Carbon.

This is one of the fifty-three simple substances known at present as constituting the materials of our globe. It has long been known under a number of different forms, such as coal, diamond, and plumbago. It exists both in the and inorganic organic kingdoms of nature, but it especially belongs to the latter, for the great coal deposits, which constitute its great store-houses, are undoubtedly of vegetable origin. It has been ranked by some writers as the base of organic nature.

The purest form of carbon, as ordinarily procured, is charcoal, which is developed by exposing animal or vegetable substances to heat, and excluding the air. The means commonly had recourse to for the preparation of charcoal are illustrative of a leading chemical quality of this body—its complete fixity even at the highest temperature, provided the accession of air is prevented.

When prepared from wood of diff.rent species, the resulting charcoal differs as to its density, its power of electrical conduction and certain other characters; and on examining other forms of black carbon, such as anthracite coal, coke, and plumbago, other points of difference are recognized. Common bituminous coal is not carbon, but an association of many complex unions of carbon and hydrogen, from which heat expels the volatile parts leaving coke behind, which is a mixture of carbon with small quantities of metallic oxyds.

Amongst the most interesting forms of black carbon is plumbago or black-lead—formerly considered to be a carburet of iron—but the best specimens of plumbago are free from iron. Lead is never present in plumbago, hence the appellation "black lead" is a misnomer.

The employment of plumbago in the manufacture of pencils is too well known to require comment. For this purpose the best quality of plumbago was the produce of Borrowdale, in Cumberland, England, but this vein is now quite exhausted. Most of the ordinary pencils now used are manufactured from a factitious paste, made of powdered plumbago, antimony, and sulphur, fused together, cast into blocks, and these blocks sawn into bars of the required length and size. The great disadvantage of these pencils is their grittiness, and the difficulty with which their marks are effaced by india rubber. The best of pencils are made by subjecting the powder of plumbago to extreme hydrostatic pressure simultaneously with the abstraction of all remaining traces of air by means of the air-pump.

A material very much like plumbago in appearance, and which is formed, under certain circumstances, in gas retorts, is called *plumbagine*. Ivory and bone black are varieties of charcoal which result from the concentration of ivory and bones in retorts.—They are employed for a variety of purposes. Ivory black forms a constituent of the finer kinds of printing-ink—that used for copper and steel plates. Bone black is chiefly used in the decoloration of raw sugar in the operation of refining. For this purpose the bone black is prepared in the state of grain, packed into large cylinders, and the colored sugar solution allowed to percolate through.

The most extraordinary and beautiful, as well as the most valuable form of carbon, is the diamond, a gem which has been known and valued on account of its resplendent beauty, from the earliest ages.

Its composition is undoubtedly carbon, because the sole result of its combustion in oxygen is carbonic acid gas; but the origin of the diamond is a subject of much curious speculation. As its structure is crystaline, the diamond has been at some early period in a liquid or semi-liquid condition—a state which pre-supposes fusion by fire, or solution in some menstruum. Opposed to the first hypothesis is the circumstance that within the structure of many diamonds are seen remains of organic beings—appearances scarcely consistent with the assumption that the diamond was once in a state of igneous liquidity. Sir David Brewster inclines to the opinion that the diamond is a drop of fossilized gum.

The extreme beauty which this gem is capable of assuming can only be developed by a tedious process of cutting, unknown even to this day in its full perfection by Eastern nations, and of somewhat modern introduction to Europe, viz., in the year 1456 by Louis Berghen, of Bruges, who accidentally discovered, that by rubbing two diamonds together a new face was produced. The diamond is so hard that it can only be abraded by portions of its own substance; hence, diamond powder is universally employed for that purpose; such stones as, on account of their inferior color or their flaws, are valueless as gems, being broken down into powder for the purpose of cutting others. At present, and for a long time past, the head-quarters of the diamond-cutting operation are at Amsterdam, Holland, where the operation is conducted by Jews exclusively.

