A Question of Chemistry at Law.

A very particular chemical question has recently been tried in a Jury Court in Scotland; as one of scientific importance, and connected with mining and mineralogy, an account of it must be of great interest to many of our readers. The plaintiffs were William and Elizabeth Gillespie, (his wife;) the defendants, James Russell and his son. In April 1850, the Russells obtained a lease of the whole coal, ironstone, iron-ore, limestone, and fire-clay, but no other minerals in the land of Torbane Hill, the property of the plaintiffs, for 25 years for £300 ($1500) per year. The Russells had sunk their shaft and had come upon coal, iron, lime and fire-clay of workable value, but they did not work them, but raised 19,000 tuns of a substance which they sold under the name of "gas coal." This the Gillespies alleged was not a mineral comprehended in the lease of defendants, that it was not coal, and that the contract was violated.—The defendants asserted that it was "coal," and this was the question at issue; namely, whether it was coal or another mineral—a chemical question entirely. Eminent chemists appeared on both sides as witnesses.

On the part of the plaintiffs, Profs. Ansted and Anderson, Mr. Brande, the celebrated chemist, Alexander Rose, the Rev. Dr. Anderson, Dr. George Wilson, and Dr. J. T. Cooper, were severally examined. Mr. Brande produced an analysis he had made of the mineral, from which it appeared that 100 parts of it contained only 10 of carbon, 26 of ash, and 70 of volatile matter, principally carburetted hydrogen. The result of this analysis satisfied him that it was not coal.—The effect of the evidence of the other eminent chemists and mineralogists seemed to be that it was not coal, but a new mineral hitherto unknown—a species of bituminous shale. That a substance containing less than 68 or 70 per cent of carbon could not be considered as coal; that it was rather a kind of bituminous clay. It was lower in specific gravity than coal, and lower in scale of hardness. It was less brittle than coal; its streak was brown instead of black; it was slightly translucent, while coal was opaque. It was a clay largely impregnated with bitumen, but had no property in common with coal, except that gas might be produced from it. The Torbane mineral left no available coke, and no substance could be called coke unless it gave a considerable residuum of coke. On cross-examination it was however admitted that some substance which went to compose coal might be found in Torbane mineral, though in different degrees and arrangements. Further scientific witnesses were then examined as to the appearance of the mineral under the microscope; and they gave their opinion that it was different in organic structure from coal, and presented no traces of vegetable origin. Operative coal miners and coal managers were then examined. The former had worked in the Torbane pits and in coal mines; and they stated that the mineral when struck produced a deaf and not a clear sound like coal; that it emitted a smell of gas so strong as to produce headaches, or to make them vomit, which they had never experienced when working coal, and that it was very difficult to work compared to coal; and the latter as practical men gave their opinion that the mineral was not coal. Scientific and practical evidence was further given that the mineral yielded gas of a highly illuminating power and in large quantity—14,000 cubic feet of gas to the ton; whilst the best Cannel (the Wigan Cannel) only produced 11,500; that it yielded much more tar than any other coal, and much less ammonia; and that although not coal, it had been probably so called from also producing gas, which it produced of high quality.

On the part of the defendants, Prof. Johnson, of Durham, Prof. Ramsey, of London, Professor Hoffman, Chemist in the Government School of Mines, Professor Fyfe, Dr. Douglas Maclagan, Dr. Gregory, Professor Frankland, Mr. Dicenson, Government Inspector of Coal Mines in England, and a number of other scientific, practical, and operative witnesses were examined. The result of their evidence was, that it was a coal of the Cannel or Parrot kind, differing in no essential respect from that sort of coal, but agreeing geologically and chemically with it in all its characteristics. Professor Hoffman, who had been a pupil, and for some time assistant, of Liebig, had subjected it to the usual solvents and tests, to ascertain if it was a mixture of bituminous matter, and he only discovered the merest trace of bitumen, and it was not reduced to a fluid state, as would have been the case if it was bitumen. The ingredients of coal varied considerably, but carbon was the largest; and from 100 parts of this substance he extracted 65·66 of carbon. There was nearly 9 per cent of hydrogen, but he did not consider this incompatible with this mineral being coal; he did not believe there was bitumen in this body. Coal shales generally contain 60 per cent of earthy matter; this mineral could not be called shale, or schist, its predominant constituents not being earthy matter, as in shale, but carbonaceous: he considered it a true coal. Dr. Fyfe stated that he had analysed all the Cannel coals in Scotland, in order to obtain their gas producing qualities; and he had also analysed the disputed mineral, and it in no respect differed from the ordinary Cannel coals, except in being of a very superior quality. Comparing its constituents with Capeldrae Cannel coal, he found them to be as follows:—

TORBANE HILL MINERAL.		CAPELDRAE CANNEL.	
Carbon	60·25	Carbon	56·7
Hydrogen	8·8	Hydrogen	6·8
Oxygen	3·6	Oxygen	8·8
Nitrogen	1·5	Nitrogen	1·9
Sulphur	·3	Sulphur	·25
Ash	25·6	Ash	25·4

The only difference between the two was, that this was a better gas coal than the other.—The further scientific evidence went to establish that this mineral burnt exactly like a Cannel coal—that, when heated in a retort, its products were exactly those of a Cannel.

