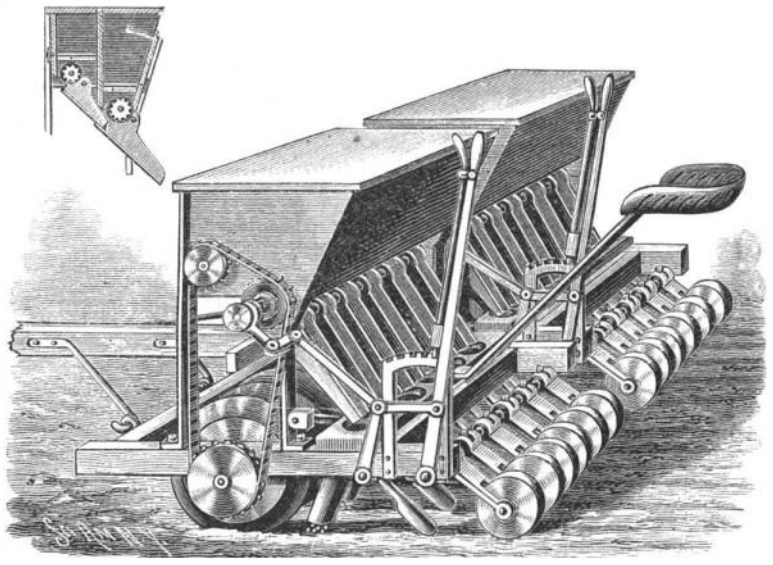
A NEW AGRICULTURAL IMPLEMENT.

In the roller and drill shown in the annexed engraving are combined two efficient implements, which taken together enable the farmer to sow seed in even drills upon either smooth or rough ground. The main frame of the machine is mounted upon the journals of a roller formed in two sections, the periphery of the roller being furnished with circumferential V-shaped ribs, which serve to pulverize the soil and at the same time form the drill for the reception of the seed.

Above the roller are supported seed boxes, each of which in the present case is divided into two compartments by a longitudinal partition, as shown in the detail sectional view, so that both seed and fertilizer may be sown simultaneously. The seed boxes are provided with openings closed by slides for supplying the seed to peculiar feed wheels, which cause a uniform discharge through the troughs, which are inclined downwardly and rearwardly to the drill teeth.

Behind the drill teeth are supported a series of slotted, concave covering blades for throwing the soil over the seed, and behind the blades, and in the path of the ribs of the roller and the drill teeth, are journaled series of rollers for compacting the earth above and around the seed. These rollers are adjustable by the levers seen at the rear of the machine. A seat is provided for the driver. Behind and above the ribbed rollers is journaled a zigzag bar which may be brought into engagement with the periphery of the rollers whenever it becomes necessary to clear them from adhering soil.



JONES'S COMBINED ROLLER AND DRILL.

It is obvious that this improved machine may be used upon either rough or smooth ground with equal facility. If desired, the rollers, the covering blades and the drill teeth may be removed, and the rollers alone may be employed for pulverizing the soil.

Further information in regard to this invention may be obtained by addressing Mr. Harvey E. Jones, of Carlysle, Ill.

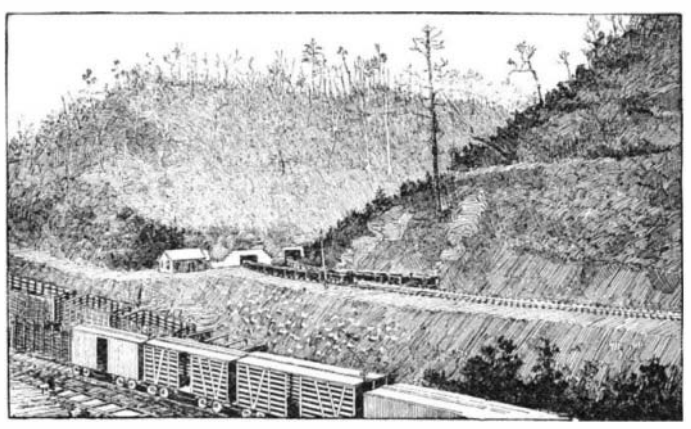
Regularity of Habit.

