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(Illustrations are indicated by an asterisk.)

Every man who has money to invest always desires to place it where it will make the best return. This being admitted, we undertake to say that $3, invested in the SCIENTIFIC AMERICAN, will return three-fold in the amount of valuable information which its columns supply. Mechanics, inventors, manufacturers, farmers—as well as every head of a family—will get, on an average, $10 worth of information from a year's number of this journal, and yet they can get it for the low sum of $2 50, in clubs of ten names.

Talk about high prices—here is something cheap enough to stop the mouths of all grumblers. Only think of it—a large volume of 832 pages, full of costly engravings, for $3, and less to clubs. If any of our readers think we can get rich at such prices, let them try the experiment. Send in your clubs and subscriptions.

THE GREAT PARIS EXHIBITION.

We are informed that upon application of our Government the time for receiving applications from this country has been extended to the first of March next.

Those who propose to exhibit will bear in mind, however, that they will have till January, 1867, to prepare their articles, as the Exhibition will not open until a year from next April.

Our Government is manifesting a deep interest in the Exhibition, and evinces a strong desire that our country should be honorably represented in this great congress of industry and skill, and we have no doubt that an appropriation will be made by the Government to defray all expenses attending the shipment and proper display of the articles to be sent.

About three hundred applications for space have already been made by our countrymen, and the list embraces some of our best-known manufacturers and inventors.

We have no doubt that great care will be exercised by a competent committee that none other than meritorious articles be admitted. With the experience of the past before us, and having ample time for the arrangement of all details, there is no reason why we should not make a display such as shall do credit to our skill and ingenuity.

All applications for space should be made to J. C. Derby, No. 40 Park Row, New York.

THE CIRCUIT OF CARBON THROUGH ANIMAL AND VEGETABLE LIFE.

Among those operations of nature which may be contemplated from new points of view with ever-renewed interest, is the circuit which carbon is perpetually running through animal and vegetable organisms. Upon the continuance of this circuit depends the existence of all life upon our globe. If it were suspended, all animals would cease to breathe, and all vegetables to grow; the sea would become a lifeless waste of waters, and the earth an uninhabited desert, with no leaf or flower, or living thing upon its plains or mountains.

Here is a piece of charcoal that was very recently an essential portion of a growing oak tree. If we set it on fire and expose it to a current of air, its color changes from black to red, and it slowly vanishes from our sight—vanishes, not by some trick of legerdemain, but by actually becoming invisible. The miracle would excite our wonder but for the fact that we have seen it peformed so many times before.

To the imperfect observation of the unaided senses, it seems plain that the charcoal is annihilated; but the power of modern science can follow it in its invisible flight, and can ascertain positively that every ounce and grain of its substance is still in existence, and that it weighs precisely as much now as it did when in a solid mass, before undergoing its miraculous transformation.

The simple explanation of the disappearance is that the charcoal in burning combined with the oxygen of the atmosphere—that the two elements, thus combined, constituted carbonic acid—and that carbonic acid at ordinary temperatures is a colorless gas. The charcoal in its combination with oxygen has been changed from the solid to the gaseous state, and has, by this change, become transparent and invisible.

The same combination of carbon and oxygen is always going on in the interior of our bodies, a given quantity of carbon generating, in this case, the same amount of heat—though not of the same intensity—as when charcoal is burned in a fire. It is in this way that the body is kept warm, and the vital functions are kept in operation. The lungs are made up of numerous minute cells of extremely thin membrane, on one side of which delicate blood vessels are distributed, while the air comes in contact with the other side. This membrane has the property of absorbing oxygen from the air, and of passing it through by endosmosis into the blood. The blood, thus supplied with oxygen, returns to the heart, and is forced through the arteries all over the system. The digested food, being also poured into the blood, is brought in contact with the oxygen, when the carbon of the food combines with oxygen, forming carbonic acid, and generating heat. On the return of the blood to the lungs, the carbonic acid passes outward through the membrane by exosmosis, and is expelled through the nostrils into the atmosphere.

