The Unknown powers of Frost.

We must place frost amongst the mightiest physical agencies in nature, whether we consider the rapidity of its operations, the silence with which it works, or the vast extent over which this conquering power might carry its ravages. It is impossible for us to imagine the surprise of the man who first, when the world was young, beheld a frozen river or sea. Perhaps he had wandered with a few fellow exiles far from the primitive seats of men, and would look, we must suppose, on the waters turned to a solid as an omen of terrible import. One evening he saw the waves as they had ever been in his view, rippling with perpetual motion on the glittering sands; the next morning all was silent. Perhaps to his astonished mind the thought came that the sea had died, and that the motionless expanse before him was but its Titanic corpse. *He* would probably deem so strange an appearance as the beginning of universal desolation; *we* have no such apprehension, being acquainted with the operations of frost, and informed of its power. But during all the ages of the earth's duration, this mighty energy has only put forth *half* its strength, touching, as it were, the globe with its petrifying finger, but never descending with the full force of its iron tread. In the northern parts of Siberia mercury is sometimes frozen, and the frost must there reach a point represented by 40 deg. below Zero of Fahrenheit's thermometer. Were such a destructive agent to operate during one of our winters, England would become a desert, trees and shrubs perish, and the ensuing spring call in vain for the return of flowers and foliage. But there are elements in nature which *could* produce, were they allowed to combine, a far more destructive cold than that which reduces the liquid quicksilver to a hard block of metal. The present arrangements of the Creator prevent the union of such powers, but chemists have produced an artificial combination of natural agents, from which has ensued a cold 91 deg. below Zero, and 131 deg. below the freezing point. This fatal degree of cold is caused by a union of two parts of sulphuric acid with one of snow. Now both sulphuric acid and snow might be produced from the elements around us, which could therefore, make a winter capable of destroying all animal life in a month. A frost equal to 40 deg. below Zero penetrates about two hundred yards into the ground: but cold of 91 deg. below the same point must pierce to a far greater depth, turning the whole crust of the earth into a frozen mass. The consequence of such a degree of cold on the human body can scarcely be imagined; but some notion may be gained from the fact that no metalic substance can be touched by the hand, when the thermometer is 40 deg. below Zero, without producing a *burn*, like that caused by grasping a red hot poker; so strangely similar are the effects of extreme heat and cold. To produce a fearful disorganisation in our globe, there is but needed some fresh distribution of the acids stored up in nature, but which are kept in their present safe arrangement by the agency of the all-wise God. The cold does, indeed, sometimes increase to the highest *point of safety*, but never quite passes this line, being held, like the ocean, within its appointed limits, and exhibiting through many seasons, a uniformity which attests the control of some invisible power. Thus in the severest winters in our latitudes the frost does not penetrate into the earth more than nine or ten inches, and rarely to half that depth, as may be proved by placing a thermometer in the ground during a sharp frost. The waters of the seas around these islands tend to preserve us from the higher rigours of cold, for the temperature of the British channel is even in the winter not below 50 deg., and that of the German ocean seldom lower than 42 deg. of Fahrenheit; the vast stratum of air around Great Britain is, therefore, warmed by the ocean in winter: and thus the cold is continually checked in its intensity. Let us, therefore, see in cold the intimations of that divine power which protects man from those terrible frosts, the hidden elements of which are chained in the secret recesses of all liquid and solid substances, but so beautifully fitted to other parts of the great system, that they work for our good in a thousand forms. The thoughtful heart may not need such considerations to convince it of the wondrous agencies discovered on all sides, but it is wise to place continually before our view those bright confirmations of physical truths which direct our contemplations to objects too often obscured by the passing pomps and vain displays of the world.—*Sharpe's Magazine.*

The Dew.

The dew, celebrated through all time and in every tongue for its sweet influence, presents the most beautiful, and almost striking illustration of divine agency in the economy of nature, and exhibits one of those wise and bountiful adaptations by which the whole system of things animate is fitted and bound together. All bodies on the surface of the earth radiate and throw out some rays of heat, in straight lines—every warmer body to every colder; and the entire surface of the earth is continually sending rays upwards through clear air into free space. Thus, on earth's surface, all bodies strive as it were, after an equal temperature, (an equilibrium of heat,) while the surface, as a whole, tends generally towards a cooler state. But, while the sun shines, this cooling will not take place: for the earth then receives, in general, more heat than it gives off; and if the clear sky be shut out by a canopy of clouds, these will arrest and again will throw back a portion of the heat, and prevent it from being so speedily dissipated. At night, then, when the sun is absent, the earth will cool the moisture; on clear nights, also, more than when it is cloudy; and when clouds only partially obscure the sky, those parts will become coolest towards the clearest portions of the heavens.—Now, when the surface cools, the air in contact must cool also; and, like the warm current on the mountain side, must forsake a portion of the watery vapor it has hitherto retained.—This water, like the floating mist on the hills, descends in particles almost infinitely minute. These particles collect on almost every leaflet, and suspend themselves from every blade of grass in the drops of "pearly dew." And mark here a beautiful adaptation: Different substances are endowed with the property of radiating their heat, and thus becoming cool with different degrees of rapidity; and those substances which, in the air, become cool first, also attract first and most abundantly the particles of falling dew. Thus, in the cool of summer's evening, the grass plot is wet while the gravel walk is dry; and the thirsty pasture, and every green leaf, are drinking the descending moisture, while the naked land and barren highway are still unconscious of their fall.—*Farmer and Mechanic.*