The weight of diamonds is estimated in carats, 150 of which are equal to one ounce troy, or 480 grains. These carats are subdivided into halves, quarters, or carat grains, eighth, sixteenth, and thirty-second parts. The rule for the estimation of the value of diamonds is peculiar, and supposing the gems under comparisen to be equal in quality, may be expressed as being in the ratio of the square of their respective weights. Thus, supposing three diamonds to exist, weighing, respectively, one, two, and three carats, their respective values would be as one, four, and nine.

Farmers have not yet learned the value of charcoal as an agent in fertilization. In the form of a dust it absorbs and retains ammoniacal solutions; and on sandy and clayey soils is valuable for retaining carbonic acid, which is positively necessary to the growth of every plant. Charcoal ground into dust, and mixed with manure, or sown on sandy and clayey soils, has a most beneficial effect in promoting the growth of vegetables.

Crystalization.

We copy the following beautiful extract from an editorial in the Philadelphia *Ledger*:—

"Crystalization is found through all nature. There is not a substance, which, when allowed the free movement of its particles, does not exhibit a tendency to crystalize. Water at a low temperature crystalizes into ice. Metals slowly cooled after melting, crystalize. The gases, evanescent as they seem, may be made so artificially cold as to crystalize. Our children eat crystalized sugar under the name of rock-candy, and we ourselves use it in the loaf, crystalized in another form.

What is glass but a crystal? The sizes of crystals vary infinitely. There are crystals too small to be recognized except under a microscope; and there is one at Milan weighing nearly nine hundred pounds. The White Mountains of New Hampshire are a vast aggregation of crystals. The Mammoth Cave in Kentucky is an enormous museum of crystals. As yet, however, with all our knowledge, we are comparatively ignorant of the laws of crystalization. Under them, we see atom arrange itself by atom in mystic, myriad forms; we discover also, that not only magnetism, but light and heat exercise an influence in crystalization, but there our information substantially stops. The science of crystalization is almost a sealed book. Its mightiest curiosities still lie, like the virgin islands of the Pacific before the days of Cook, awaiting the skill and perseverance of some fortunate explorer."

Rosin Oil.

The following, from the New Orleans *Picayune*, affords evidence of the progress of the manufacture of rosin oil in New Orleans, and the use of rosin oil gas on plantations in Lousiana:—

"We some years ago announced the formation of a company in this city for the manufacture of oil from rosin, and now it affords us pleasure to be able to state that the undertaking has proved a complete success. The attempt to extract oil from such a substance was at first looked upon as simply ridiculous, for between rosin and oil there was nothing held to be in common. But there are more wonders between heaven and earth than ever was embraced in any man s philosophy; and the making of rosin oil is one of those recently developed wonders. The discovery was made and patented by Mr. Robbins some four or five years ago, and has ever since been slowly though surely working its way into popular favor. Last spring a company, under the title of the 'New Orleans Manufacturing Company,' was formed in this city, with a capital of $100,000; the patent right for this State was obtained; a site was purchased on the road side of the new canal, and now the works have been completed and are capable of turning out over 500 gallons of crude oil per day. To make paint oil, or the best description of lubricating oil, the crude article has to be twice refined, and altogether about ten per cent. of the original substance is dissipated in gases. Of the remainder, every portion is greatly superior in value, bulk for bulk, than rosin, while the greater portion of the product is worth from fifty to seventy-five cents per gallon. The oils produced by the various processes made use of are gas oil, paint oil, lubricating oil for machinery, tanners' oil, tallow oil for light-colored leather, bright varnish, naphtha, black varnish, cart grease, and pitch. The various kinds of oil are classed according to the number of distillations which they have undergone, and the residuum is pitch.

The success of the experiment thus far has been so satisfactory that the company has already determined to increase their works by the addition of two more stills. No fewer than two hundred planters have ordered sets of apparatus for the manufacture and use of rosin oil gas."

