proposed to revictual Paris, which was strictly blockaded by the German forces. A large number of cattle had been collected, waiting for an opportunity to cross the German lines. But a difficulty was to silence these animals, as their cries would attract the attention of the enemy. Claude Bernard proposed to practice upon them the section of the nerve which enables them to emit their usual cries. The operation is so easy that it could be executed in a few seconds by an ordinary butcher. None of the animals appeared to suffer in any way by the mutilation which made them mute. Unfortunately, however, the military movement proved a failure, and for other causes the revictualing could not take place.

It would be greatly to the relief of the public if this same method could be applied to cats, which make night hideous with their caterwaulings.

SOME RECENT AMERICAN PATENTS.

An improved cranberry picker, invented by L. & Z. Hall and W. Crowell, of Dennis, Mass., is shown in Fig. 1. It consists of a hinged back, provided with closingsprings and handles for operating it, and having on the side opposite the handles a series of inclined wire fingers for pulling the berries from the vines. The picker is operated by opening the jaws and inserting them under and over the vines, and drawing the implement from the vines, which escape, while the berries are retained by the fingers.

A new grafting implement is shown in perspective in Fig. 2; in detail in Fig. 3; and Figs. 4, 5, and 6, show three different forms of grafting that may be done with the implement. To one of the jaws are fitted angular knives, as shown in Fig. 3. The opposite jaw is simply a flat bearing surface which supports the stock or scion while it is cut. This tool is the invention of Mr. William H. Gray, of Lama City, Iowa.

The novel picket pin, shown in Fig. 7, is the invention of Mr. P. J. Tweed, of Blair, Neb. It has a spiral corkscrew-like shank and a hollow head, containing a washer for receiving the end of the tedder rope. With a pin of this kind the tedder rope cannot become twisted nor will it wind around the pin.

An improved induction apparatus, for lighting by electricity, invented by the late J. B. Fuller, of Brooklyn, N. Y., is shown in perspective in Fig. 8, and in section in Fig. 17. The inventor's aim in the construction of this apparatus is to operate along the main electric circuit a large number of small lights, each being placed in a local circuit, whose currents are induced by the currents of the main circuit. Two magnet cores are arranged parallel with each other, and connected magnetically at the ends, as shown in Fig. 17. Around the center of each of these cores is a soft iron head, and at a short distance fromeachside of this is a head of insulating material. The outer ends of the cores are coiled with insulated copper wire, and so connected together and to the electric generator as to produce, when in action, two consequent opposite magnetic poles,at N and S. A, B, C, D, and E, represent the connections of these coils. Between the iron heads and these coils are wound smaller coils of insulated wire, the fineness of which depends upon the tension of the current required.

There is an iron arm hinged to one of the iron heads, so as to swing over upon the seat connecting magnetically the poles, N and S, as shown in Fig. 8. Now, if electric currents be sent through the main circuit, flowing around the large coils, and rapidly changing, in alternately opposite directions, the magnet cores will as rapidly change polarity, and these changes will induce in the small coils electric currents of greater or less tension, according to the fineness of the wire composing the small coils.

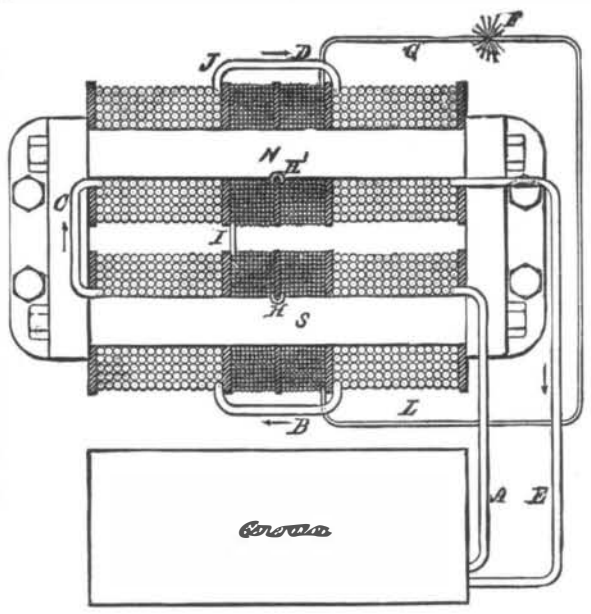


Fig. 17.—PLAN OF THE FULLER ELECTRIC LIGHT.