Difference between Iron and Steel.

Steel is iron passed through a process which is called cementation, the object of which is to impregnate it with carbon. Carbon exists more abundantly in charcoal than in any other fusible substance, and the smoke that goes up from a charcoal forge is carbon in a fluid state. Now, if you can manage to confine that smoke, and put a piece of iron into it for several days, and heat the iron at the same time, it will become steel. Heating the iron opens it pores, so that the smoke or carbon can enter into it.

The furnace for this purpose is a conical building of brick, in the middle of which are two troughs of brick or stone, which hold about four tons of bar iron. At the bottom is a large grate for the fire. A layer of charcoal dust is put upon the bottom of the troughs, then a layer of bar iron; and so on alternately, until the troughs are full. They are then covered over with clay, to keep out the air, which, if admitted, would prevent the cementation. Fire is then communicated to the wood and coal with which the furnace is filled, and continued until the conversion of the iron into steel is completed, which generally happens in about eight or ten days. This is known by the blisters on the bars, which the workmen occasionally draw out, in order to determine when the conversion is completed. The fire is then left to go out, and the bars remain in the furnace about eight days more to cool.

The bars of steel are then taken out, and either sold as blistered steel, or drawn to a convenient size, when it is called tilted steel. German steel is made of this blistered steel, by breaking the bars into short pieces, and welding them together, drawing them down to a proper size for use.

Manufacture of Diamonds.

It has been long known that Diamonds were nothing more or less than carbon in a chrystalized state. But the chemists have not been able to produce the chrystals, by any artificial process; and perhaps the great supply of gold that is now coming in upon the world, is to be matched with a corresponding supply of Diamonds, made by art. The Paris correspondent of the London Times says:—

The scientific world has been in a state of commotion during the whole week, in consequence of the publication of the discovery of the long sought for secret of the fusion and crystalization of carbon. The Surbonne has been crowded for the last few days to behold the result of this discovery in the shape of a tolerably sized diamond of great lustre, which M. Desprezt, the happy discoverer, submits to the examination of every chemist and *savant* who chooses to visit him. He declares that so long ago as last autumn he had succeeded in producing the diamond, but in such minute particles as to be visible through the microscope, and fearful of raising irony and suspicion, he had kept the secret, until, by dint of repeated experiments and great labor, he had completed the one he now offers to public view. Four solar lens of immense power, aided by the tremendous galvanic pile of the Sorbonne, have been the means of producing the result now before us. M. Desprezt holds himself ready to display the experiment whenever it may be required. The diamond produced is of the quality known in the East as the black diamond, one single specimen of which was sold by Prince Rostoff to the late Duke of York, for the enormous sum of twelve thousand pounds!

The Hippopotamus.