One of the most difficult of all minor habits to acquire, says an able writer, is that of regularity. It ranks with that of order. The natural inclination of most persons is to defer until the last possible moment, or to put off to another time, where this can possibly be done. Yet habits of regularity contribute largely to the ease and comfort of life. A person can multiply his efficiency by it. We know persons who have a multitude of duties, and perform a vast deal of work daily, who set apart certain hours for given duties, and are there at the moment and attend rigidly to what is in hand. This done, other engagements are met, each in order, and a vast deal is accomplished, not by strained exertion, but by regularity. The mind can be so trained to this that at certain hours in the day it will turn to a particular line of duty, and at other hours to other and different labors. The very diversity is restful, when attended to in regular order. But let these run together, and the duties mix, and what before was easy is now annoying and oppressive, and the exact difference between many is at this point. There are those who confuse and rush, and attempt to do several things at once, and accomplish little, while others will quietly proceed from one duty to another, and easily accomplish a vast deal of work. The difference is not in the capacity of the two, but in the regular methods of the one as compared with the irregular and confused habits of the other.

SOME OF THE INDUSTRIES OF VIRGINIA.

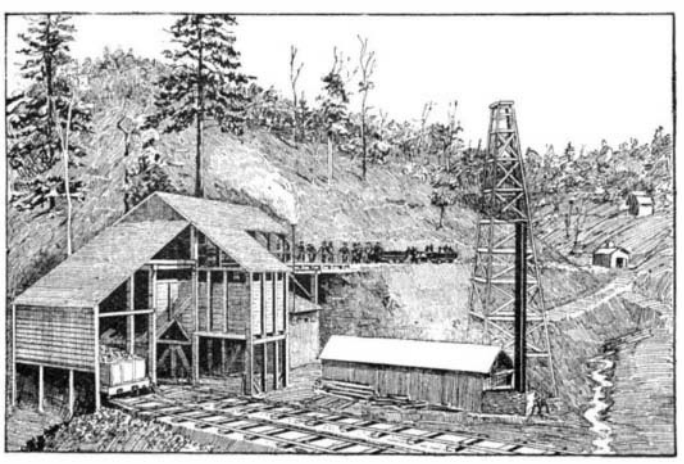
We present views of some of the coking works of Virginia, the cuts being kindly furnished by the Norfolk and Western Railroad Company.

The remarkable Pocahontas coal fields are well known throughout the country. The area of these steam and coking coal beds extends through Tazewell County, Virginia, and Mercer, Wyoming, McDowell and Raleigh Counties, West Virginia. The Pocahontas coal exists in three workable bed or veins, above water level; that which is chiefly worked being known as No. 3, and having a thickness in the vicinity of Pocahontas of 11 ft. 3 in. It has been estimated that this vein should yield 10,000 tons per acre, while those above it should produce each 6,000 tons additional. The almost unrivaled quality of this coal for steam-making purposes is now a matter of general knowledge. As compared with samples from five of the leading coal districts of Pennsylvania and one from Wales, it stands highest in fixed carbons and lowest in ash, sulphur and volatile matter. Fourteen corporations and firms are now engaged in coking operations in this field, running a total of 1,765 ovens, with 247 additional ovens under construction, and about 700 contemplated to be built, as the requirements of coke for furnaces demand. To these others are constantly being added. The relative value of this coke product, as compared with that used at the furnaces of the Alabama, Tennessee and Pennsylvania (Connellsville) iron-making districts, is shown in the fact that the percentage of sulphur and ash in the Flat Top coke is very much lower, and the percentage of fixed carbon very much higher than those of either of those districts. The total output of coal from this region for 1889 was 1,785,292 net tons, and the coke production was 312,310 net tons.

