

CARBON A PUZZLE

The Mystery That Links a Diamond to a Lump of Graphite.

A SECRET OF THE MOLECULES.

Why Exactly the Same Elements Form Such Different Substances is the Riddle—Changing a Mass of Charcoal into a Minute but Pure Gem.

Carbon, one of the seventy or eighty primary elements out of which all matter is formed, occurs, pure, in two entirely different and contrasted forms. These are, first, diamond and, second, graphite or plumbago (pencil lead). If each of these substances was a compound or mixture of different elements, comprising in both cases carbon as the principal constituent there would be no cause for mystification. But they are absolutely the same unaltered thing, although in appearance and in properties they are totally unlike!

The molecules of each are the same—they are molecules of carbon, and nothing else—but in one the molecules are so arranged that they form a transparent, excessively hard, solid crystal, endowed with marvelous powers of refracting light which make it the most dazzling of all gems, and, in the other, the same molecules are so arranged that they form a dull, soft, black or gray substance that leaves a dirty streak when rubbed upon paper.

The secret lies within them. It is in the internal play of the molecular forces, but what makes those forces act so differently when they have precisely the same material to work upon? Burn a diamond and it turns to graphite.

Charcoal is a third form of carbon, ordinarily produced by the charring of wood, whereby all the other elements contained in the wood are removed, leaving the carbon in the form of a soft, black substance which, in some ways, resembles graphite.

Charcoal and a few similar substances are called amorphous, or "shapeless" carbon, because they are never crystallized, as diamond always, and graphite sometimes, is. Yet charcoal, too, has the royal diamond blood. That blood sometimes sits on the throne and sometimes slaves in the mine; but, despite the turn of chance below, it is always itself.

Charcoal can turn to diamond, and the things that make it turn are great heat combined with great pressure. Here, in outline, is the process, as it has been performed in laboratories, especially by the French chemist, Moissan: Into a mass of molten iron a quantity of pure charcoal is put. Then the liquid iron, which dissolves the charcoal very much as water dissolves sugar, is placed in an electric furnace and heated in a temperature of nearly 5,000 degrees F. Immediately it is plunged into cold water, in order to cause a quick cooling.

The result of the sudden cooling is the formation of a solidified shell on the surface of the iron which powerfully compresses the interior part, when it in turn cools and tries to expand. The result of this compression is to force the imprisoned carbon (charcoal) to crystallize into diamond. If the molten iron is allowed to cool at ordinary pressure the charcoal only turns to graphite. So we see that the magic wand whose touch makes diamond of what would otherwise be mere dull pencil lead is the wand of high pressure.

It is believed that this is substantially the way in which nature herself makes diamonds. In the great diamond mines of South Africa there is evidence that the gems were formed in the bowels of ancient and long since extinct volcanoes, where, of course, both intense heat and enormous pressure were available in unlimited quantities. But nature in her huge volcanic laboratories works on a scale which we cannot imitate, so that there is no cause for surprise in the fact that, while she can make diamonds as big as walnuts when she chooses, we can make none even as big as a pin's head. The largest artificial diamond is less than a millimeter in diameter. But it is genuine diamond, and with that fact to start with, who can say what may be done some day?

There are a number of meteors which have fallen upon the earth from outer space that contain microscopic diamonds resembling the artificial ones. None of them is large enough to be of any importance except as scientific curiosities, but as such they fill the mind with wonder. Where and how were they created—in what world or what star?

The principal metals found in meteors are iron and nickel, with occasional traces of cobalt, copper, aluminum, tin and magnesium.

Done. "Gadspar is a man who prides himself on doing things."

Cruel Comment. Manager—I say, Hamfat, old man, why don't you join a moving picture company? Crushed Tragedian—Why should I so degrade my art, sir? Manager—Because then, you see, you can become a reel actor.

Our life—a little gleam of time between two eternities.—Carlyle.

Sir Glenholme Falconbridge, speaking at a recruiting meeting, offered his services in any capacity. "Canada's revenue increased more than thirty million dollars during the past ten months."

DODGING AN AVALANCHE.

A Risk That Often Must Be Faced in Climbing the Alps.

CHANGED ONE LETTER.

How a Serious Political Crisis in Canada Was Averted.

At the period when British Columbia was threatening to withdraw from the Dominion of Canada because the Caribou settlement had been ignored by the Mackenzie administration the late Lord Dufferin took part in a public function in Quebec.