The Mesmerism of Machinery.

A Birmingham (England,) paper describes the following remarkable case, which is stated to have taken place in one of the large iron manufactories in that place:—

"One of the most singular instances in connection with material things exists in the case of a young man, who, not very long ago visited one of our large iron manufactories. He stood opposite a large hammer, and watched with great interest it perfect, regular strokes. At first it was beating immense lumps of crimson metal into thick sheets, but the supply becoming exhausted, at length it only descended on the polished anvil. Still the young man gazed intently on its motion; then he followed its stroke with a corresponding motion of his head; then his left arm moved to the same tune; and finally, he deliberately placed his fist upon the anvil, and in an instant it was smitten to a jelly. The only explanation he could afford was, that he felt an impulse to do it, that he knew he should be disabled, that he saw all the consequences in a misty kind of manner, but that he still felt the power within above sense and reason—a morbid impulse, in fact, to which he succumbed, and by which he lost a good hand."

This story may be true; as wonderful events as this have occurred before. It certainly has a Baron Munchausen look about it, but we presume all have at times felt more or less of a similar temptation to thrust the hand into shears, gearing, or the like.

Louisville Mechanics.

The best criterion by which to judge the intelligence of any people, is from the means they employ to acquire useful knowledge. There is no city in the Union that can claim a more intelligent class of mechanics than Louisville.

At the commencement of the present Volume of the SCIENTIFIC AMERICAN, the enterprising publishers offered to the persons who should send them the twelve largest Clubs of subscribers by the 1st of January, 1857, *one thousand dollars* in Cash Prizes. The last number of that paper that has reached us contains the commencement of the awards, and the mechanics of Louisville, through the agency of D. McPherson, Esq., stand at the head of the list, for the first and highest prize of $200. This is the second time this honor has been awarded to the mechanics of Louisville. First in 1855, and in 1856 they received the award for the second highest prize, and now again for the first. It affords us pleasure to make this announcement.—[Louisville Courier.

[Our cotemporary could not have paid a more just and merited compliment to the mechanics of Louisville, than it has done in the above paragraph. As we cannot have a better test of the character of a man than "the company he keeps," so the best criterion of the intelligence of any class of men, is just the means they employ to acquire useful knowledge; and, in this respect. the citizens of Louisville may well feel proud of their mechanics—they are not merely great readers, but *good* readers, and they have earned for themselves a noble reputation for intelligence and practical skill.

Genius under Difficulties.

The following case is one of such a rare and peculiar nature that we feel it our duty to present the correspondence, especially as the circumstances are therein explained in a very lucid and interesting manner. We copy, *verbatim et literatum*:—

Look out for Mistakes.

——, Pa. Jan 22it 1857.

MUNN & Co DEAR SIR

your favour of the 17it inst At at one favour i Ask of you if you will Please to Come here i will inform you of My Improvemetnt And Should it be An unjust one as it is frequently the Case i am willing to go with you to Case New York and work for to pay your Expenc for Coming here And further i think i have as good an impovement and Better for the Purpose Designed for Cheapness and Durability and if you do Not want to go to the Expense of Coming here Please send the Money and and you will Not be the loss of or Regret of it

As i am No Seffisf kind of a Man the Reason i ask this Favour i have been on on a Deep Study for the Last 6 mo on different Plans Concerning the improvement to Find the Cheapest way of Puting the Machinery Where it is Designed My My Pocket Book beCame suoject of the sweeny i will Come to a close By say My Pen is Bad My ink is Pal My upright and Contrite heart to you Shall Never Fail

Yours Truly

G. W. L——.

I think We Can Come to terms for i Like to Live While i am Alive and i Like to See others Live too

yours truly G.W. L.

you Can find Me By Enquiring of David P Browns Coal works at Mount Laffe David Lives in Market Street Most any Body Can show you Where he Lives

Want of time and funds will, unfortunately prevent us from following up this promising case.