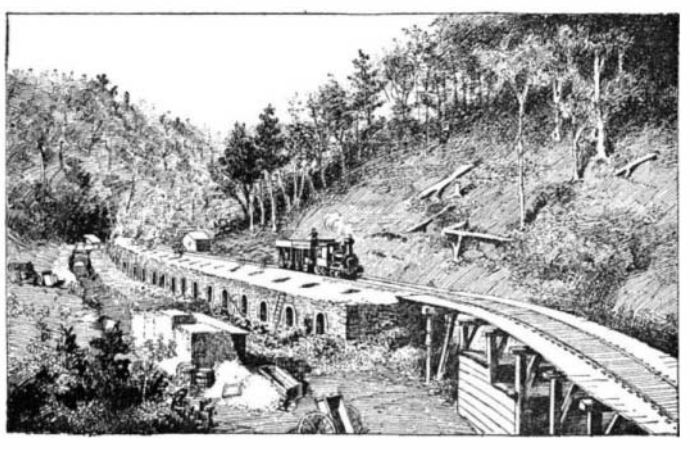


COAL MINES AT POCAHONTAS, VA.

COKE OVENS AT POCAHONTAS, VA.



COAL MINE AND TIPPLE ON THE BLUESTONE, W. VA.



COKE OVENS ON THE BLUESTONE, W. VA.

Cholera in Japan.

Advices reveived from Tokio, *via* Yokohama and British Columbia, contain intelligence of the terrible outbreak of cholera which has taken place in Japan, by the ravages of which upward of 200 deaths were occurring daily. Cholera first broke out in Nagasaki, the southern metropolis of Japan, and in twenty days there were 926 cases and 671 deaths. The disease quickly spread, and by the 29th of July all the towns from Satsuma to Hakodate were attacked, the deaths per day being estimated at not less than 200. At Yokohama the outbreak was not very serious, but the officers and crew of the Turkish war ship Ertogrul were attacked and the vessel was removed to the quarantine grounds, where two seamen died. Her Majesty's ship Imperieuse left the harbor to avoid the epidemic, and the captains of the English, American, and other merchant vessels in port were adopting every precaution to protect their crews.

Treatment of Diphtheria by Inoculation.

In the *Repertoire de Pharmacie* for July 10, 1890, it is stated that Dr. Babchinski was attending a case of grave diphtheria occurring in his own son, in which a rapid change for the better occurred coincidentally with the appearance of erysipelas on the face. The fever rapidly fell, the false membrane disappeared, and cure rapidly took place. Dr. Babchinski also states that in several other cases he noted a great improvement coincident with the appearance of erysipelas, and in one of them the erysipelas occurred on the leg and not on the face. These facts suggested to Dr. Babchinski the idea of inoculating diphtheria cases with blood taken from patients suffering from erysipelas, and he states that in several cases in which he employed this procedure cure resulted. Later on he practiced inoculation of other cases of diphtheria with cultures of the microbe of erysipelas in agar-agar, and likewise noticed the disappearance of the symptoms of diphtheria. He further adds that when the inoculations were made all special treatment was suspended, and in no case did the erysipelas present any sufficient gravity to cause uneasiness. He concludes by stating that, if his observations and experiences are confirmed, this treatment should rob diphtheria of all its dangers.

MR. CHARLES BELL, of Stroudsburg, Pa., sends a photograph of a part of a collection of moths, beetles, and other insects killed by arc lights. The specimens are artistically grouped and represent a large number of species. Mr. Bell says the number of insects destroyed in this manner is very great, some nights amounting to more than a bushel.

FILLING FOR DRY BATTERIES.—A new mixture for filling dry cells prepared by Mr. A. V. Meserole, of this city, consists of the following solid ingredients in the form of powder: Charcoal, 3 parts; mineral carbon or graphite, 1 part; peroxide of manganese, 3 parts; lime hydrate, 1 part; white arsenic (oxide), 1 part; and a mixture of glucose and dextrine or starch, 1 part; all by weight. These are intimately mixed dry and then worked into a paste of proper consistency with a fluid solution composed of equal parts of a saturated solution of chloride of ammonium and chloride of sodium in water, to which is added one-tenth volume of a solution of bichloride mercury and an equal volume of hydrochloric acid. The fluid is added gradually and the mass well worked up.

The Utilization of Niagara Falls.