While the procession was moving through the principal streets a gentleman, breathless with excitement, hurried up to his excellency's carriage to say a "rebel" arch had been placed across the road so as to identify the viceroy with the approval of the disloyal inscription thereon.

"Can you tell me what words there are on the arch?" quietly asked Dufferin.

"Oh, yes," replied his informant. "They are 'Carnarvon Terms or Separation.'"

"Send the committee to me," commanded his excellency. "Now, gentlemen," said he, with a smile to the committee. "I'll go under your beautiful arch on one condition. I won't ask you to do much, and I beg but a trifling favor. I merely ask that you alter one letter in your motto. Turn the 'm' into an 'h'—make it 'Carnarvon Terms or Reparation'—and I will gladly pass under it."

The committee yielded, and eventually Dufferin contrived to smooth over the difficulties and to reconcile the malcontents.

Something Almost Human in Some of the Plants' Actions. Mr. James Rodway, who is the curator of the British Guiana museum and an eminent botanist, declares that plants have at least three of our five senses—feeling, taste and smell—and that certain tropical trees smell water from a distance and will move straight toward it.

But trees not in the tropics can do as well. A resident of an old Scotch mansion, says a writer in the Scotsman, found the waste pipe from the house repeatedly choked. Lifting the slabs in the basement paving, he discovered that the pipe was completely encircled by poplar roots. They belonged to a tree that grew some thirty yards away on the opposite side of the house.

Thus the roots had moved steadily toward the house and had penetrated below the foundation and across the basement until they reached their goal, the waste pipe, 150 feet away. Then they had pierced a cement jointing and had worked their way in long, tapering lengths inside the pipe for a considerable distance beyond the house.

There seems something almost human in such unerring instinct and perseverance in surmounting obstacles.

And Yet They Say Authors Are Poor. Authors may not own spurs the offer of money for their work, but they really do sometimes fall to cash checks, according to the cashier of the Century company. "I don't know what they do with the checks," he said in complaint to a friend the other day, "unless they frame them. Through acknowledgments have proved the receipt of the checks, I am always carrying on the books corresponding accounts that I can't close up for months, sometimes years. I remember especially one check issued to a famous actor and author. He died a number of years ago. The check was made out anew to the estate. Still it is uncashed. There is more than one author I'd bless if he—it is usually he—would only go and get his money."

Ready For the Worst. "A woman in a pariah where I lived," said an English clergyman, "used each day to prepare herself for the worst. I was complimenting her one day on the extreme tidiness of the house even early in the morning.

"Yes," she said; "I always like to 'ave my bedrooms done heavenly, for, as I allus sez, you never knows what may appen, 'ow soon one of the children may be brought 'ome in a fit or with a broken leg, and, as I allus sez, it don't matter what appens, so long as you've got a bedroom to put 'em into."

The Oldest Libraries. The oldest libraries of which we have any certain knowledge are those brought to light by excavations among the ruins of the east. Among these are the Babylonish books inscribed on clay tablets, supposed to have been prepared for public instruction about 600 B. C. It is said by Aristotle that Strabo was the first known collector of books and manuscripts. This was about the year 330 B. C.

Skeptical. Over the Phone—Hello! Is that you, Blank? Why, there's a report around town that you're dead.

"Is that so? Well, call me up again if it's confirmed, will you?"

IS OUR CLIMATE CHANGING?

Put in a Blue Book. According to the London correspondent of The Glasgow Herald, an amusing incident in the later years of the diplomatic career of the late Sir Claude Macdonald has passed unrecorded by his biographers.

It happened at the time that he was at the head of the Legation at Peking. He had sent to the home Government a despatch dealing with events which were at that moment engaging widespread attention, and a rough proof of the document was submitted in due course to Mr. G. N. Curzon, the late Lord Salisbury's assistant at the Foreign Office.

One afternoon the Under-Secretary perused the despatch and pencilled in the margin a number of piquant comments upon the grammar of the distinguished diplomat. Indeed, so forcible were the interjections that no doubt whatever existed that between the two men there was the utmost divergence of view in regard to the question of grammatical propriety.

To the amusement, however, of the Foreign Office, the comments in all their bald frankness appeared in the Blue Book as subsequently published, and upon attention being directed to the matter the issue was promptly withdrawn and a fresh edition substituted.

How these marginal notes ever came to be published in the finished document will probably remain a secret for all time, unless the theory be accepted that the printers adhered too strictly to the wholesome rule as to following "copy," which is, or should be, one of the cardinal principles of the typographical art.