Growth of Coral Islands.

The reef building coraline will not operate in water of a mean winter temperature less than 68 deg., which circumstance confines it principally to the torrid zone. It is for this reason that corals do not grow on the coast of South America. On our own coast they grow to a greater distance north than elsewhere, owing to the presence of the Gulf stream. Their growth is also limited by the depth of water—ten or fifteen fathoms. Another condition is that the reef coral will not grow in fresh water, nor in turbid or muddy shores. Whenever rivers or muddy waters pour into the sea, there is a break in the coral reef. The washing of the waves is also necessary to its growth; consequently it will thrive on the windward side of an island when it will not on the leeward side. At first, when a coral island is formed, it gives growth only to the lowest order of vegetables, such as feed on air. These decay, and thus leave a little soil which by and by sustains a higher order of plants. These islands seldom rise more than ten or fifteen feet above the water, and are seldom more than half a mile broad. There is a vast area in the Pacific 6000 miles long by 3000 wide, without any coral islands.

Rise and Fall of Water in Lake Erie.

At a recent meeting of the Cleveland (O.) Academy of Natural Sciences, Colonel Whittlesey exhibited tables and diagrams of the rise and fall of water in Lake Erie, from the year 1796 to 1852, the maximum being in 1838, the minimum in 1819 and 1820, the variation being 4·55 feet. Rain gauges were kept for various periods in different places in the lake region. He also stated that, by a long course of observation he had discovered the existence of a short pulsating wave in this chain of lakes, and entirely independent of winds or currents. Its altitude does, in no case, exceed eighteen inches—more commonly four or five. Its periods of vibration are short.

The sum of $5,060.000 has been paid by our government to the Collins' line for carrying the mail.

A. P. W., of Ill.—There are a number of plans for cutting down standing corn; some of them have been patented. Yours is not new or patentable; you will have to try again. You evidently possess the qualifications of a true inventor; you have constructiveness—that is shown in the sketch of your device; you have benevolence—that is evinced by the sending of your ink recipe you are sanguine (the most important of all qualifications for an inventor)—that is apparent from your remarks relative to the late elections.

A. L. B., of Vt.—We do not see that your electric engine has any advantages over others that are well known. Unless you could show some peculiar superiority, we think a patent could not be had. You would excite the electricity by a machine; but more power could be required to produce the current than you could obtain from the electric engine.

E. V., of Ind.—We do not remember to have seen or heard of any furnace feeder arranged like yours The idea of moving the saw dust to the proper points by elevators, is not patentable. But other parts of your plane probably, could be secured. Your theory is good; practical experiment alone can determine the utility of the device.

J. J., of Mass.—Safety floats in boilers for operating the valve when the water falls below a cert in line, are old Your plan is not patentable.

E. O. A., of Ga.—We find nothing new in your breech-loading cannon and projectiles. Making the cannon smaller at the muzzle is old; making it in two parts, secured together, is also old. Goodfellow's (English) patent, described in "Newton's London Journal," shows this plan. There is nothing new in your segment lever. Projectiles substantially similar to yours, have long been known. Packing the projectiles, to prevent windage, is not new. $2 received.

R. W., of Iowa—Your paddle-wheel device is good in theory, but of no value practically; neither is it substantially new. You will find diagrams of paddle wheels whose buckets are held perpendicularly for the same purposes as yours, in Vol. 5, Sci. Am. Your arrangement of parts is a little different from any device of the kind that we remember; but it is not patentable.

E. H., of Cal.—It would require considerable power to move such a lengthy column of water, no matter how small the bore of the pipe. How do you propose to fill the pipe? We regard your scheme for a Transatlantic Telegraph as impracticable. For short distances perhaps it could be made available. Your instrument, if new, is patentable. But the idea of telegraphing by means of a tube filled with water, is not new. The subscriptions you speak of are all right.