A contract was awarded on September 13 to Rogers & Clemens, of this city, to construct a tunnel parallel to Niagara River for the Cataract Construction Company. The consideration involved is not announced. A bond in the sum of $300,000 has been executed by the firm. Work will be commenced immediately, and must be finished in January, 1892. In 1886 the Niagara River Hydraulic Power Server Company was incorporated by a special act of the State Legislature. At various times the charter was amended and the name finally changed to that of "The Niagara Falls Power Company." In July, 1889, this company awarded the Cataract Construction Company the contract to construct at Niagara Falls works which will develop 119,000 horse power. Since that time the contractor has been preparing plans and specifications for the work. The sub-contract just awarded is the first decided move which proves to the public that the preliminaries are nearly finished, and that it is certain the works are to be built. At the present time the contractor has a commission in Europe studying plans of plants of a similar nature, with a view of ascertaining the most practical method of constructing the Niagara plant. Up to date plans for any portion of the plant, excepting the tunnel, have not been adopted. Consequently the manner of connecting the tunnel with the upper river is not known. There will, however, be a canal either with or without a series of transverse surface conduits, which will conduct the water to penstocks and thence upon turbine wheels. The tunnel, which is to be merely a tail race, will receive the water from the turbines conducting it below the falls. The details upon which this tunnel is to be constructed are at hand. It is to start at a point below the falls under the suspension bridge, extending through the rock to the upper river to a point 6,700 feet from its mouth, where a head of 120 feet will be obtained. It will be 28½ feet high, 18 feet wide, with a semicircular top of 9 feet radius, and straight sides. The fall will be 36 feet to the mile.

The company owns 225 acres of land along the river suitable for mill sites, 75 acres under water adjacent to said land, and 1,100 acres lying back from the river about midway between La Salle and Niagara Falls. It has been estimated that the flow of water over the falls amounts to 12,785,455 cubic feet a minute. To develop 119,000 horse power with a 120 foot fall would require but one-fifth of one per cent of this volume. From these figures it will be seen that the power is almost inexhaustible. If this plant, soon to be constructed, proves to be a success—and there is no reason to believe that it will not—the power now running to waste, reaching a figure almost beyond the comprehension of the mind, can be utilized by additional plants of a similar nature. —*Eng. and Min. Jour.*

The Coloring of Metals.

In a recent issue of the *Zeitschrift des Vereines Deutscher Ingenieure*, Herr S. Stein gives the results of some experiments relating to the coloring of metals when annealing, which he shows is due to oxidation of their surfaces. In these experiments pieces of iron and steel were carefully cleaned with alcohol and ether, and put into a glass tube; the air was exhausted and replaced with pure nitrogen, which also was pumped out in order to secure a thorough removal of the oxygen. The tube was then gradually heated, and as the hydrogen and nitrogen generated from the metals they were pumped out. The inner surface of the tube, on its cooler parts, became covered with a white precipitate of a still unknown nature. The whole scale of the temperatures appropriate for the appearance of the annealing colors was tried, but these failed to appear, whereas they were called forth immediately on the admission into the tube of air with oxygen. Herren R. Schwirkus and F. v. Lichtenstein have demonstrated in an experimental way that an increasing hardness of the steel necessitates an increasing heating to produce the same annealing color, and that the composition of the steel affects the conditions for the appearance of the different colors in a still higher degree than the hardness. The combinations of temperatures and colors in the ordinary methods are thus entitled to only conditional correctness at best. Another series of experiments relating to the influence on the colors of the duration of the heating manifested that they can appear at even very low temperatures if they are only kept up long enough, and that the difference between hard and soft steel asserts itself here too. A soft piece exposed during several days to the heat of 177 deg. C. showed purple after 68 hours, violet after 93, and dark blue after 120, whereas a glass-hard piece turned light yellow after 20½ hours, dark yellow after 27, orange after 50, and purple after 103. At higher temperatures the colors appeared with shorter intervals.

The Longevity of Trees.

It is generally admitted that European trees have rarely exceeded the very respectable age of 800 years. Thus, recent information gathered by the German Forestry Commission assigns to the pine 500 and 700 years as a maximum, 425 years to the silver fir, 275 years to the larch, 245 years to the red beech, 210 years to the aspen, 200 years to the birch, 170 years to the ash, 145 years to the alder, and 130 years to the elm. The heart of the oaks begins to rot at about the age of 300 years. The holly oak alone escapes this law, and there is a specimen of this aged 410 years in existence near Afschafenburg in Germany.