This carbonic acid floats in the atmosphere until it comes in contact with a growing leaf, when it is instantly absorbed, and under the combined action of light and vegetable life it is decomposed, the carbon is carried inward to help build up the structure of the plant, or to aid in the formation of fruit and grain, to be again used for food; while the oxygen is set free in the atmosphere to be again breathed by some animal, again combined with carbon to keep up the slow fire of animal life, and again restored to the atmosphere.

Thus carbon runs its perpetual circuit from the animal to the vegetable world, and from the vegetable back to the animal—keeping up, in its course, both forms of organic life.

GEOLOGY OF THE CENTRAL RAILROAD WATERS.

At the last meeting of the Polytechnic Association, extracts were read from Professor Chandler's report to the officers of the Central Railroad, on boiler incrustations, when Dr. Stevens remarked that this report is interesting to geologists as well as to engineers, for it is the most thorough examination of the waters of that district that has ever been made. The examination was confined to the line of the road between Syracuse and Rochester, and in this portion the road runs very nearly along the line of the canal. Throughout the whole distance the formation is the Onondaga salt group—the rock from which our salt is obtained—and this is the only formation in the State that contains sulphate of lime.

The waters examined by Professor Chandler are derived from three sources—from the Onondaga salt rocks, from surface ponds and brooks, and from streams flowing northward which have their source in the Devonian and Carboniferous formations. By examining any one of these analyses it is easy to tell from which of the three sources the water was derived. Those from the salt rocks contain a large proportion of mineral impurities, especially sulphate of lime and chloride of sodium; those from the southern streams bear traces of the various rocks which they have traversed; while the surface waters are comparatively pure.

Dr. Stevens further stated that the officers of the Central Railroad are so well pleased with Professor Chandler's labors that they have determined to have all the feed waters throughout the line of their road examined by him. This will be the most complete examination that has ever been made of the waters of so large a district in any country.

THE SMOKE OF THE RIVER.

"It is a terribly cold morning. We have never had any thing like it before in New York. I have kept a thermometer for thirty years, and till this morning I never saw it more than one or two degrees below zero; this morning it was ten below. As I came over in the ferry-boat the steam was going up from the East River as if the water was boiling. By the way, I want to know what makes that steam vanish so quickly; what becomes of it?"

These remarks were made to us by a Brooklyn gentleman, and in reply we asked him—

"Did you see the glass engine that was exhibited in Brooklyn by the glass blowers?"

"Yes."

"You noticed that the steam was perfectly invisible?"

"Yes."

"When you see steam blowing out of a pipe, if you observe closely, you will find that very near the pipe there is nothing to be seen; it is only after the jet gets an inch or so from the pipe that it becomes visible. In fact, it is only after the fluid has been condensed from steam to water that we are able to see it. The white cloud that we see is made up of numerous globules of water—very minute, indeed, but still liquid globules, which reflect the light from their surfaces. Steam is a gas that allows the light to pass through it in straight lines, and it is consequently transparent and invisible.

"In these cold mornings, as a portion of the water rises in vapor, it is immediately condensed in little globules, forming the white cloud that we see, and then it may disappear in two ways—the several globules may be so scattered that they cease to be visible, or the water may be absorbed by the atmosphere, and thus changed again to the form of vapor. Cold as the air was here, it was coming down to us from Lake Superior where it had been colder still, and it was in process of being warmed. With the rise in its temperature its capacity for moisture was being increased, and it was thus in a condition to absorb an additional quantity of watery vapor. We presume the disappearance was the result mainly of absorption."

Gigantic Scheme for Supplying London with Water.

Mr. Bateman, the engineer of the Glasgow waterworks, has published a pamphlet proposing a scheme for supplying London with water by means of an aqueduct from North Wales. He proposes that the aqueduct shall have two branches in Wales, which shall meet before they cross the Severn; the length of the whole will be 152 miles; the capacity will be 220,000,000 gallons daily, and the cost £8,600,000—upwards of $40,000,000.

MACHINE FOR TURNING HUBS.—Manufacturers o the above machines will do well to advertise in the SCIENTIFIC AMERICAN, as we have inquiries from readers.

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