and oil, and melted in a strong fire.
10	Oxygen, arsenic, iron, sulphur, nickel, sulphuric and arsenic acids.	Mineralized.	The oxide is mixed with soot and oil, and melted in a strong fire.
11	Oxygen forming the Colombic acid, oxides of iron, manganese, and itrium.	Mineralized.	By treating the Colombic acid as oxide of Cobalt is treated.
12	Oxygen, sulphur, carbonic, hydrochloric, and sulphuric acids.	Native and mineralized.	The sulphuret is roasted several times, then refined in a reverberatory furnace, the bottom of which is covered with a mixture of charcoal and clay.
13	Oxygen, sulphur.	Mineralized.	The oxide is pounded, washed, roasted, and treated afterwards in a furnace with powdered charcoal.
14	Oxygen, sulphur, carbon, carbonic, hydrochloric, and sulphuric acids.	Native and mineralized.	The oxide is pounded, washed, sometimes roasted, and melted in a high furnace, with fluxes of argil and lime; the cast-iron is afterwards converted into wrought iron.

	Names of the metals.	Colour.	Character.	Specific Gravity.	Degree of fusibility.	Action of heat and air.
1	Antimony,	Bluish white.	Brittle.	6.7021	431° Cent. therm.	Oxidable and volatile.
2	Silver,	Shining white.	Ductile.	10.4753	23° Wedg's Pyrometer.	Not oxidable.
3	Arsenic,	Grayish white.	Brittle.	5.9590	Undetermin'd	Acidifiable & volatile.
4	Barium,	Undetermined.	Undeter'd.	Undeter'd.	Undetermin'd	Oxidable in the open air.
5	Bismuth,	Grayish white.	Brittle.	9.8220	256° Cent. therm.	Oxidable.
6	Cadmium,	Silvery white, approaching bluish.	Ductile.	8.6040	A little more fusible than zinc.	Oxidable and very volatile.
7	Calcium,	Undetermined.	Pulverulent.	Undeter'd.	Undetermin'd	Oxidable in the open air.
8	Cerium,	Grayish white.	Brittle.	Undeter'd.	Infusible at the heat of the furnace.	Oxidable.
9	Chromium,	Grayish white.	Brittle.	Undeter'd.	Almost infusible at the heat of the forge.	Oxidable.
10	Cobalt,	Grayish white of tin.	Brittle.	8.5384	130° Wedg'ds Pyrometer.	Oxidable.
11	Columbium, or Tantalum,	Deep gray.	Pulverulent.	Undeter'd.	Infusible at the heat of the forge.	Acidifiable.
12	Copper,	Redish yellow.	Ductile.	8.8950 8.6670	27° Wedg's pyrometer.	Oxidable.
13	Tin,	White approaching that of silver.	Ductile.	7.2910	210° Centig'e therm.	Oxidable.
14	Iron,	Gray, with a blueish tint.	Ductile.	7.7880	158° Wedg's pyrom.	Oxidable.

Action of acid with heat.		
Nitric of 40° Baumé.	Sulphuric of 66°.	Hydrochloric of 22°.
1 Very strong, converted into a white, insoluble oxide.	Feeble.	Very feeble.
2 Strong, solution complete.	Strong, and the solution complete.	No action.
3 Strong, converted into soluble arsenic acid.	Feeble.	Feeble.
4 Violent, solution complete.	Violent, converted into an insoluble sulphate	Violent, solution complete.
5 Strong, solution complete.	Feeble, forming a small quantity of white insoluble oxide.	Very feeble.
6 Strong, solution complete.	Complete solution.	Lively, solution complete.
7 Violent, solution complete.	Violent, converted into a sulphate almost insoluble.	Violent, solution complete.
8 Scarcely perceptible.	No action.	No action.
9 Scarcely perceptible.	Feeble.	No action.
10 Strong, complete solution.	Feeble.	Feeble.
11 Scarcely perceptible.	No action.	No action.
12 Strong, solution complete.	Strong, but the anhydrous sulphate is soluble in water.	Fusible, forming the hydrochlorate, soluble.
13 Very strong, converted into white insoluble oxide.	Feeble.	Very strong, solution complete.
14 Very strong, solution nearly complete, and forming an insoluble oxide.	Feeble; but with weak acid, solution complete.	Very strong, solution complete.