In the circuit of each of the small coils may be placed a lamp, F, of minimum illuminating capacity. Two small coils may be connected together, parallel or in series, for producing a light of medium capacity; or four small coils may be connected, for producing one light of maximum capacity, as shown in Fig. 17.

These connections for producing any changes in the circuits are made by means of ordinary switches, plugs, or keys. The arm which extends across the face of the coil in Fig. 8, acts as a governor of the light, by strengthening or weakening the magnetic poles, and thereby varying the strength of the current.

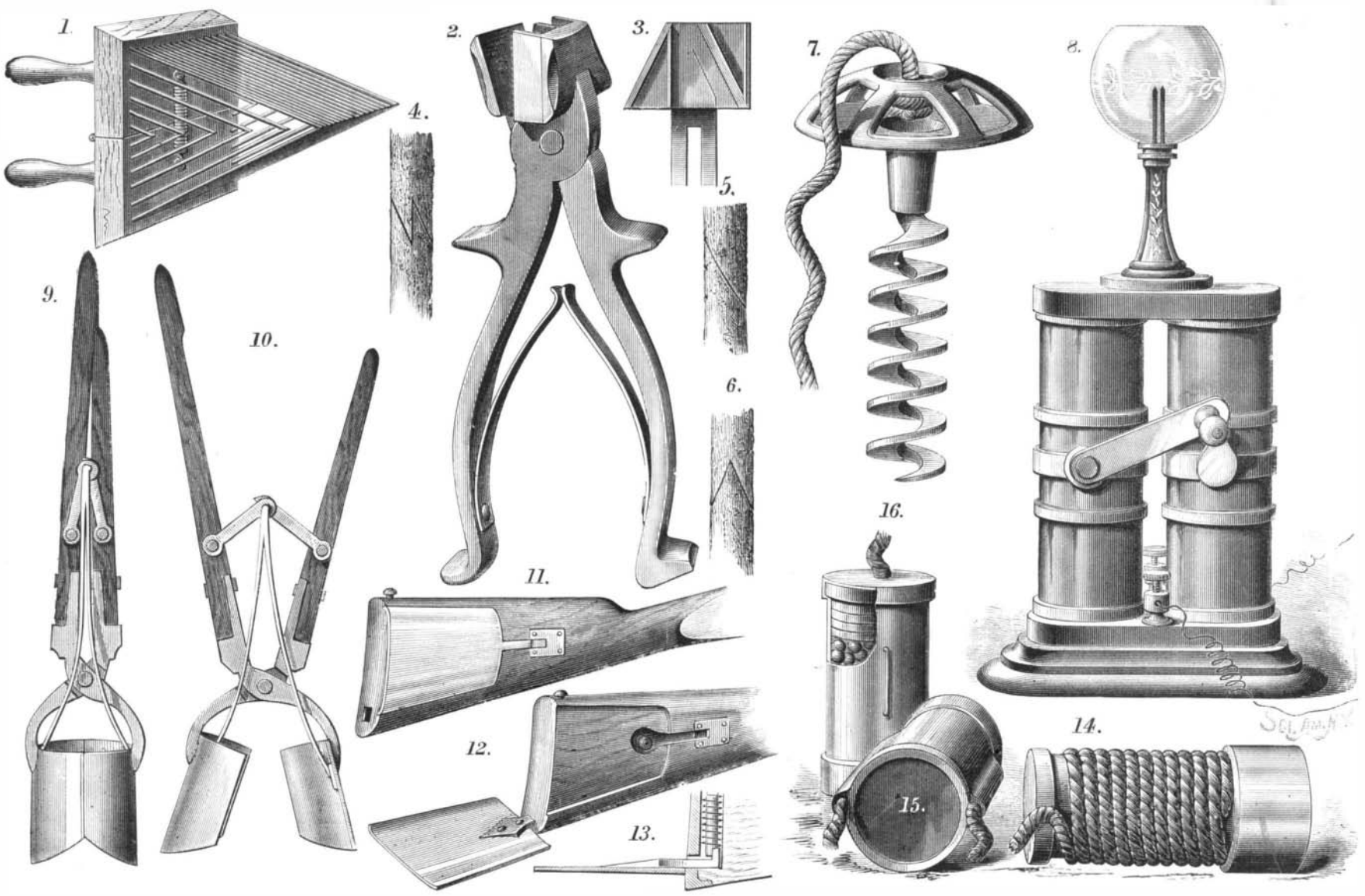
Any number of such apparatus which the electro-motive force of the generator will supply may be arranged along the line of a conductor, the large coils being included in the circuit, and, by means of a switch in the local circuits, each or any lamp may be lighted or extinguished independently from the others.

