was found to beat for thirty-six hours after the death of the body by decapitation. There is therefore a possibility of long persistence of life in those organs. And the great cause why we see those organs stop at death so quickly is that the phenomena of arrest of their activity have taken place at the time of death.

MOTION WITHOUT NERVE FORCE.

A very singular fact is that movements, voluntary in appearance, can exist without nerve force, and Dr. Séquard related the following remarkable case:

"I was called," he says, "to see a patient who was indeed no more a patient; he had died before I reached him. I was told that he was making certain movements, and his family and friends all thought him alive. I examined him and found that he was certainly dead without any chance of returning to life, at least according to our very limited knowledge. I found that he was performing slowly movements that he had been performing with great vigor before I came. He would lift up his two arms at full length above his face, knit the fingers together as in the attitude of prayer, then drop the arms again and separate them. The movements were repeated a good many times with less and less force, until at last they ceased. There was no trace of sensibility anywhere, no reaction to the operation of galvanism or burning anywhere, as I had to make use of these means to satisfy the family. A needle was pushed into the heart as there was no danger from this experiment, a certain physiologist having, for the mere sake of showing what the Japanese had done that way, introduced one many times into his heart. The needle introduced showed that the heart of my cholera patient did not beat."

Dr. Dowler of New Orleans has amputated limbs from cholera patients after death, and has found that the members amputated continued to move after having been separated from the nervous centers; so that, if there were nerve force acting, then it was nerve force existing in trunks or nerves and not the nerve force that comes from the will.

The lecturer then proceeded to give several curious instances of movements apparently voluntary but really without the control of the person. One case was of a young lady in Paris who every Sunday at ten o'clock ascended a bed, and, putting her back on the top of the edge or border of the bed, took an attitude of prayer and began to address prayers to the Virgin Mary. She continued in that attitude, fixed like a statue, except that her chest continued to move and her heart to beat; her lips were giving utterance to sounds All the other parts of the body were absolutely motionless. This was a feat that you could not perform on level ground. Standing rigidly on tiptoe, even without shoes, is an utter impossibility, beyond a short time. Sometimes a movement forward is made, sometimes backward, and often rotary motions take place. Two cases of the last mentioned class happened in persons who exhibited their strange contortions standing on their heads. A girl who had received a severe blow on the head had a rotary movement on that account. She knew well what was the matter with her, and had come to be able to prevent any bad effect of it. If she wanted to go in a contrary direction, she turned herself in a direction almost at right angles to it, and the irregularity of her movement brought her to the right place.

Passing to another branch of his subject, Dr. Séquard proceeded to show that the

CENTRAL NERVOUS SYSTEM

has power to act on all regions of the body through the medium of the vaso-motor system, which is capable of diminishing the size of blood vessels and thus regulating circulation; also, that a suspension of the activity of the vaso motor nerves produces a passive dilatation of the blood vessels with increased afflux of blood. Increased circulation in any part of the body may be due to chemical processes, going on in the tissues, which attract the blood into the vessels supplying the tissues in question. Professor Draper of New York has shown that these chemical changes do cause an increase in the rapidity and amount of circulation. And such chemical force the lecturer believes to arise from a direct transmutation of nervous force. The circulation depends more on the general tissues of the body, and much less on the heart, than is commonly supposed. Indeed it may be said that the heart is formed by the circulation instead of *vice versa*. The curious rapidity with which an engrafted organ will not only grow to its stock, but will show evidence of partaking in its circulation, should be remembered in estimating the causes of the latter. The lecturer told an anecdote of his engrafting a cat's tail on a cock's comb.

Another influence belongs to the nervous system, which is that it regulates the nutrition, secretion, and other functions. It is not essential to nutrition, though it is of great use.

THE POWER OF THE MIND OVER THE BODY

through the nerve force is infinitely greater than most of us can imagine, in extent and variety. Mesmerism, animal magnetism, the Od force, Perkins's tractors,—all these have some ground in Nature, that ground being simply the immense power of the imagination on the body. John Hunter made some curious experiments in willing pain into a part; he failed, however, to will the attacks of his gout into his great toe, though he tried to do it. Swedenborg, though subject to illusions and hallucinations, had an equally clear view of the way in which the brain can convey various kinds of sensation, etc, into any part of the body. Bennett of Edinburgh tells of a man whose sleeve was caught in a hook; the man, thinking his arm was pierced, suffered excruciating pain until he was extricated. As for mesmerism, the senses are exquisitely exalted; but the feat of reading a watch placed out of sight may be (perhaps) explained by the obscure faculty we possess of estimating the lapse of time, even in sleep. The *convulsionnaires* of St. Médard suffered themselves to be trampled under foot in the most shocking way without feeling pain; this is one instance of the suppression of feeling by mental influence, of which the mesmeric anæsthesia is another example.