Professor Owen has just published a report on this valuable acquisition to the Zoological Society, from which it appears that the hippopotamus now safely housed in its comfortable quarters in Regent's Park, was captured in August, 1849, about 1,350 miles above Cairo. The hunters having previously wounded its mother, had their attention attracted to the thick bushes on the river's bank, in which the young animal was concealed. When discovered, the calf made a rush to the river, and nearly escaped, owing to the slipperiness of its skin, and was only secured by one of the men striking the boat-hook into its flank.—The hippopotamus is now only ten months old, and measures seven feet long and six and a half in girth at the middle of the barrel-shaped trunk, which is supported clear of the ground on very short and thick legs. The naked hide covering the broad back and sides is of a dark India-rubber colour, impressed by numerous fine wrinkles crossing each other, but disposed almost transversely. When Professor Owen first saw the beast, it had just left its bath; and he observed minute drops of a glistening secretion exuding from the pores, which are dispersed over the whole integument, and which the animal is provided with for the purpose of lubricating its thick hide, and thus preventing it from breaking. After lying quietly an hour, the hippopotamus rose and walked slowly about its room, and then uttered a loud and short harsh snort four or five times in quick succession, reminding one of the snort of a horse, and ending with an explosive sound like a bark. The keeper stated that the sounds were indicative of its desire to return to the bath. The Arab opened the door and walked to the new wing containing the bath, the hippopotamus following like a dog close to his heels. On arriving at the bath-room, the animal descending with some deliberation the flight of low steps leading into the water, stooped and drank a little, dipped his head under, and then plunged forwards. It was no sooner in its favorite element than its whole aspect changed, and it seemed inspired with new life and activity, sinking down to the bottom, and, moving about submerging for awhile, it would suddenly rise with a bound, almost bodily out of the water, and, splashing back, commenced swimming and plunging about with a porpoise like motion, rolling from side to side, taking in mouthfuls of water and spurting them out again, raising every now and then its grotesque head, and biting the woodwork at the margin of the bath. The broad-rounded back of the animal being now chiefly in view, it looks a much larger animal than when out of the water. After half an hour spent in this amusement, it quitted the water at the call of its keeper, and followed him back to the sleeping room, which is well bedded with straw, and where a stuffed sack is provided for its pillow, of which the animal, having a very short neck, thicker than the head, duly avails itself when it sleeps. When awake, it is very impatient of any absence of its favorite attendant, rises on its hind legs, and threatens to break down the wooden fence by butting and pushing against it in a way strongly significant of its great muscular force. Its food is now a kind of porridge of milk and maize meal. Its appetite has been in no respect diminished by the confinement and inconvenience of the sea voyage, or by change of climate. No other living specimen of this singular animal has been seen in Europe since the period when they were last exhibited by the third Gordian in amphitheatre of Imperial Rome.

The Farm.

HOW TO MAKE YOUNG TREES BEAR.

Whoever plants trees with his own hand or causes them to be planted, is commonly anxious to partake of their fruit as early as possible.—He watches the first flower bud, and if the young fruit drops from the bough, experiences great disappointment. To such of our readers as have felt this emotion, it must be a gratification to know how they may force their young trees into bearing so as early to test their fruit. Whoever would have his trees bear at an early age, must cut off about one-third of the new growth, from the extremity of a few branches, about the middle of July. This will force the formation of blossom-buds near the end of the branches during the latter part of the season, for the fruit next year. On small trees this process should be applied to but few of the limbs, otherwise the trees will produce fruit which is imperfect or of inferior quality, and may be injured. In this way we have often obtained fruit in the third year from the setting of the bud or graft.

Use of Lime in the Culture of the Apple Tree.

Lime is found to enter more largely into the structure of the apple tree than of any other tree known. The analysis of Dr. Emmons has given us 51 per cent. of lime in the ash of its bark; hence we learn that lime should make a prominent ingredient in all our composts for the apple orchard. Where, from exhaustion, lime has become deficient, and the orchard seems to be on the decline, the work of re-invigorating may be speedily accomplished by a liberal use of it.

GERMAN METHOD OF RAISING POTATOES.

The Germans have recently taken a particular fancy to raising potatoes. The following is their method of producing the greatest good for the greatest number:

"The potato is planted whole, without any preparation, only allowing a little more space than usual. When the plants have attained the height of the hand, they are also cleared and hoed as usual. When, however, the time for drawing up the earth around them has arrived, the following process is adopted instead: The green stalks are divided and laid down by the hand on the flat soil in the form of the spokes of a wheel and covered with the neighboring earth—the operation being readily performed by placing the foot on the plant. Some weeks later the leaves begin to push through the soil, when they are again laid down and covered with four inches of earth. This is all the labor required, and occupies about the same time as the ordinary hoeing-up process, but it produces six times more fruit. The subterranean stalks are covered with potatoes in the form of a wreath or chaplet."

PRESERVING GATHERED FLOWERS.

For the benefit of our lady readers, we copy from an Eastern paper the following recipe for preserving the beauty of gathered flowers:

"Procure a flat dish of porcelain, into which pour water; place upon it a vase of flowers, and over the vase put a bell of glass, with its rim in the water. The air that surrounds the flowers being confined beneath the bell glass, is constantly moist with water, that rises into the form of vapor. As fast as the water is condensed, it runs down the side of the bell glass into the water, on the inside of the bell glass, so as to prevent it evaporating into the air of the sitting room; the atmosphere around the flowers is continually damp. The experiment may be tried on a small scale by inverting a tumbler over a rose in a saucer of water."

CHURNING.

The Albany Cultivator says: "According to our experience, the best butter is not produced by a very *short* nor a very *long* period of churning. If it is churned too quick, the separation is not complete, and the butter, besides being less rich, is deficient in quantity; if the process is continued too long, the butter is likely to be *oily*. We think our best butter makers would decide, that churning for ordinary quantities, say from ten to twenty pounds, should occupy from *thirty* to *fifty* minutes.