T. D. J., of Mich.—Consult a doctor upon the medical properties of hemp, in diseases of the ear. Placed *under* the ear, it is an absolute specific for cut-throats and other pests of society. Cane heads are much in vogue in this city, to deprive people of hearing and other senses, so that they can be conveniently robbed; but we never heard of cane heads that were good ear-trumpets. Water conductors of metal, for chimnies, are old; so are portable towers, ladders, fire escapes, &c., drawn on wheels. None of your devices are new or patentable. Try again.

G. L. W., of Md.—The Office do not regard drawings or models which are sent to file as evidence, unless the whole conditions of the Office are complied with, *i. e.* specifications and drawings complete are filed, and the Government fee paid. Our charges for re-issues are the same as new cases. The Government fee is $15. You can get volumes at $2.75.

E. B., of Wis.—Soapstone is often used for stove pipes to pass through, and the substitution of a hollow brick for that purpose, would not be patentable.

N. S. P., of Ill.—We have not the engraving to which you refer, in our possession, and if we had, we could not get up the circulars for you; we have no facilities for doing job work.

W. D., of N. Y.—Your plan for preventing gutters and leaders from freezing, is good and practicable; but it is not patentable. Discharging the exhaust of engines into leaders for the same purpose has long been practiced. Preventing pipes from freezing by running a warm-water pipe along side, is common.

E. W., Jr., of Cal.—There is no treatise on the Steam Engine, issued very recently.

D. N. F., of Vt.—We perceive no special novelty in your carriage seat; it would not be of sufficient interest to our readers to compensate for the room it would occupy in our columns.

J. G. White, Perry, Ga., wishes to correspond with a manufacturer of thimble skeins for wood axles.

G. D. B., of N. Y.—It will be much easier for you to send us a description of your invention for examination, than for us to send you a description of all the hose couplings with which we are conversant. We wish our correspondents would always remember that it is easier for us to determine the novelty of their invention, whatever it may be, than for us to send them descriptions of all the machines in existence of a like nature.

W. H., of Mass.—There is nothing new or patentable in your heater. Heating the air by passing it through chambers, surrounded by the products of combustion, is quite old.

C. J., of N. Y.—Cooling liquids by forcing them through pipes that are submerged in cold water, is very old. Your device is not patentable.

N. R., of Pa.—Your plan of keeping rivers clear by warming the bottom of the steamboat, and thus imparting heat to the stream, is certainly novel, and doubtless patentable. Had Dr. Kane and other Arctic navigators been provided with your arrangement, it is probable they never would have been stuck in the ice. Why did you not bring out your improvement earlier? On a small body of stationary water it might operate; but in large rivers the warm water would be carried off as fast as heated.

P. P. J., of Pa.—Your plan for supplying children's carriages with fresh air, by means of a revolving fan, operated by the wheel of the vehicle, is a benevolent one for the rising generation, but it is not patentable.

H. P. J., of Mass.—Your compound bombshell, or big shell, containing a lot of little shells, is a very old device. It was invented several dozen times during the late seige of Sebastopol.

J. M. C., of N. C.—If your plan for preventing backlash, in gearing is new, it could be patented. Yes, it would be better to join two ends of a rail on the same sill. A cannon ball, placed in water, would sink to the bottom. It is a popular error that bodies heavier than water will sink until they reach a point where the liquid is sufficiently dense, and there remain.

F. G. A., of Ga.—We do not think of any particular number of our paper in which engines and mills, similar to those you speak of, are described. But we presume we have many times published accounts of machinery that would suit you. Read the Sci. Am. carefully, and no doubt you will soon find what you desire. $2 received.

J. D., of Pa.—The great amount of space required for your method of propelling vessels would certainly be an objection to its employment.

E. C., of Iowa.—The water in a tube will expand just in proportion to the heat which it is submitted; the same in low pressure steam as in boiling water.