The secretions are arrested or made active by nerve influence. Nursing mothers who give way to anger or other emotions poison their own milk, whereby the infant's health is often injured for life, if he be not killed outright. The bowels are purged by bread pill (as was once proved on a large scale by the Emperor Nicholas) provided people are told they are to be purged; eighty out of one hundred hospital patients have been vomited by a neutral remedy, when told "there had been a mistake made and they had all taken emetics." Much sea sickness would be avoided if people could be made to believe they were not going to have it. The stigmata, or marks of the nails on the Saviour's hands and feet, have been plainly seen to appear on the corresponding portions of the bodies of certain of his more devout followers, among whom St. Francis of Assisi must be specially named. Yet ought we not to lose from our sight the possibility that these occurrences, however unquestionable they be, are yet simply owing to an action of the imagination, whereof a notable instance is related upon authority of great weight: A mother saw a window sash descend with violence upon her little child's fingers, whereupon she herself was instantly seized with extreme pains in her own fingers which did afterwards swell and inflame in such a manner that she was long in being cured. The fakirs of India are sometimes able to divest themselves of the signs of life—respiration and circulation being stopped and bodily temperature lowered—for months continually. This well attested fact becomes less strange in view of the fact, once observed by the lecturer in his own laboratory, where a dog remained several months after death in a temperature from 40° to 60° without undergoing putrefaction; here is evidence of a power to arrest metamorphosis, even when the voluntary, and indeed all, the motions are at an end. The pain of toothache vanishes at sight of a dentist's chair; neuralgia once disappeared as the lecturer was about to enter on an operation for its relief; most functional, and even some organic, affections (as dropsy) may be cured by giving a patient the idea that he is to be cured! and the well attested list of modern miracles is in the same category of facts.

Nervous force is generated through the blood; it results in this case from a transmutation of chemical force. It is accumulated by rest, but too prolonged rest stops its production, and an anæmic condition, with degeneration, occurs. Too prolonged action of a part or organ does the reverse, in producing congestion and the diseases incident to congestion. The principal rule of hygiene is deducible from these principles: It is not to draw blood by exertion to one part of the nervous system alone, exclusive of the rest.

We may not despise the doctors, but must attend to certain cautions, which are summed up in one, as follows: We ought not to spend more than our means allow. We ought also to use all of our organs pretty equally. Regularity in the time of meals, sleep and exercise must be acquired; if it is not natural to us, it must be gained by habit.

IN THE LABORATORY WITH AGASSIZ.

BY A FORMER PUPIL.

It was more than fifteen years ago that I entered the laboratory of Professor Agassiz, and told him I had enrolled my name in the scientific school as a student of natural history. He asked me a few questions about my object in coming, my antecedents generally, the mode in which I afterwards proposed to use the knowledge I might acquire, and finally, whether I wished to study any special branch. To the latter I replied that, while I wished to be well grounded in all departments of zoölogy, I purposed to devote myself specially to insects.

"When do you wish to begin?" he asked.

"Now," I replied.

This seemed to please him, and with an energetic 'very well," he reached from a shelf a huge jar of specimens in yellow alcohol.

"Take this fish," said he, "and look at it; we call it a hæmulon; by and by I will ask what you have seen."

With that he left me, but in a moment returned with explicit instructions as to the care of the object entrusted to me.

"No man is fit to be a naturalist," said he, "who does not know how to take care of specimens."

I was to keep the fish before me in a tin tray, and occasionally moisten the surface with alcohol from the jar, always taking care to replace the stopper tightly. Those were not the days of ground glass stoppers and elegantly shaped exhibition jars; all the old students will recall the huge neckless glass bottles with their leaky, wax-besmeared corks, half eaten by insects and begrimed with cellar dust. Entomology was a cleaner science than ichthyology, but the example of the Professor, who had unhesitatingly plunged to the bottom of the jar to produce the fish, was infectious; and though this alcohol had "a very ancient and fishlike smell," I really dared not show any aversion within these sacred precincts, and treated the alcohol as though it were pure water. Still I was conscious of a passing feeling of disappointment, for gazing at a fish did not commend itself to an ardent entomologist. My friends at home, too, were annoyed, when they discovered that no amount of *eau de Cologne* would drown the perfume which haunted me like a shadow.