Actors in Retirement. Many actors have lived long after retiring from the stage. Macready, retiring in 1851 at the age of fifty-eight, passed an honored leisure till his death at Cheltenham, England, in 1873. After Mrs. Siddons' farewell appearance as Lady Macbeth in 1812, being then in her fifty-seventh year, she spent her remaining years in almost unbroken retirement. The record in this respect, however, is held by that famous Master Betty whom in 1804 London acclaimed as the Infant Roscius. His positively last appearance was made on Aug. 8, 1824, at the age of thirty-two. He died in August, 1874, a "retinger" of half a century.—London Standard.

Discovered by Accident. Fuller's earth was discovered in Florida in 1895 through mere accident. An effort was made to burn brick on the property of a cigar company near Quincy. The effort failed, but an employee of the company called attention to the close resemblance of the clay used to the German fuller's earth. Florida is now the leading state in the production of fuller's earth.

A One Sided Argument. "He wants to marry Mary." "Well?" "What do you think of him?" "Oh, he's all right, I guess!" "But doesn't it strike you that he is a little bit foolish?" "Of course, dearest. I cannot argue that with you because the fact that he wants to get married would give you the strangle hold."

Common Phenomena. "Father," said the small boy, "what are delusions of grandeur?" "My son, they are what would cause almost any man to be considered insane if he were so indiscreet as to own up to them in public."

The Play. It is remarkable how virtuous and generously disposed every one is at a play. We uniformly applaud what is right and condemn what is wrong when it costs us nothing but the sentiment.—Hazlitt.

Rewarded. Actor—I have been in your company ten years. Is it not time that you do something extra for me? Manager—Yes. From now on you shall play all the parts in which there is eating.—Flegende Blaetter.

That's Different. "Faint heart never won fair lady, you know." "Nonsense! I know a man who's got \$4,000,000 and a weak heart, and all the girls are just crazy to marry him."—St. Louis Post-Dispatch.

Room Dust. Dust is everywhere, but the worst kind of dust is that which is confined within the four walls of a room. The dust is always germ laden, because it is infested with effete matter thrown off by human bodies.

The Comforter. "I understand Mrs. Green is very ill." "That's so? What's the matter?" "The doctor thinks it's pleurisy." "Oh, my, I must hurry right over to see! I know dozens of people who died of that."—Detroit Free Press.

Brown Study. The term "brown study" is a corruption of brown study, brown being derived from the old German "braun," meaning the brow.

The Hard Struggle. "It's a tough struggle." "What is it?" "Doing without the things we actually have to have to try to keep up the payments on the luxuries we didn't need."

Mrs. Mohr was acquitted at Providence of the charge of instigating the murder of her husband. "The Germans have killed chivalry in warfare," said the Bishop of London in an address Saturday.

SENSES OF TREES.

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A Downpour. "What do you do when your wife begins to cry, Hilway?" "As my wife is a head taller than I am and she cries copiously, my first thought is to stand from under."

Unkind. Tired Business Man—Take dancing lessons! Well, I guess not! There are too many other ways by which I can make a fool of myself. His Loving Wife—Yes, dear, but you have tried all of those.

A Definition. Debate—An argument or word battle of a formal nature, engaged in by two or more people, in which each tries to convince the other that he is wrong, but only succeeds in convincing himself more firmly that he is right.

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COMPLUSORY SERVICE.

Objections to System Disappear in England.

Opposition to compulsory service disappeared in Great Britain when the question came to its final test. Only 36 votes were counted against the bill on its third reading in the House of Commons, and the bill is now before the Lords, who will certainly not obstruct it. The war will do at least this for Great Britain—it will bring about a recognition of the fact that the state has a right to call upon every citizen to come to its defence in time of danger. This right, it is needless to say, has been recognized in the United States, where the draft has been invoked in the past, and that would be invoked again, without any serious opposition, the moment the country got into a tight fix. The question for us, as well as for Great Britain, to consider is whether it is not wise to employ the principle in our preparation for defence instead of leaving its invocation to the last desperate moment. Both countries have learned by experience that no tyranny is involved in calling upon all citizens to do their part, with equal service, in the defence of the country. The principle is in no wise different from that implied in requiring every man to pay his taxes and to keep his premises clear of unsanitary or incendiary conditions that threaten his neighbors. It is a part of what each man owes to the safety of all his fellow citizens. Since this is the case, why not recognize the duty frankly from the start, and introduce a form of universal military training for the young which would supply us with a sufficient number of capable soldiers for any emergency?