	Names of the metals.	Dates of discovery.	Names of the Discoverers.	Names of the places where the principal mines are situated.
15	Iridium,	1803	Descotels.	Always mixed in the mines with platinum.
16	Lithium,	1818	Arfwedson.	In Sweden, in the Petalite of the mine of Uto.
17	Manganese,	1774	Gahn & Scheele	In France, at Aveline, (Vosges,) in the Perigueux, and the Romanesche; Saxony, Bohemia, Piedmont, Germany.
18	Mercury,	Antiquity		In France, in Dauphiny; Spain, at Almaden; Germany, at Idria; Italy; Hungary, near Chemnitz; in America, in Peru, &c.
19	Molybdenum,	1782	Suspected by Scheele, proved by Hielm; also suspected by Bergman.	In France, in the Vosges, at the mine of Tillot, environs of Mont Blanc; Bohemia, in the mines of tin at Schlanckenwald; Saxony, Sweden, Iceland, &c.
20	Nickel,	1751	Cronstedt.	In France, in Allemont; Saxony, at Scheneberg, Armaberg, Freiberg; Bohemia, Joachimstat.
21	Gold,	Antiquity.		In France, in the valley of Doisan; the sands of several rivers on the continent, the Rhone, Garonne, &c.; in Spain, Germany, Hungary, America, North and South, &c.
22	Osmium,	1803	Tennant.	Always mixed with mineral platinum.
23	Palladium,	1803	Wollaston.	Always mixed with the mineral platinum.
24	Platinum,	1741	Wood, Assayer in Jamaica.	At Choco, at Barbacons, St. Domingo; in the bed of the river Yaki, South America, Spain, Russia.
25	Lead,	Antiquity.		In France, in Vienne, (Isere,) Poulhavuen, St. Sauveur, Languedoc, &c.; Germany, in Carinthia; Siberia, at Tarnowitz; in Spain; England, in Derbyshire, &c.
26	Potassium,	1807	Davy.	Wherever there exists lignious plants, particularly at Dantzic, in the Vosges, America, Russia.
27	Rhodium,	1803	Wollaston.	Always mixed with mineral platinum.
28	Sodium,	1807	Davy.	In France, Spain, in the plants which grow on the borders of the Mediterranean; Egypt; Hungary.
29	Strontium,	1807	Indicated by Davy.	In France, near Paris, at Menilmontat, Montmatre, Beauvoir, (Mance;) Pennsylvania; Scotland, at Strontian; Peru, near Popayan, &c.