In ten minutes I had seen all that could be seen in that fish, and started in search of the Professor, who had however left the museum; and when I returned, after lingering over some of the odd animals stored in the upper apartment, my specimen was dry all over. I dashed the fluid over the fish as if to resuscitate the beast from a fainting fit, and looked with anxiety for a return of the normal sloppy appearance. This little excitement over, nothing was to be done but to return to a steadfast gaze at my mute companion. Half an hour passed,—an hour,—another hour; the fish began to look loathsome. I turned it over and around; looked it in the face,—ghastly; from behind, beneath above, sideways, at a three quarters' view, just as ghastly. I was in despair; at an early hour I concluded that lunch was necessary; so, with infinite relief, the fish was carefully replaced in the jar, and for an hour I was free.

On my return, I learned that Professor Agassiz had been at the museum, but had gone and would not return for several hours. My fellow students were too busy to be disturbed by continued conversation. Slowly I drew forth that hideous fish, and with a feeling of desperation again looked at it. I might not use a magnifying glass; instruments of all kinds were interdicted. My two hands, my two eyes, and the fish: it seemed a most limited field. I pushed my finger down its throat to feel how sharp the teeth were. I began to count the scales in the different rows, until I was convinced that that was nonsense. At last a happy thought struck me—I would draw the fish; and now with surprise I began to discover new features in the creature. Just then the Professor returned.

"That is right," said he "a pencil is one of the best of eyes. I am glad to notice, too, that you keep your specimen wet and your bottle corked."

With these encouraging words, he added:

"Well, what is it like?"

He listened attentively to my brief rehearsal of the structure of parts whose names were still unknown to me: the fringed gill arches and movable operculum; the pores of the head, fleshy lips and lidless eyes; the lateral line, the spinous fins and forked tail; the compressed and arched body. When I had finished, he waited as if expecting more, and then, with an air of disappointment:

"You have not looked very carefully; why," he continued more earnestly, "you haven't even seen one of the most conspicuous features of the animal, which is as plainly before your eyes as the fish itself; look again, look again!" and he left me to my misery.

I was piqued; I was mortified. Still more of that wretched fish! But now I set myself to my task with a will, and discovered one new thing after another, until I saw how just the Professor's criticism had been. The afternoon passed quickly; and when towards its close, the professor inquired:

"Do you see it yet?"

"No," I replied, "I am certain I do not, but I see how little I saw before."

"That is next best," said he, earnestly, "but I won't hear you now; put away your fish and go home; perhaps you will be ready with a better answer in the morning. I will examine you before you look at the fish."

This was disconcerting; not only must I think of my fish all night, studying, without the object before me, what this unknown but most visible feature might be: but also, without reviewing my new discoveries, I must give an exact account of them the next day. I had a bad memory; so I walked home by Charles River in a distracted state, with my two perplexities.

The cordial greeting from the Professor the next morning was reassuring; here was a man who seemed to be quite as anxious as I, that I should see for myself what he saw.

"Do you perhaps mean," I asked, "that the fish has symmetrical sides with paired organs?"

His thoroughly pleased "of course! of course!" repaid the wakeful hours of the previous night. After he had discoursed most happily and enthusiastically—as he always did—upon the importance of this point, I ventured to ask what I should do next.

"Oh, look at your fish!" he said, and left me again to my own devices. In a little more than an hour he returned and heard my new catalogue.

"That is good, that is good!" he repeated; "but that is not all; go on;" and so for three long days he placed that fish before my eyes, forbidding me to look at anything else, or to use any artificial aid. "Look, look, look," was his repeated injunction.

This was the best entomological lesson I ever had,—a lesson whose influence has extended to the details of every subsequent study; a legacy the Professor has left to me, as he has left it to many others, of inestimable value, which we could not buy, with which we cannot part.

A year afterward, some of us were amusing ourselves with chalking outlandish beasts on the museum blackboard. We drew prancing starfishes; frogs in mortal combat; hydra-headed worms, stately crawfishes, standing on their tails, bearing aloft umbrellas; and grotesque fishes with gaping mouths and staring eyes. The Professor came in shortly after, and was as amused as any at our experiments. He looked at the fishes.

"Hæmulons, every one of them," he said; "Mr. —— drew them."

True; and to this day, if I attempt a fish, I can draw nothing but hæmulons.