An improved post hole digger, patented by Mr. W. H. Ryan, of Moline, Ill., is represented in Figs. 9 and 10. The invention consists chiefly in a cleaning device which descends when the handles of the implement are opened. The transplanter is forced into the soil in the usual way, and when withdrawn it brings up a clod of earth between the shovels. When the handles are spread to drop the clod the toggle which connects the handles is wholly or partly straightened out, thrusting the scrapers down inside of the shovels, expelling the clod and scraping from them any adherent clay or earth.

It is very well known that by throwing up an earthwork of a very few inches in height, and especially by excavating in the earth ditches of just sufficient depth to allow the men to lie on their faces or backs, and not be above the level of the ground in which the ditches are dug, troops may remain a long time exposed to the enemy's fire without serious loss, as the shot will be thrown over them, or striking the earth in front, ricochet over them. These earthworks may be thrown up or the ditches dug in a very few minutes—in less time than will be required by the enemy to get the range of the troops—if each man has his musket or rifle provided with a spade or intrenching tool. Figs. 11, 12, and 13 illustrate a novel tool of this description, invented by Mr. James L. Buskett, of St. Louis, Mo. The spade when not in use fits a recess in the side of the gun stock, as shown in Fig. 11, but when it is required it may be quickly placed in the position shown in Figs. 12 and 13.

Figs. 14, 15, and 16 represent an improved shot cartridge for sporting purposes, invented by Mr. H. H Schleber, of Rochester, N. Y. In this cartridge the shot are confined within a separable case, which is provided, either outside or inside, with a time fuse, which operates, when ignited and consumed, to release the case, and to allow the shot to spread at a distance from the gun. The case is held together during the earlier part of the flight of the cartridge by the fuse itself, which, in this construction, is wound spirally about the case, or by a wrapper or other suitable fastening of combustible material, which is burned in two by the fuse, the combustion of the fuse in either case operating to destroy the fastenings which hold the case together, and to allow it to fall away from the shot. The rear end of the fuse cartridge is filled with wadding, to lighten it to prevent it from turning sidewise during its flight through the air. The engraving shows three forms of this cartridge.

AT a meeting of the Royal Society, Edinburgh, Professor Tait gave some account of experiments he is conducting with the view of determining the connection between the rate of speed and the electro-motive force of a Gramme magneto-electric machine. He is not yet through with this investigation, but thus far the results have appeared to him to show that the electro-motive force varies approximately in the duplicate ratio of the rate of turning.



A FEW RECENTLY PATENTED NOVELTIES.

The Leadville Mining District.

The first house was built in Leadville, Colorado, in 1877; now it is said to have a population of 10,000. It is needless to add that it is an extremely lively town.

In 1864, Mr. Wm. H. Stevens, the founder of Leadville, went to Colorado from Lake Superior. He was a practical miner, and pursued his calling in Park and Gilpin counties until 1871, when he discovered the mines on Mount Bross and Mount Lincoln. In 1873 he prospected the tract about California Gulch, now so famous for silver; but he was looking for gold, and did not at first dream of the value of the carbonate ore that was so abundant about him. Ultimately he discovered its nature, and while ostensibly carrying on unprofitable placer mining operations, much to the derision of his neighbors, he discovered and defined the remarkable outcrop of silver-bearing ore that takes in the Adelaide, Camp Bird, Iron, Bull's Eye, Limestone, and Rock mines. The first placer claim was located by Mr. Stevens in 1874.

The limitation act of Congress took effect June, 1875, and soon after Mr. Stevens began to survey for patents. Then he told his neighbors that he was after silver, not gold; and the wonderful development of the Leadville district began. In the fall of 1876, Walls and Powell discovered the Adelaide, and shortly after the Gallaghers discovered Camp Bird. In the summer of 1877 Mr. Stevens began to work the Iron mine, which had been located by H. B. Woods in 1876, and conveyed to Stevens and Leiter.