	Names of the substances with which the ore is united in the mines.	State in which they are found	Principal processes of reduction.
15	Osmium, mineral platinum.	Mineralized.	By the humid process.
16	Oxygen, and mixed with petalite and tourmaline.	Mineralized.	By means of the voltaic pile, but in very small quantities.
17	Oxygen, sulphuric, and phosphoric acids.	Mineralized.	The oxide is mixed with soot and oil, and melted in a strong fire.
18	Sulphur, silver, hydrochloric acid.	Native and mineralized.	The sulphuret is mixed with lime, and heated in iron vessels; the mercury is volatilized.
19	Sulphur, oxygen, and lead, forming the molybdate of lead.	Mineralized.	By treating the Molybdic acid as the oxide of Cobalt is treated.
20	Oxygen, arsenic, iron, cobalt, sulphur.	Mineralized.	The oxide is mixed with soot and oil, and melted in a strong fire.
21	Silver, copper, sulphurets of iron and copper.	Native.	Sometimes roasted, and treated with mercury, and distilled.
22	Iridium, mineral platinum.	Mineralized.	By the humid process.
23	Mineral platinum.	Mineralized.	By the humid process.
24	Palladium, rhodium, osmium, iridium.	Mineralized.	It is treated by nitro-muriatic acid, and precipitated by muriate of ammonia, and the precipitate calcined.
25	Oxygen, sulphur, sulphuric, carbonic, phosphoric, hydrochloric, chromic, molybdic, and arsenical acids.	Mineralized.	The sulphuret is pounded, washed, roasted, and melted in a furnace with charcoal.
26	Oxygen, sulphuric, hydrochloric, carbonic, and nitric acids.	Mineralized.	By treating the hydrate of potash at a high temperature with iron.
27	Mineral platinum.	Mineralized.	By the humid process.
28	Oxygen, sulphuric, hydrochloric, and carbonic acids.	Mineralized.	By treating the hydrate of soda, at a high temperature, with iron.
29	Oxygen and acid, in the state of sulphate and carbonate.	Mineralized.	By means of the voltaic pile, but in very small quantity.

	Names of the metals.	Colour.	Character.	Specific Gravity.	Degree of fusibility.	Action of heat and air.
15	Iridium,	Silverish white.	Undeter'd.	18.6800 at least.	Infusible in the heat of the forge.	Not oxidable.
16	Lithium,	Undetermined.	Undeter'd.	Undeter'd.	Undetermin'd.	Oxidable in the open air.
17	Manganese,	Grayish white.	Brittle.	6.8500	160° Wed'd pyrom.	Very oxidable
18	Mercury,	White, appr'ing to silver.	Fluid.	13.5680	-39° Cent. th.	Oxidable and volatile.
19	Molybdenum,	Deep gray.	Brittle.	7.4000	Scarcely fusible.	Acidifiable & volatile.
20	Nickel,	Deep gray.	Brittle.	8.2790	160° Wed'd P	Scarcely oxidable.
21	Gold,	Pure yellow.	Ductile.	19.3610 19.2580 See note at end.†	32° Wed'd pyrom.	Not oxidable.
22	Osmium,	Powder black or blueish.	Pulverulent	Undeter'd.	Infusible in the heat of the forge.	Oxidable and volatile.
23	Palladium,	White, appr'ing to silver.	Ductile.	12.0020 11.6270	A little less fusible than iron.	Not oxidable.
24	Platinum,	White, appr'ing to silver.	Ductile.	22.6690 20.9800	Infusible in the heat of forge.	Not oxidable.
25	Lead,	Gray white, approaching blue	Ductile.	11.3520	260° Cent. th.	Oxidable and vitrifiable.
26	Potassium,	Grayish white.	Ductile.	0.86507	58° Cent. th.	Oxidable in the open air.
27	Rhodium,	Grayish white.	Brittle.	appears to be 11.0000	Infusible in the heat of the forge.	Not oxidable.
28	Sodium,	Grayish white.	Ductile.	0.97223	90° Cent. th.	Oxidable in the open air.
29	Strontium,	Undetermined.	Undeter'd.	Undeter'd.	Undetermin'd.	Very oxidable

Action of acid with heat.			
	Nitric of 40°. Baume.	Sulphuric of 60°.	Hydrochloric of 20°.
15	No action.	No action.	No action.
16	Violent, solution complete.	Violent.	Very strong.
17	Slight, solution incomplete.	Feeble, but with a weak acid, complete.	Very strong.
18	Strong, solution complete.	Feeble.	No action.
19	Forming molybdic acid, a grayish insoluble powder.	Feeble.	No action.
20	Strong, complete solution.	No action.	Feeble.
21	No action.	No action.	No action.
22	No action.	No action.	Feeble.
23	Slight, but solution complete.	Very feeble.	No action.
24	No action.	No action.	No action.
25	Strong, complete solution.	Strong, converted into the insoluble sulphate of lead.	Feeble.
26	Violent, solution complete.	Violent, forming an insoluble sulphate.	Violent, solution complete.
27	No action.	No action.	No action.
28	Violent, solution complete.	Violent, forming an insoluble sulphate.	Violent, solution complete.
29	Very strong, solution complete.	Violent, forming an insoluble sulphate.	Violent, solution complete.