The fourth day, a second fish of the same group was placed beside the first, and I was bidden to point out the resemblances and differences between the two; another and another followed, until the entire family lay before me, and a whole legion of jars covered the table and surrounding shelves; the odor had become a pleasant perfume; and even now, the sight of an old, six inch, worm-eaten cork brings fragrant memories.

The whole group of hæmulons was thus brought in review; and, whether engaged upon the dissection of the internal organs, the preparation and examination of the bony framework, or the description of the various parts, Agassiz' training in the method of observing facts and their orderly arrangement was ever accompanied by the urgent exhortation not to be content with them.

"Facts are stupid things," he would say, "until brought into connection with some general law."

At the end of eight months, it was almost with reluctance that I left these friends and turned to insects; but what I had gained by this outside experience has been of greater value than years of later investigation in my favorite groups.—*Every Saturday.*

Correspondence.

The Screw Propeller.

To the Editor of the Scientific American:

Having been intimately connected with the introduction of screw propulsion in the United States, the biographical notice of Sir Francis Pettit Smith, in your issue of March 7, 1874, induces me to present the following statement:

Francis P. Smith obtained a patent in England, dated May 31, 1836, for a propeller consisting of a continuous screw, formed and applied as shown by the engraving which accompanies your biographical sketch referred to. John Ericsson obtained a patent in England, dated July 13, 1836, for a propeller consisting of several blades or segments of a screw, the twist of which was determined in accordance with the principle new universally adopted in the construction of screw propellers.

That Ericsson carried his invention into practice immediately after having obtained a patent in England will be seen from the following notice in the London *Mechanics' Magazine,* June 3, 1837, vol. xxvii., p. 130, relating to the screw steamer Francis B. Ogden;

"*Captain Ericsson's New Propeller.*—The American packet ship Toronto, of 630 tuns burden, and drawing 14 feet 6 inches water, was on Saturday last towed down the Thames at the rate of full 4½ knots an hour, against wind and tide, by an experimental steamboat called the Francis B. Ogden. We subjoin a copy, with which we were favored, of the certificate given by the pilot and mate of the Toronto, of the performance of the Francis B. Ogden on this occasion:

"'Packet ship Toronto, in the Thames, May 28, 1837:

"'We feel pleasure in certifying that your experimental steamboat, the Francis B. Ogden, has this morning towed our ship at the rate of 4½ knots an hour through the water, and against the tide.

(Signed) "E. Nashby, Pilot.
"H. R. Hovey, Mate.

"To Captain Ericsson."

Bennett Woodcroft, in his celebrated work on steam navigation, published in London, 1848, thus notices the Robert F. Stockton, the second vessel built in England propelled by Ericsson's screw propeller:

"On the 7th of July, 1838, a new iron vessel, built by Messrs. Laird & Co., of Birkenhead, and fitted with a screw propeller, was launched into the Mersey. This vessel was constructed for Captain Stockton, of the American navy, who has been already mentioned, and consequently received the name of Robert F. Stockton. To the kindness of Mr. John Laird I am indebted for the drawing of this vessel, as she was rigged for her first voyage across the Atlantic; and from one of the scientific journals already quoted the following particulars: Several experiments have been made with her (the Robert F. Stockton), the results of which appear very satisfactory, both in relation to the application of the propellers to inland and to ocean navigation; and these experiments derive additional weight from the fact of their having been performed and approved of in Liverpool, the great emporium of shipping and commerce.

"The Robert F. Stockton left England for the United States in the beginning of April, 1839, under the command of Captain Crane, of the American merchant service, a most intrepid sailor. His crew consisted of four men and a boy

"Captain Crane made a forty days' passage, under sail only; and for his daring in thus crossing the Atlantic in this small vessel, he was presented with the freedom of the city of New York.

"Prior to Captain Ericsson leaving this country for America, he had built, for Mr. John Thomas Woodhouse, an iron screw propeller vessel to run as a passenger boat on the Ashby de la Zouch canal.

"She was named the Enterprize; her length is about 70 feet, beam 7 feet, and her engines about 14 horse power; her speed, where the water is wide and deep, is from 9 to 10 miles an hour.

"She was delivered and commenced to run on that canal in the middle of the month of August, 1839; and having run during a season without being profitable, she was then used as a steam tug on the Trent and Mersey, for a certain coal traffic, with great success."

Mr. Woodcroft adds (see p. 102 of the work referred to): "It will thus be seen that Captain Ericsson accomplished for the screw propeller in America and in England what Fulton did for the paddle wheel in the former and Bell in the latter country, namely, its practical introduction."