The Fryer Hill deposits were discovered in the spring of 1878, suggested by Cooper's discovery in 1877 of the Carbonate mine on an outcrop lower than the line of the Iron mine outcrops. In that spring Stevens and Fryer made surveys for the prolongation, decided on a point to sink, and there, in the present plat of the New Discovery mine, the first ore was struck in Fryer Hill. Then Rische, Hook, and Tabor opened the Little Pittsburg, and the excitement that supervened carried a host armed with pick and shovel over to the attack of that mammoth deposit.

The situation and geology of this new mining district have been described by Francis L. Vinton, in the *Engineering and Mining Journal*, as follows:

"Nearly in the center of the State of Colorado, the crest line of the Rocky Mountains breaks abruptly to the direct east for twenty miles, departing from and then resuming a general course that closely approaches north. At this point are the headwaters of the Arkansas River, that flows thence southerly seventy miles in a beautifully timbered valley, between the main range on the west and the Park range on the east, a lateral elevation fifteen miles from the axis, beginning at the break and prolonging itself south into the Greenhorn and Wet Mountain ranges, a hundred miles below.

"About twenty miles from the head of this Arkansas valley is Leadville, situated near the river and within the general *débouchure* of several gulches—the Evans, Stray Horse, California, Iowa, and Empire, that have been cut in the western flank of the Park range by their torrents, exposing a uniform geological section throughout, and a series of faults and slips or throws, whose effect has been to arrange lines of similar outcrops, one above the other, like terraces.

"The upper sedimentary rock is limestone. This is underlain by quartzite and schists to gneiss, and covered above by a thick, solid formation of trachytic porphyry. In the vicinity of Leadville there is found often between the lime and porphyry a metallic deposit sometimes as regular as a true lode, consisting of iron oxides carrying a sort of pay vein of silver ore and some gold. This silver ore is characteristically argentiferous galena; but the lead is to a great extent modified into carbonate, and this, when disintegrated to sand, mingled with equally loose iron ore, has given origin to many peculiar belts so easy to mine, and of ore so adapted to smelting, that though their grade may be nothing extraordinary for first-class mineral, yet their economic value is remarkable. Moreover, in certain localities, a confused but immense volume, washed from the outcrops of this deposit, has accumulated in inchoate bodies, whose vertical dimension is anything from ten to fifty feet, whose title in silver is pretty regular, and whose almost only cost to work is for timbering.

"The porphyry that overlies Fryer Hill seems, by common admission of experts and miners, to differ structurally from that on the Iron Hill. It resembles a drift of porphyry bowlders, pebbles, and breccia, lightly cemented, and is described by the miners as gravel. The porphyry on the Iron Hill is massive, hard, compact, and homogeneous, a continuous formation back to the summit of the range, and containing well defined fissures of magnitude, bearing ore like true lodes; for example, the Printer Boy, a well known gold mine, a gash vein, and numerous silver mines, such as the Tiger, Nelly, and Last Chance, in the first of which, considerably exposed by shaft and drift, are two continuous veins of argentiferous galena from four to eight inches wide, in a crevice carrying iron oxide and pyrites for vein filling and gangue. The ore runs from thirty to eighty ounces of silver, and thirty to eighty per cent of lead; these fissures carry no carbonates, though, from late discoveries on the same horizon beyond Little Evans Gulch to the N. E., it may be supposed that they lead through porphyry to lime, and may merge into deposits identical with those below. The limestone that underlies the porphyry seems to pervade the entire country; it is believed to be the same as that at the Moose mine, and on the east of the Park range in Buckskin, and as developed also in the main range and across to the Gunnison, as well as south to Silver Cliff and Saguache. Silurian fossils are found in it; the color is drab, and the quality often silicious. In contact with the iron veins it becomes deeply impregnated with rust; these veins are brown and red hematites, sometimes carrying magnetite and manganese oxide enveloping the lodes of argentiferous galena, carbonate of lead, chlorides of silver, and the native metal. Generally the carbonates and chlorides affect association with iron oxide; where that is deficient, the ore is galena.