At the Edinburgh Forestry Exhibition, four years ago, there were exhibited two transverse sections of a couple of Scotch firs. One of these, which was 7¼ feet in diameter, was 217 years of age; the other, which was but 5¾ feet in diameter, was older, and exhibited 270 annual rings. A *Sequoia gigantea* felled in Calaveras County, California, measured 387 feet in height, 3.25 feet in diameter at the base, 15 feet at 125 feet above the earth, and had attained the age of 3,000 years. At Caphyoe (Arcadia) may be seen a plane tree which for a long time was regarded as the one that the historian Pausanias spoke of in the second century.

There is a cypress in the vicinity of Padua which is regarded as having been a contemporary of Julius Cæsar, and according to another and more plausible legend, it was against the trunk of this tree that Francis I., seeing "all lost save honor," endeavored to break his sword. The oak of Swilcar Lawn in the forest of Needwood was still robust in 1822 at the age of 600 years, and, at the same epoch, there might have been seen at Chupstead Place, County of Kent, a large elm, around which a fair was annually held during the reign of Henry V., in the fifteenth century.

The age of the Braburn yew, in this same county of Kent, was estimated by De Candolle to be 3,000 years, and he attributed the same age to another yew, that of Fortingal, in Scotland. The English historian Evelyn, in the seventeenth century, cited a linden of the environs of Neustadt (Wurtemberg) then aged more than 1,000 years.

At Hildesheim, in Hanover, there is a celebrated rose bush, the oldest in the world. Charlemagne himself planted it more than a thousand years ago in commemoration of the embassy received from the caliph of the Thousand and One Nights, Haroun al Raschid. In 818 Louis le Debonnaire, son of Charlemagne, had a chapel constructed, the altar of which was placed over the roots of the rose bush. The stem of this dean of rose bushes is about 2¼ inches in diameter and 28 feet in height. The branches trained up against the apsis of the chapel cover a surface of 118 square feet. The plant annually bears a large number of flowers.

In addition to the celebrated linden of Morat in Switzerland, several specimens of this tree are cited as having reached a more advanced age. One may be seen not far from the church of Cadier in Keer, in the province of Limburg, whose trunk measures about 20 feet in circumference. It is said to have been planted by the Roman soldiers who were besieging the neighboring city of Attnatica, now Horstens. A violent storm broke off a portion of its branches in 1868, and the debris amounted to six wagon loads. Some years later its top suffered greatly from a fire that consumed the houses in the vicinity; but, despite these two accidents, the tree is still vigorous, and it shades a vast surface. There is to be seen also at Schwarzenberg, in Saxony, a linden whose trunk is 25 feet in circumference, and two others at Schneeberg, one 16 and the other 14 feet in circumference.

The oldest known conifer of Germany, a fir, has recently been felled at Grunnthal, Saxony. It measured 7 feet in diameter at 5 feet above the ground. The ancient acts and charters often mention trees selected as boundaries of property. Thus, a chestnut tree of Tortworth, England, whose trunk is formed by the adhesion of two trees, figures upon a charter dated 1135. An oak still living at Tilford, near Farnham, is mentioned in a charter of Henry of Blois under the date of 1250. A hawthorn in the vicinity of Norfolk, long known as the Hethel thorn, is the old thorn spoken of in an act of 1200.