The history of the introduction of steam navigation in the United States shows that, several years before screw propulsion had assumed any commercial importance in England, the carrying trade on our lakes was, to a great extent, conducted by screw vessels. Already in 1843, the Ericsson line of screw steamers was in full operation between Philadelphia and Baltimore, running through the Delaware and Chesapeake canal, seriously damaging the freight business of the Philadelphia and Baltimore Railroad Company.

Permit me to add that the sum which you mention in your biographical notice, as having been awarded to Sir Francis P. Smith, was paid at a recent period, and divided, in various proportions, among several (I believe seven) patentees who had in the meantime obtained patents for modifications of detail which the Admiralty desired to avail itself of. It is scarcely necessary to mention that Captain Ericsson received a fraction of the sum paid by the British Government. C. H. DELAMATER.

New York city.

The Attraction of the Sun and the Earth.

To the Editor of the Scientific American:

It appears that some of your correspondents are still in doubt about the exactness of the data in regard to the size and density of the sun and earth, and their consequent relative attractions, as established by astronomy. I made some remarks on this subject in your issue of February 7 (page 84, current volume) wherein I pointed out the impracticability of the proposition of Mr. Slaughter, who wished to find by the balance how much a few tuns weight would increase or diminish in gravity at certain hours, and I mentioned Herschel's method of illustrating the variation of terrestrial attraction from the equator to the poles by a spring balance. After this communication, a correspondent (Captain Ericsson) communicates that he has constructed an apparatus for measuring these changes, consisting of a heavy iron globe floating in mercury, and Mr. Slaughter now proposes a spring balance with a mirror attached. In regard to the first contrivance, I must remark that a floating object is identical with a lever scale, as the liquid balances the floating body, and any change in the gravitation will equally affect both; so that such an apparatus would show no change whatsoever, even when transported to the moon or to Jupiter. It is, therefore, not in the least surprising that Captain Ericsson, according to his own showing, had no results. In regard to a spring balance with a mirror, this might show differences of attraction, but could not possibly be delicate and reliable enough for purposes of measurement, being affected so strongly by other causes as to be unfit for such delicate measurements as the minute changes in gravitation in question.

The best method is with the pendulum, by watching the changes in the periods of its oscillations at different hours of the day and night; but with what standard can we compare it, as all pendulums will be equally affected? Fortunately we have an equivalent instrument, of which the oscillations are not affected by gravity, and which is thus independent of changes in the same. I refer to a good, well compensated chronometer, in which the mass of the balance wheel and the elasticity of the spiral spring are substituted for the weight of the pendulum and its gravitating tendency. If therefore a criterion of the solar and lunar attraction is judged desirable, all we have to do is to compare the oscillations of the pendulum of a regulator with those of the balance of a chronometer, at different hours of the day and night. At those hours when gravitation is less by solar or lunar attraction, that is, when the sun or the moon crosses the meridian, the pendulum clock must be found to move more slowly, making the seconds longer, going behind the chronometer, and indicating less than 3,600 seconds for the hour as recorded by the chronometer. When the sun or moon is in the meridian of the antipodes, the opposite effect must be observed. These results differ from the ocean tides, which rise equally at the two periods.

I intend making these observations shortly on an astronomical pendulum clock driven by electricity, of which the weight attached to the pendulum is unusually large. I will communicate the results, if any are obtained worthy of notice. P. H. VANDER WEYDE.

New York city.

Calming the Sea by Means of Oil.

To the Editor of the Scientific American:

The communication on page 212 of the current volume of your journal interested me very much. I have read of a whale ship in distress being lightened of a part of her cargo of oil by pouring it overboard, and the sea, for some distance around the vessel, became comparatively smooth. The writer when a boy, living on a farm in Vermont, remembers that, in making maple sugar (by boiling the sap in deep cast iron kettles, as the custom then was), we had a small piece of fat pork, held in the end of a stick; and whenever the sirup foamed and would be in danger of boiling over, we dipped the pork in the sirup, and the foaming would cease instantly. Some years ago we owned a small hoisting engine that we could do no work with on account of foaming in the boiler. By advice of a boiler maker we forced a small quantity of lard oil in it and the cure was complete. It was only necessary to force in about two tablespoonfuls once or twice a day to keep things perfectly quiet inside.

Hartford, Conn. JOHN McCLAY.

The Electro-Capillary Machine.

To the Editor of the Scientific American:

La Nature erroneously describes this motor, illustrated on page 195 of your current volume, as a French invention. The original description of the machine may be found in *Puggendorff's Annalen,* 1873, vol. 149, pp. 546 to 561. The machine was invented by Gabriel Lippmann, student in the laboratory at Heidelberg; and it was built by the instrument maker Jung, at Heidelberg.