Dr. Douglas Maclagan exposed this substance to the action of naphtha, which made substances containing bitumen yield it; he found only an infinitesimal quantity—mere traces of it. Shale was a mineral with a larger quantity of earthy matter than coal, but the earthy matter in this substance was incompatable with its being a shale. Carbonaceous matter was the base of this mineral, and not clay. Prof. Frankland could discover no bitumen in it, but its gas producing powers were much greater than those of bituminous coal.

It was found among the ordinary coal strata. Several scientific witnesses of the highest repute were then examined upon the structure of the mineral as exhibited by the microscope. Its structure was vegetable, characteristic of the fossil plants of the coal formation. The woody fibre, and the cellular tissue, were found in this mineral, while shales did not exhibit any traces of vegetable structure.

After the jury had been addressed by most eminent counsel on both sides, the Lord President summed up. The jury were to determine whether the substance in question fell within the term whole coal in the demise, for it was not pretended that it came within any other terms specified in it. On the one side there were four geologists, who gave it as their opinion that it was not coal, and five on the other side who said it was coal, all speaking with perfect sincerity, according to what they, as geologists, classed as coal. Men of the highest reputation in geology and chemistry had been examined, but they differed very much in opinion. On one side there were five of the most eminent chemists, who had applied all their skill and energy to find out whether it was coal or not, and who had expressed themselves as clearly of opinion that it was not coal, while ten, equally eminent on the other side, were of a diametrically opposite opinion. Is this substance, then, a coal or not, in the ordinary language of those who deal in it, and of the country? because to find a scientific definition of coal after what has been brought to light for the last five days would be, he said, indeed a difficult thing. The jury, after retiring about five minutes, returned with a verdict for the defendants, thus establishing that, in their opinion, the substance in question was, in effect, coal, and removing altogether from the company the slightest imputation of concealment and deceit.

The evidence in this case, impresses us painfully with respect to the chemical abilities of men whose names are now famous in the annals of science. What a conflict; and that not on the speculative opinion of whether the mineral was coal or shale, but the details of every analysis. It is indeed difficult to reconcile experiments, when one chemist produces 10 parts of carbon out of 100, and another 60 parts out of the same quantity. A witness on one side demonstrated that it was largely impregnated with bitumen, while another as clearly demonstrated that it scarcely contained a trace of it. Such testimony is enough to shake public confidence in the present state of chemical knowledge, and must diminish our reliances in the dogmas propounded by scientific experimentalists in the laboratory. We believe the decision of the jury to be right, although that great chemist, Rose, was brought from France to prove the contrary. On such a question as this, Prof. Fyfe was the most competent chemist, for no man in the world has devoted so much attention to the analysis of coals, and with so much success. We happen to know what the substance is, and as it is similar in every respect to Boghead coal, it is nothing more than a superior Cannel coal,. It is the best kind in the world for making gas, containing nearly three times more, than the common bituminous coal. Such a question as this has never come before any of the courts in our country, but may do so at some future period.

Recent Foreign Inventions.

NEW EXPLOSIVE COMPOUNDS (GUN POWDER AND PRIMING.)—George Winnewater, of London, patentee.—There are three explosive compounds embraced in the patent. No. 1 is composed of fulminating mercury 300 parts by weight; chlorate of potassa 288 parts, sulphate of antimony 312; of charcoal 40; of nitre 20; ferrocyanide of potassium 23; binoxyde of lead 6; and etheroxylin (that is 75 pyroxylin dissolved in 150 of sulphuric acid) 900 parts. No. 2 contains fulminating-zinc 75 parts; chlorate of potassa 4; sulphite of antimony 7; binoxyde of lead 15; ferro cyanide of potassium 1; etheroxylin, 224. No. 3 consists of amorphous phosphorous 75 parts; binoxyde of lead 64; charcoal 9; nitre 6; and etheroxylin 107. These materials are ground separately and mixed with great care. They are made into pellets and used both as substitutes for gunpowder and for priming—percussion composition.

OIL FROM COAL SHALES, &C.—J. Perkins, of Manchester, Eng., patentee.—This invention is for distilling at a low temperature coal shales, and other bituminous substances found in the carboniferous formations yielding bituminous matter, and obtaining therefrom paraffine. The apparatus used is simply a common gas retort, built up in brickwork and heated by a fire, to which is connected a coil of iron pipe immersed in cold water to condense the distilled matters.

MAKING CARBONATE OF SODA.—Chas. F. Merckshagen, of Barmen, Prussia, patentee—The inventor mixes sulphate of soda with charcoal, and calcines them to produce sulphuret of sodium; this is then decomposed by mixing it with an excess of bicarbonate of soda and exposing the mixture in a moist state in a reverberatory furnace. The product is then washed, evaporated and dried.

