GRAPHITE

The Difference Between Blacklead and Lead Proper

A prim young lady, fresh from the reals of higher education, recently appeared at the office of a prominent manufacturer of lead pencils, presented credentials as a health department investigator, and announced her desire to study conditions in the factory with reference to lead poisoning, says a bulletin of the Smithsonian institution. Just as "pigs is pigs" so her lead was lead. Such literal-mindedness is hardly to be expected of the average mortal, but if the fair investigator had called to inquire as to the actual nature of the product made and just why it had to share names with something equally common but totally different, the memory of her visit would have been less likely to have been perpetuated in the guise of the traditional factory joke.

Most persons are aware that lead pencils are not made of lead, but that the so-called black lead in them is a full brother to coal and to the aristocratic diamond, and that it is identical with many other substances in common use, such as the blacking on the kitchen range, are additional facts not nearly so well known. A recently installed exhibit in the National museum shows the various forms of graphite including natural and manufactured, as well as the various ingredients used in this industry.

Black lead and plumbago are popular terms for a form of pure carbon whose proper name, graphite—from the Greek word meaning "to write" is more accurate and appropriate. As a mineral from the earth, it has been known and used since about the middle of the 16th century, but for a matter of 200 years thereafter the conceptions of science with reference to its true nature seem to have remained about on a par with those of the fair visitor at the pencil factory. Pencils made of it were in use as far back as 1565. It was not known then that this soft black greasy mineral might be burned and that in burning it vanished from view in the form of carbonic acid gas, just like such much charcoal. Meanwhile, in lieu of any regular name, various nicknames were assigned, originating in superficial resemblances to better known substances. Two of these nicknames black lead and plumbago, outgrowths of the fact that lead is soft and when tarnished will leave a black streak on paper, have persisted.

Graphite occurs rather frequently in granite rock throughout the Appalachian system from Maine to Texas, and has been mined in various localities, notably at Ticonderoga in New York, and at a number of points in Pennsylvania and New Jersey. But the Appalachian range of occurrences, and with them those of Canada, consist of disseminated grains know to the trade as flake graphite, and the cost of recovery have pretty generally proven prohibitive, with the result that even the old Ticonderoga mines are no longer operated. For a number of years the chief supply of natural graphite has come from Ceylon, where the mineral occurs in massive veins. Another prominent graphite field lies in the Tunkiusk mountains of Siberia, and Mexico also has a rather important source in Sonora. In this country, Montana has the only occurrence, other than of flake graphite, thus far encountered.

Offhand, there seems to be something incongruous in the thought of carbon being at once the most typical of combustibles, and the best known fire resistor, but such is the case; for the kitchen range, which is fed with carbon in the form of coal, is blacked with carbon in the form of graphite. The answer lies in the fact that the purer and denser the carbon, the less inflammable it becomes. Thus, just as anthracite coal is less inflammable than bituminous coal with its high percentage of gas-forming ingredients, so in turn there is a so-called graphized anthracite, notably in Rhode Island, which is so dense that it will not support combustion practically, and true graphite in its extreme density, is almost incombustible. Moreover, it does not melt at any attainable temperature, so is peculiarly fitted to withstand great heat.

As a matter of fact, few people begin to realize the range of uses to which graphite is put; it is an essential though minor ingredient in a great number of unsuspected connections as common as that of lead pencils. With many of these the graphite man is himself unfamiliar, beyond the simple fact that this or that manufacturer purchases from him; for in such uses it is apt to represent part of a secret process. Lead pencils, lubricants, electrical conductors, and black polishes and paints are prominent conventional uses; but it is liable to be present pretty much anywhere that anti-friction, unfading blackness, heat resistance, electrical conductivity or noncorrosiveness are desirable properties, and the fact that without graphite the derby hat as we know it could not be, is an example of its importance as an incidental ingredient.

A few years ago, while Dr. E. G. Acheson was engaged in conducting a high-temperature experiment in which he was using anthracite coal in an electrical furnace at Niagara Falls, he happened to let his furnace run beyond the intended temperature, and upon examination found that in place of the anthracite coal put in, the carbon removed was in the form of graphite. In view of the importance of graphite to the comfort of man, Dr. Acheson's discovery was a valuable one, not only to himself but to civilization in general. While commonly referred to as "artificial graphite," the product from the electric furnace is artificial only in the sense that manufactured ice is artificial. It is not merely an artificially prepared substitute, but is graphite, just as ice is ice, whether the water be frozen in a pond during winter or in a tank during summer.

An exhibit recently installed in the National museum visualizes the manufacturing procedure involved in the making of graphite in accordance with Dr. Acheson's discovery. It shows the raw materials—anthracite coal, coke, or other form of carbon—a model reproduction of the furnace in operation, the product as it comes from the furnace, and the general range of preparations for use. The striking feature connected with the procedure is the furnace, which is uni. It is simply a long rectangular open trough constructed of some heat-resisting substance, such as carborundum. The trough holds up to six tons of anthracite coal. A powerful electric current is fed in at one end of the trough. It generates a tremendous heat, jumping from lump to lump of coal, just as it does from one carbon to the other in the arc light, only instead of the single electrical jump there are thousands. It takes about 30 hours to convert coal to graphite, and the working temperatur of around 7,500 degrees challenges full comprehension.