This very interesting machine works economically with feeble currents. It ran once continuously five days and nights by the current of one single Daniell. The power of any electro-capillary motor is independent of its volume, being proportional to the variation of the surface of contact of the two liquids. If S be the variation of the surface (in square meters) of contact under one Daniell, then the work of the machine will be (S÷100) kilogrammeters for each stroke.

Iowa City, Iowa. G. HINRICHS.

The Beech Blight.

To the Editor of the Scientific American:

In your issue of March 28, Mr. Jacob Stauffer calls attention to an article in the *Science Record* for 1874, on the blight recently observed on beech trees in Westphalia, and states that he had noticed the same thing as early as the summer of 1857. I can go farther back still. In the fall of 1838, I noticed the same white cotton-looking insect on beech trees in Lapeer county, Mich., presenting the wavy undulating motion mentioned by your correspondent. I asked one of the native Indians, who was present at the time, what they were; and he said that they were called "*me mes.*"

New York city. EDWIN LEACH.

The Emerald Mines of Muzo.

Within four days' journey from Bogota, a French company has been enjoying a monopoly for the last ten years of all the emeralds found in the neighboring mines, and indeed of all the emeralds found in Columbia. The lease expires shortly, and the government think they can get better terms in the open market for a fresh contract, than by granting a renewal to the present leaseholders. The annual payment now is 14,700 dollars, for which the government bound themselves to prohibit the working of any other mines, existing in the territory of the Union.

The mines were known and worked long before the discovery of America and the conquest of New Granada by the Spaniards. When an expedition arrived in that part of the country, about 1553, to reduce the tribe Los Muzos to the Spanish rule, these Indians were found to possess a large quantity of emeralds. It is, however, not easy to see how they worked the mines, as they had no tools of iron it is supposed that they found the stones in the beds of the mountain torrents; for it sometimes occurs that the winter rains produce great land slides which lay bare large veins of emeralds, in which they are washed out by the waters. But report speaks unfavorably of the quality of these gems; they resemble those which are still found in the Indian burial places, or in the lakes into which the Indians used to throw their relics during their struggle with the Spaniards. Let, however, this be as it may, the mines of Muzo were worked soon after the arrival of the Spaniards on a large scale, both in the open air and by means of subterranean galleries; but about the middle of the eighteenth century, the mines were abandoned no one knows why. And it was not until the war of independence and the expulsion of the Spaniards that working operations were again resumed. The mines were naturally taken possession of by the Republic, and let out to individuals and companies.

The principal mine now in work is pierced in every direction by galleries made by the Spaniards. Since 1825 it has been worked in the open air. An immense nnmber of gems have been found, many of them of great value. After this mine shall have been exhausted, which will not be for many years, not a thousandth part of the ground containing emeralds will have been touched.

About two days' journey from Muzo there is another mine called Lasquez, which was just touched by the Spaniards, and is evidently very rich. All this ground, including Lasquez, bears traces of the presence of the Spaniards; and as the geological formation is the same in the whole neighborhood, it is clear that the day is far distant before these mountains will be exhausted.

The mountains of Muzo belong to the lower formation of chalk. The emeralds are found in two distinct layers; the first or upper one composed of a calcareous bitumen, but hard and compact. These two layers are generally separated from each other by a distance of from seventeen to twenty-two yards. In the open layers are found the veins which yield the "nests" of emeralds—that is to say, a number of these gems massed together. But after one of these nests the vein disappears, being crossed by others of a different kind, which run in a different direction to those containing the emeralds. These latter veins are called "ceniceros" from their ashy color; they are generally horizontal, while the emerald veins are perpendicular. They all run from N.E. to S.W. The veins of the lower layer are more regular, and are followed for fifty or sixty yards, and even more. "Nests" of emeralds are seldom found in them, but they are more easy of extraction. When veins of fluor spar, well crystallized, are met with, the emerald is not far off; the presence of rock crystal is also a good sign, as likewise that of a pretty pyramidally shaped stone, of the color of honey.—*Iron.*

IT is hardly possible to introduce successfully an improvement in machinery of any class without the aid of a good engraving. It not only serves to show at a glance the valuable features of the machine, more effectually than the longest verbal description can do, but it also constitutes the very best method of advertising an invention, its attractive appearance securing the attention of the reader, while a column of reading matter, without illustration, might be overlooked.—*National Car Builder.*