THE VALUE OF VESSELS. Tripled in Cost Since the War—The Real Cause of This.

At least one-third of British merchant tonnage is in the hands of the Government. The Admiralty is businesslike in its dealings with ship-owners, but it acts only as a broker to the War Office and has no control over a ship after it has secured it. The system works this way: The War Office wants to transport a thousand men overseas. It asks the Admiralty to supply a ship. The ship is requisitioned. After that it is for the War Office, not the Admiralty, to say when the ship's work is done. The men may be landed, and because someone thinks the ship may "come in handy" some day she is left at a foreign port carrying no cargo and "pushing up" the freights everywhere.

We want a special Government for this sort of work. Let the soldiers and sailors do the fighting and let the business men run the business end of the war—that is, the transport of the men. A ship can pay for itself in three or four such voyages. port, clothing, feeding, and munitioning of the men.

A firm which has been buying and selling ships for a hundred years shows that the rise in freights is looked upon by ship-buyers as a solid, tangible thing, which justifies them in paying three and four times the pre-war price for a ship.

"Selling ships are worth their weight in gold. A ship with a net tonnage of 1,380 sold in January 1914 for £5,500. A similar ship, of less tonnage, sold last month for £11,250."

These prices are not extraordinary when it is remembered that the coal freight to Genoa, formerly 10s a ton

Adolph Schatte, a German bandmaster, was arrested at Wingham, and a mysterious box of explosives was discovered there in the railway station.

Chief Justice R. M. Meredith has been appointed a Royal Commissioner to investigate charges against County Judge Dowlin of Kent. Guelph, St. Catharines, Brantford and other places have taken additional precautions to guard armories, factories, etc.

The world is full of short-measure people.

15 YEARS SUFFERING FROM PILES

Mr. J. McEwen of Dundas, Ont., writes:—"For fifteen years I suffered with Piles and could get no permanent cure until I tried Zam-Buk. Perseverance with this herbal balm resulted in a complete cure, and I have not been troubled with the painful ailment since."

Mr. Henry Fougere of Poulamond, N.S., says:—"I suffered terribly with Piles and could find nothing to give me relief until I tried Zam-Buk. This cured me. I consider Zam-Buk the finest ointment on the market."

The above are specimens of the many letters we are constantly receiving from men and women who have ended their suffering by using Zam-Buk. Why not do likewise?

Zam-Buk is best for eczema, blood poisoning, ulcers, sores, cuts, bruises, and all skin injuries and diseases. 50c. box, all druggists and stores, or post free from Zam-Buk Co., Toronto. Send this advertisement with name of paper and one cent stamp for free trial box.

ZAM-BUK WRITE FOR FREE SAMPLE

Bulk Oysters Dominion Fish Co. PHONE 526.

Here is Your Chance For a short time we will give an enlargement with a dozen of our \$4.00 Cabinet Photos.

THE COOKE STUDIO 159 Wellington Street, Next Carnovsky's Fruit Store.

Coal The kind you are looking for is the kind we sell. Scranton Coal is good Coal and we guarantee prompt delivery. BOOTH & CO., Foot of West St.

Children Cry for Fletcher's CASTORIA

The Kind You Have Always Bought, and which has been in use for over 30 years, has borne the signature of Dr. J. C. Fletcher and has been made under his personal supervision since its infancy. Allow no one to deceive you in this. All Counterfeits, Imitations and "Just-as-good" are but experiments that trifle with and endanger the health of Infants and Children—Experience against Experiment.

What is CASTORIA Castoria is a harmless substitute for Castor Oil, Paregoric, Drops and Soothing Syrups. It is pleasant. It contains neither Opium, Morphine nor other Narcotic substance. Its age is its guarantee. It destroys Worms and allays Feverishness. For more than thirty years it has been in constant use for the relief of Constipation, Flatulency, Wind Colic, all Teething Troubles and Diarrhoea. It regulates the Stomach and Bowels, assimilates the Food, giving healthy and natural sleep. The Children's Panacea—The Mother's Friend.

GENUINE CASTORIA ALWAYS Bears the Signature of Dr. J. C. Fletcher

In Use For Over 30 Years The Kind You Have Always Bought

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A. R. Creelman, K. C., for fourteen years general counsel to the C. P. R., and formerly of a prominent Toronto law firm, died at Montreal after a lengthy illness.