An American journal, the *Weekly Press*, of Philadelphia, recently gave some statistics as to the largest trees in the United States. Excluding the sequoias, it cites: An oak in Marion County, Florida, whose trunk measures 31 feet in circumference, with a spread of branches 138 feet in diameter; a sugar maple in Bradford County, Pennsylvania, 16 feet in circumference, with a branching of 85 feet in diameter; a chestnut tree in Lancaster County, Pennsylvania, 25 feet in diameter, and with a spread of branches 88 feet in diameter; a sassafras 46 feet in height and 13 feet in circumference at Johnsville, Pennsylvania; a sycamore 28 feet in diameter in Wabash County, Illinois; and an apple tree 112 years of age, still bearing fruit, at Boothby, Maine. The dean of trees of the Eastern United States, the Woodbridge oak, was felled a few years ago in the vicinity of Boston. Prof. Abbott, of New York, estimated its age as 2,000 years, and Prof. Eaton as from 1,500 to 2,000. During the war of independence, Lafayette's army, marching through Woodbridge, rested beneath the shade of this venerable tree, the remains of which were used by the members of the Quinnipiac Club, of New Haven, to make seats of.—*Revue des Sciences Naturelles Appliquées.*

The Memory for Names.

At a recent session of the Biological Society, Mr. M. Duval presented a communication with the following title: "Some Facts Relative to a Peculiarity of the Memory: the Inhibition Exerted by Certain Visual Images upon Other Visual Images." These facts are connected with the memory for names, and will interest many of our readers.

"I have," says the author, "great difficulty in recollecting proper names, the names of persons. But I have gradually found that this poor memory for proper names is not the same for all names, and that it is submitted to a law whose absolute signification I recognized as soon as my attention was directed toward determining it.

"My memory is never at fault for the names of persons whose countenance I have never seen. However difficult or complicated, for example, be the names of foreign anatomists, German or others, I retain them and easily recall them whenever necessary, provided I have never had an opportunity of seeing those who bear the names. On the contrary, I am always at a loss to recall the names of persons with whom I am most familiar, whose names I hear pronounced or daily have to pronounce. In these cases, when I wish to recall such a name, it is the image of the face, the image of the person even, that presents itself to my memory, and with such an intensity that this image seems to obscure that of the name. So, too, when I suddenly see a face, that of a well known person, the very fact of looking at it prevents me from recalling the name.

"I have been led to this interpretation by the following fact: A few years ago, I would never have failed to recall the name of Kolliker at the moment desired. I knew the eminent anatomist only by his works. Of his individuality I had no other visual image than that of his printed name. Having had the honor of making his acquaintance, my memory became enriched with the visual image of his person, of his countenance. Suddenly, after this, the singular fact occurred that when I had to recall his name, it was the image, the recollection of his countenance, that presented itself exclusively, and the image of his name did not reappear. Put on the alert by this first observation, I have repeated it a great number of times in various analogous cases, and have acquired the conviction that there is a true inhibition exerted by the reviviscence of the image of the face upon the representation of the image of the name.

"Some years ago, being called upon to preside at the meetings of the Biological Society, I was sorely surprised, when a colleague asked to be heard, that I could not designate him by name. The sight of his face—of his person—at this moment effaced the image of his name by the very intensity of the impression. More recently, in presiding over the Anthropological Society, I have remarked the same thing and completely analyzed the phenomenon.

"In order to point out precisely the import of it, I must add that I have always had an excellent visual memory for things, places, and countenances, recognizing after a long interval a person who had been seen but a few instants, and finding my way again in places that I had taken but a glimpse of in passing. Now, from the moment that a figured object had engraved its image upon my memory, the reviviscence of such image rendered that of the name difficult. Now with age it seems to me that my recollection of forms, places, and faces is becoming a little less vivid; parallelly, my memory for names seems to be becoming better. This is because the first images, becoming less impressive, no longer exert so energetic an inhibition upon the second. I have never hesitated to recall an abstract word. This is because there is here no image of the thing coming to substitute itself for that of the name."

The phenomena mentioned by Mr. Duval are perhaps quite frequent. It is easy for any one to verify them upon himself. Such a study may give rise to curious observations.—*La Nature.*

Exploration of Alaska.

A bill introduced in the House of Representatives provides that the Secretary of War be authorized to send an expedition to the interior of Alaska for the purpose of making a thorough exploration and survey of that Territory, with a view of ascertaining its resources and capabilities. It is proposed that the party sent out should locate near the center of the Territory, and from that point as a base push expeditions into all parts of the interior. The party is to remain not less than three years. In this way a thorough knowledge of the topography and other features of the country may be gained. An appropriation of $100,000 is asked.