Reflecting on what would happen to a piece of ice thrown into a roaring stove fire, and imagining a temperature at which a piece of the stove would behave similarly, will convey an impression as to what the working temperature in a graphite furnace signifies. The anthracite coal used carried impurities; but in the furnace they are like so much moisture, and the resulting graphite is left practically.—"The Pathfinder."

Carrying Explosives Contrary to Law

Washington, May 18.—The claim advanced that the Lusitania was carrying explosives, in contravention of the United States law, that her rapid sinking was due to an explosion of this portion of her cargo, and that consequently responsibility for the loss of life on board rests upon the Cunard Line, has aroused interest here.

The Passenger Act of 1882, as amended in 193 and 1905 to include foreign ship, provides:

It shall not be lawful to take, carry or have on board of any such steamship or other vessel any nitroglycerine, dynamite or any other explosive article or compound, nor gunpowder, except for the ship's use, nor any article or number of articles, whether as cargo or ballast, which, by reason of the nature or quantity or mode of storage thereof, shall either singly or collectively be likely to endanger the health or lives of the passengers or the safety of the vessel.

The First Canoe

These Indians who made the first canoe of birch bark long ago were our greatest benefactors. The children of these Indians know the canoe, and they know how to use it, and if you go to Timagami, Ontario, this summer, they will paddle your canoe in their own superb way. Students who camp in summer along the Timagami lakes are able to do two years' work in one. Finest of fishing and hunting.

A much-married man is just now enjoying an era of peace that he has not experienced since his marriage. His wife put her tongue on a flat iron to see if it was hot. It was.

Austria's Generous Peace Offering To Italy

Italy on the Verge of War, German Chancellor Says

Berlin, May 18.—Dr. von Bethmann-Hollweg, the Imperial Chancellor, speaking in the Reichstag to-day on the relations between Italy and Austria-Hungary and Germany, outlined the concessions Austria had offered to Italy and said:

"With its Parliament, the Italian people will now decide whether it will reach the fulfilment of all national aspiration in the widest extent in a peaceful manner, or whether it will plunge the country into war and to-morrow draw the sword against its allies of yesterday and to-day.

"I will not give up the hope entirely that the scale of peace will be heavier than the scale of war, but whatever the decision of Italy may be, we, together with Austria-Hungary, have done all within the bounds of possibility to support an alliance which was firmly rooted among the German people and had brought profit and good to the three empire.

"If the alliance is torn by one of the three partners, we shall know, together with the other partner, how to meet the new dangers with dauntless confidence and courage."

"You are aware," said the Chancellor, beginning his speech, "that the relations between Italy and Austria-Hungary within the last months have been strongly strained.

"From the speech made yesterday by Count Tisza, you will have gathered that the Vienna Cabinet, in a sincere effort to insure enduring peace between the Dual Monarchy and Italy, and to take into account the last great vital interests of both empires, had resolved on far-reaching concessions to Italy of a territorial nature.

"I consider it proper to indicate these concessions to you:

"First—Part of the Tyrol inhabited by Italians was to be ceded to Italy.

"Second—The western bank of the Isonzo, in so far as the population was purely Italian, and the town of Gradisca likewise was to be ceded to Italy.

"Third—Trieste was to be made an imperial free city, receiving an administration which would insure the Italian character of the city and to have an Italian university.

"Fourth—Italian sovereignty over Avona (a seaport of Albania) and a sphere of interest belonging thereto to be recognized.

"Fifth—Austria-Hungary declared her political disinterestedness regarding Albania.

"Sixth—The national interests of Italians in Austria to be particularly respected.

"Seventh—Austria-Hungary to grant amnesty to political military prisoners belonging to the ceded territory.

"Eighth—The further wishes of Italy regarding the general question to be assured every consideration.

"Ninth—Austria-Hungary, after the conclusion of the agreement, to give a solemn declaration concerning the concessions.

"Tenth—Mixed committees for the regulation of the details of the concessions to be appointed.

"Eleventh—After the conclusion of the agreement Austro-Hungarian soldiers, natives of the occupied territories shall not further participate in the war. Guarantee from Germany.

"I can add," continued the Imperial Chancellor, "that Germany, in order further to strengthen the understanding between both her allies, undertook with the full agreement of the Vienna Cabinet, to give a full guarantee for the loyal fulfilment of these offers. Germany and Austria-Hungary herewith formed a resolution which, if it should lead to result, would, I firmly believe, find an overwhelming majority in the three nations."

The Imperial Chancellor's speech was loudly applauded from the galleries. The various Secretaries of State were present. The President of the Reichstag opened the sitting by saying:

"We begin our work inspired with full confidence, which is justified by the course of events up to the present, without vanity, but with steadfast determination, which has its root in unity and justice of our cause. The German people is looking forward quietly to the future, which must bring the development of all our forces for the good and greatness of our beloved fatherland."

"Want a hair cut, sir?"

"I don't believe in partiality. I want 'em all cut."

Miss Fluffy: "I suppose waiting for an inspiration is the hardest part of writing short stories?"

The Author: "No; waiting for the cheque!"