"The Iron mine of Stevens & Leiter is a belt or zone or vein of hematite, about the color of brick to burned brick, from four to eight feet thick, lying on a downward dip to the east of 15°, between porphyry and lime, both well defined, but the whitish porphyry especially showing a line of contact unbrokenly continuous and everywhere sharply marked, not stained, with impregnations from the vein. The walls are undulating but not parallel, more resembling the expansions and contractions of vein walls, nor is there any appearance of stratification in the deposit, or of concordant regularity in the pay vein. At places the vein is disintegrated to sand, but it is mostly to be worked with powder. The carbonate of lead is sometimes found as cerusite, purely white and in clusters of long crystals; again, it is massive and pinkish, with a certain metallic aspect; or, again, compact and blue drab, not unlike limestone. It sometimes penetrates, sometimes surrounds, bunches of galena, which ore is often found in large pockets, and not to be distinguished from the similar ore of Clear Creek and Bowlder counties. The slide on the Iron mine is fifteen feet thick, but the outcrop of the vein at the surface of the rock in place is mathematically plane. This outcrop continues on the plats already mentioned; but above and below it are two other lines of distinct exposure, but underlain by the same series of rock, so that no observer can but imagine they all were once united."

The extremely slight dip of the Leadville veins has led to no little litigation, with decidedly conflicting decisions. In the case of Stevens & Leiter against Williams, the court decided that the deposits of Leadville came under the same law as fissure veins, the oldest claim holding the vein through all its dips and spurs and angles wherever it may go, so long as it does not go beyond the produced end lines of the claim. A later decision, in the case of the New Discovery lode against the Little Chief, denies that these deposits are veins or lodes, and lays down the rule that the miner cannot follow them beyond the limits of his surface location. If the first decision is sustained the vast wealth of the Leadville deposits will fall to a lucky few; if the latter, a multitude of men will share the spoil.

The Domestication of the Buffalo.

Col. Ezra Miller, of Mahwah, N. J., has been making some experiments which have led him to the conclusion that it will pay to breed buffaloes, both pure blood and crossed with our domestic cattle. Relating his experience with these animals lately, the Colonel said: "I have proved to my own satisfaction several points. First, that buffaloes can be tamed. Second, that it doesn't cost one half as much to keep a buffalo as to keep an ordinary cow. Third, they can be fattened as quickly as ordinary beeves, and on half the food, and their meat is just as good. Fourth, they are as good milkers as our Alderneys; and fifth, they are as good butter makers. The milk of the buffalo is a little yellower then that of the Alderney, but very sweet and rich, and there is more cream than in the Alderney milk. As to the quantity of milk given by buffalo cows, they will average with the average milker. The udder of the buffalo cow is very small indeed, but the milk veins are immense. This is a provision whereby nature enables them to run faster than if cumbered by a large udder. I am of the opinion that the most desirable cross is with the big Dutch cattle that have such big udders. I think that crossing them with our short-horns will give remarkably good beef. But the beef from our buffaloes more than met my expectations. It was sweet and juicy and tender, not at all like the meat of the buffalo of the plains.

"Now, in drawing the balance between the buffalo and the ordinary cow, I find these facts: The buffalo can be kept at one half the cost of the cow: that's one point for the buffalo. We will assume, to give the cow a fair show, that she yields more milk and butter. That balances the account so far. The buffalo is fully equal to our stock in the quality of meat. So they are still on even terms; but its hide is worth four times as much, so it comes out far ahead in the last heat, as horsemen say. The hide from my bull was a beautiful specimen. It was better than a $25 robe I bought to compare with it. The fur was longer and finer, the result of good feed, I think."

The buffaloes herded with the other cattle on the best of terms. What surprised the Colonel most was their weakness. He supposed they were very powerful; but they are not. He has seen a yearling Alderney bull push a three year old buffalo bull uphill. They are fast, but they are not strong. They are also very cowardly, very playful, and very cunning.

AN eminent French coachmaker says: "I never build two carriages exactly alike, not because I do not build each one as well as I know how, but in building that I learn how to make the next one better. When I placed these carriages of mine in the Exhibition building, I thought them perfect, but now that I have spent three months looking over the carriages of other builders, I see that they are not so." Here is an illustration of the value of these shows to intelligent tradesmen.

WESTERN IOWA COAL FIELDS.

The Western Iowa coal basin lies at the foot of the "Middle Terrace" of the State Geological Survey. The newly opened fields are situated on the North Raccoon River, Green county, and are traversed east and west by the Iowa division of the Chicago and Northwestern Railroad, and north and south by the Des Moines and Fort Dodge Railroad. Mr. E. J. Couch, of Grand Junction, asserts that in these beds an abundance of fine bituminous coal is found at a depth of from 80 to 100 feet. Two strata, the upper and the lower, are each from 3½ to 4 feet in thickness, with other lesser strata.