M., of Me.—An arrangement somewhat similar to yours for straining saws, was illustrated in the last volume of the Scientific American, page 57. It is the invention of Brown & Coffin. They use air instead of steam. We do not think your device is patentable. $1 received.

J. L., of Va.—Your water wheel is not new in principle. It is more expensive, and not so good for practical purposes as others which exhibit the same general plan, viz., buckets that alternately slide through a cylinder.—You will find a number of such devices in the fifth volume of the Scientific American. Your invention would serve for a pump or rotary steam engine just as well as it would for a water wheel. But it is better in theory than in practice. It is not patentable, nor usefully practicable.

S. D., of O.—Cast-iron mantel pieces are enameled with a frit of ground glass and borax, put on wet, in the form of a paste, allowed to partially dry in the air, and then fused in an oven. Don't know the temperature of the oven, nor any enamel that will stand an extremely high temperature.

G. W. F., of N. Y.—Artificial lights have been made of sufficient strength and purity to produce ambrotypes and daguerreotypes, but merely as abstract experiments, and not with a hope of improving upon daylight for such purposes.

F. W. E., of N. Y.—We could give you opinions about building a barn, according to our notions how a good and convenient one should be built, but not from practical experience. Probably you would find it profitable to steam your hay for feeding milch cows, at least for one meal per day.

Mr. H. G. Seeber will oblige us by sending his post office address without delay, as we wish to communicate with him.

D. E. W., of Conn.—You can make and sell an article two years before applying for a patent; but you run the risk of some other person taking out a patent on it during that period.

B. & B., of N. C.—Mr. F. S. Pease, of Buffalo, N. Y., manufactures and sells a good lubricating oil. The price of a suitable machine for mortising plow beams we do not know. Address some of the manufacturers.

N. W. C., of N. Y.—Christopher Hollingsworth, the inventor of the knuckle joint washing machine was a resident of Liberty, Ind., at the time his patent was granted—1352. A letter to that address might reach him.

S. & B., of Conn.—Your device for twisting twine is old.

Money received at the Scientific American Office on account of Patent Office business for the week ending Saturday, Feb. 7, 1857:—

J. F. R., of Iowa, $25; D. R. A., of O., $30; J. M., of Miss., $60; A. E. W., of Iowa, $25; I. H. C., of Ill., $110; O. D. W., of Pa., $100, H. W., of N. Y., $30; B. S., of N. Y., $30; S. G. L., of Mass., $30; W. B., of N. J., $10; B. T. B., of N. Y., $35; I. P. S., of N. Y., $17; H. R., of N. J., $30; G. A. M., of N. Y., $30; A. R. H., of Pa., $25; T. P. S. D., of Me., $5; G. & F., of N. Y., $30; E. F., of Iowa, $30; J. B., of R. I., $30; N. B., of Ill., $30; L. W., of L. I., $35; N. N., of Pa., $30; F. W. W., of Texas, $25; E. B., of N. Y., $30; B. A. H., of N. Y., $10; R. W., of Mass., $30; G. W. F., of Pa., $50; J. P. R., of Pa., $150; E. F. F., of Vt., $25; J. M., of Ind., $50; R. S. J., of Conn., $25; W. W. D., of N. Y., $27; J. H., of N. Y., $15; L. W., of N. Y., $15; J. H. S., of N. Y., $27; J. C., of L. I., $60.

Specifications and drawings belonging to parties with the following initials have been forwarded to the Patent Office during the week ending Saturday, Feb. 7, 1857:

T. P. S. D., of Me.; A. R. H., of Pa.; W. L., of N. Y.; J. F. R., of Iowa; C. B. G., of Iowa; W. W. D., of N. Y.; E. F. F., of Vt. J. H., of N. Y.; L. W., of N. Y.; T. H. S., of N. Y., G. W. F., of Pa. (2 cases); F. W. W., of Texas; J. C. of L. I.

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