	Names of the metals.	Dates of Discovery.	Names of the Discoverers.	Names of the places where the principal mines are found.
30	Tellurium,	1782	Muller.	In Transylvania, at Offenbanger, Fatzbay, in the mines of Maria Lozetto.
31	Titanium,	1781	Gregor.	In France, near Limoges, at Allemont, Hungary, near Boinik; Spain, at Caju-clo; America; England, in Cornwall, &c.
32	Tungsten,	1781	Delhugart.	In France, in the department of Isere and Haute Vienne; Bohemia, at Zinnwald; Saxony, at Ehrenfreidersdorf; Sweden, at Bilverg, &c.
33	Uranium,	1789	Klaproth.	In France, at Simphorien, near Autun, environs of Limoges; Bohemia, at Goachinsthat; Saxony, at Schverberg; England, in Cornwall.
34	Zinc,	1541	Indicated by Paracelsus.	In France, at Vizille, (Ysere,) Bagouery, (haute Pyrenees;) Sweden, at Dammera; England, counties of Somerset and Nottingham; Swabia, Poland, Hungary, &c.

	Names of the substances with which the ore is united in the mines.	State in which they are found.	Principal processes of reduction.
30	Iron and gold, gold and silver, gold, silver, and sulphur, lead, sulphur, and copper.	Mineralized.	By the humid process.
31	Oxygen.	Mineralized.	By mixing the oxide with soot and oil, and melting in a strong fire.
32	Oxygen and lime, oxygen and iron, forming the "tungstates."	Mineralized.	By treating the acid of Tungsten as the oxide of Cobalt.
33	Oxygen in the state of protoxide and peroxide.	Mineralized.	By mixing its oxide with soot and oil, and melting in a strong fire.
34	Oxygen, cadmium, sulphur, carbonic and sulphuric acids.	Mineralized.	By treating the Calamium in closed vessels, with charcoal, the zinc sublimes, and is afterwards melted.

* There are six others metals, whose existence was first admitted by analogy, or because the matters from which they are extracted have the greatest resemblance to metallic oxides, viz: Magnesium, Glucinium, Lithium, Aluminium, Thorium, and Zirconium. The existence of these metals has been proved, and others discovered, since this table was prepared.

	Names of the metals.	Colour.	Character.	Specific Gravity.	Degree of fusibility.	Action of heat and air.
30	Tellurium,	White, app'ing to silver.	Brittle.	6.1150	A little less fusible than lead.	Very oxidable
31	Titanium,	Redish brown.	Brittle.	5.3000	Intusible in the heat of the forge.	Oxidable.
32	Tungsten,	Bluish gray.	Brittle.	17.6000 17.5000	Almost infusible.	Oxidable.
33	Uranium,	Deep gray.	Brittle.	9.000	Almost infusible.	Oxidable.
34	Zinc,	Grayish white, approaching to blue.	Ductile.	7.1000 6.8610	370° Cent. th.	Oxidable and volatile.

Action of acid with heat.

	Nitric of 40°. Baume.	Hydrochloric of 20°.	Sulphuric of 60°.
30	Strong, solution complete.	Feeble.	No action.
31	Scarcely perceptible.	No action.	Feeble.
32	Scarcely perceptible.	No action.	No action.
33	Strong solution complete.	No action.	No action.
34	Strong solution complete.	Feeble; but with weak acid, the solution complete.	Very strong, solution complete.

† Whenever two specific gravities are expressed, the first is that of the metal hammered or condensed, by rolling. Several other metals have been discovered since the date of this table, and several of the compartments marked undetermined, will be found in the last edition of Thenard.