NEW METALLIC ALLOY.—Andre M. Massonett, of Paris, France, patentee.—Take of copper filings 5 ozs.; burnt calamine or zinc 12 1-2 ozs.; bitartrate of potash 10 ozs.; hydrochlorate of ammonia or nitrate of potash 5 ozs.; quick lime 1 1-4 ozs.; these are melted together in a crucible and cast into ingots.

TO PREPARE WOOD FOR RAILWAY SLEEPERS.—Wm. Romaire, of London, patentee.—For 50 cubic feet of timber take 3 bushels of unslacked lime, 1 gallon of the oil of gas tar, and as much water as will cover the wood. These are placed in a tank lined with lead and boiled—the wood in the liquor—for about three days. The timber is then removed and either dried in the sun, or in ovens heated to 70 deg. If the timber is to be used in very hot climates, about 4 ounces of arsenic should be added to the solution. The timber so prepared is excellent for docks as well as railways.

PESERVING METALS FROM CORROSION.—John Carvalho de Mideiros, of Paris, patentee.—This invention consists in applying mercury to any metallic surface, to which it can be applied to preserve iron or any sheathing of ships from being attacked by barnacles, &c., it also prevents oxydization.

Soap and Paint.

Soap or strong soap-suds, will destroy green paint more readily than any other colors. The ley has the same effect on oil paints that it has with grease. Many painted rooms, window blinds, &c., are soiled by carelessness or ignorance of washer-women, in the application of soap or strong soap water. When it does not destroy the paint, it affects the lustre.

A Great Railroad Scheme.

It is reported that a company to construct a railroad to the Pacific is now being organized in this city, at the head of which, it is said, are Erastus Corning, Simeon Draper, and other capitalists. The object is to provide a substantial six feet gauge road from New York to the Pacific ocean, running through Missouri, Arkansas, Texas, Northern Mexico, and California. The estimated cost is $100,000,000, which is to be the capital of the company. It is said that thirteen of the most responsible contractors of the United States have undertaken to build one hundred miles each on the route above described, and to take in payment fifty per cent. cash, twenty-five per cent. in the bonds of the company, and twenty-five per cent. in its stock.

Photography on Stone.

The "Comtes Rendus" says that M. Barreswill and Lemercier propose to prepare a negative picture on paper, and then produce a positive picture on lithographic stone. The negative is obtained by any method, the most rapid being preferable. The positive is produced by a fatty or resinous coating laid on the stone, and capable of being rendered soluble in some solvent by the action of light (and perhaps of oxygen). The negative is laid upon the stone thus prepared, and covered with a glass plate; the whole is then exposed to the sun, the stone is then washed with the solvent, and then treated by the ordinary processes of lithography.—The authors have hitherto employed asphaltum for coating the stone, and sulphuric ether as the solvent. They expect in this manner to reproduce lithographs.

Delegates to the Worlds Fair from Washington.

At the last meeting of the National Institute at Washington, the following Delegates were appointed to visit the Exhibition of the World's Fair at the Crystal Palace, New York:—Col. Peter Force, Prof. A. D. Bache, Prof. Joseph Henry, Capt. Wm. Easby, Robert Mills, Esq., Prof. J. H. C. Coffin, Commander Chas. Wilkes, Prof. L. D. Gale, Dr. Thos. T. Everett, J. C. C. Kennedy, Dr. Daniel Breed, Wm. Q. Force, Esq.

They will meet in the city of New York on the first, Tuesday of October, at 9 o'clock, A. M., and visit the Exhibition during the week. It is expected that each delegate will select some subjects upon which he will make a report.

Prof. Gale, and Drs. Everett and Breed are Examiners in the Patent Office.

Agassiz's Cabinet Sold.

The "Boston Traveller" has been informed that the valuable cabinet of many thousand specimens in Comparative Anatomy, Mineralogy, and other sciences, collected in the course of years by that distinguished savant, Prof. Agassiz, has been purchased for the University at Cambridge, at the price, as is rumored, of $12,500, the greater part of which, it is said, was obtained by private subscription.

New Kind of Cotton.

A new kind of cotton has been brought from among the Pino Indians of New Mexico, by an officer of the Mexican Boundary Commission.—Its peculiarity consists in a fine silky staple, superior in length and strength to all kinds previously known. We learn that the seed has been introduced into Texas, and that the plant will soon be grown there extensively. It has also the great advantage of not degenerating, and not requiring a renewal of seed. The plant, if all these peculiarities are proved permanently to belong to it, must effect a revolution in cotton raising.

A New Railroad for Broadway.

A new elevated railroad for Broadway, invented by Wm. Dietz, of Albany, has been very favorably noticed by some of our cotemporaries; as we may be able to present an engraving of it in a few weeks, we will not further allude to it at present.