The abundance of assured fuel, at cheap rates, is inviting the attention of seekers for new homes and those who desire to open new industries in a rapidly growing and prosperously rising new country. Coal of the best grades is sold at the banks at $2 and $2.50 a ton, while engine coal, slack, is sold at so low a rate that an ordinary manufacturing engine can be run at 25 cents a day. The lands are as yet mostly broken prairie; probably not one fourth is taken up in farms, and is held at from $5 to $10 an acre. The prairie is of as rich and fertile a quality as can be found in the West, and the elevation above the sea being 1,500 feet, gives the locality a salubrity of climate unsurpassed. Large numbers of cattle graze the free range, which, with hay costing only the labor of putting up, gives this locality advantages for stock purposes. Grand Junction promises to become an important manufacturing center. It has permanent water for steam, and the coal basin comes to the very limits of the town.

A New Ohio Coal Field.

Mr. Andrew Roy reports, in the *Coal Trade Journal*, the development of a new coal field in Ohio. The coal is known as the Hill or Wellston coal. The coal is remarkably pure and easy of access, and promises to play an important part in the history of coal mining in Ohio. Like some other rare coals, notably the block coals of the Shenango Valley of Pennsylvania, and the Mahanoy Valley of Ohio, the Wellston coal appears to be of limited area. So far as the search for it by boring and opening has gone, 75,000,000 to 100,000,000 tons have been developed. It does not, however, appear to be all equally good, some mines showing a larger percentage of ash than others; on its western limit also it falls below two feet six inches of height; eastward it rises to four feet six inches. Two narrow gauge railroads, the Springfield, Jackson, and Pomeroy, and the Dayton and Southeastern, will, when completed, run through the heart of this new coal field.

The Advantages of Silence.

Ishael P. Inman, who died in Utica recently, had uttered scarcely a word for more than half a century. He was not dumb; he could talk well enough; but he became convinced at an early stage of his life that more harm than good was wrought by speech, and remained true to his principles ever after. When his first child was born he rode seven miles in quest of a physician. He carried slate and pencil, wrote a statement of the situation, returned with the medicine man, and received the announcement of his paternal responsibilities in silence. His wife, who survives him, says no woman ever had a kinder husband. The relations between the couple were always pleasant, and Mrs. Inman has remarked to her neighbors: "If Ishael talked as much as I do, the Lord knows what might happen." Some of his written replies to the questions of acquaintances who were curious to know why he preferred silence to speech are worthy of mention. One retort was: "A good listener is to be preferred to a poor talker." Another was: "I want to prove that a man can be happy and hold his tongue." Another: "I am trying to think of something good enough to say out loud." A clergyman once asked Inman whether he didn't think the Lord gave him his tongue to be used. The penciled reply was: "The Lord gave me a mind that tells me when to use my tongue."

In 1842, while he was traveling with his wife in a stage between Syracuse and Rochester, the vehicle was halted in front of a country tavern. A child was sleeping on the porch. Inman, looking out, saw a large black snake crawl to the side of the infant. Grasping his wife's arm, he shouted, "See!" and, pointing to the snake, sprang from the stage, pursued the reptile some distance, and finally killed it. He left a snug fortune, which his son inherits. His last written massage was: "Silence is golden." His oft-penciled admonition to his son was: "Keep your mouth shut."—*Syracuse Standard.*

Chloride of Lime as an Insecticide.

Le Cultivateur remarks that rats, mice, and insects will at once desert ground on which a little chloride of lime has been sprinkled. Plants may be protected from insect plagues by brushing their stems with a solution of it. It has often been noticed that a patch of land which has been treated in this way remains religiously respected by grubs, while the unprotected beds round about are literally devastated. Fruit trees may be guarded from the attacks of grubs by attaching to their trunks pieces of tow smeared with a mixture of chloride of lime and hog's lard, and ants and grubs already in possession will rapidly vacate their position.

WHENEVER a new and startling fact is brought to light in science, people first say "It is not true," then that "it is contrary to religion," and, lastly, that "everybody knew it before."—*Agassiz.*