Correspondence.

Expected Advent of the Locust.

To the Editor of the Scientific American:

In your issue of 23d ult., under the heading of "Expected Advent of the Locust," you say that "the 17 year brood will appear at Fall River, in the southeastern portion of Massachusetts," and other States therein mentioned, but do not say when; but in the fifth paragraph you say that "the 17 year brood that is to occur this year has been well recorded for the years 1715, 1732, 1749, 1766, 1783, 1800, 1817, 1834, 1851, 1868." Now, I *know from personal observation* that the 17 year brood made their appearance in Freetown, an adjoining town of Fall River, in the southeastern portion of Massachusetts, in the years 1818, 1835, 1852, and 1869, one year later than your record. In 1818 they were very numerous; in 1835 they were less numerous; in 1852, still less; and in 1869 they were quite scattering, in comparison with 1818. * *

Fall River, May 25, 1885.

[Prof. C. V. Riley states that the facts above mentioned are in accord with what we know, and the insects which he thus noticed in 1835, '52, and '69 belong to Brood I., as classified by Prof. C.V. Riley, of the Department of Agriculture. This is a septemdecim brood, and has been recorded ever since 1767. It has no connection with the broods of the present year, and will, of course, appear again true to time in 1886. It will appear in the valley of the Connecticut River and in Franklin, Bristol, and Hampshire counties in Massachusetts.—ED.]

The Royal Society Soiree, 1885.

On Wednesday evening, May 6, Professor Huxley, the President of the Royal Society, entertained a large number of the Fellows of the Royal Society and a number of distinguished guests at the Society's rooms in Burlington House, and, as on previous similar occasions, there were exhibited throughout the different rooms objects of scientific interest. Upon the walls of the room in which the President received his guests was a series of studies in colored chalk, illustrative of the different phases of the eclipse of the moon of the 4th of October in last year, and another series of very interesting chalk studies recording the magnificent roseate effects of sunset and afterglow which during the winter of 1883–1884 attracted so much attention, and which gave rise to much speculation among meteorologists as to their cause and origin, and which by a remarkable consensus of opinion have been set down to the presence in the higher regions of the atmosphere of immense quantities of volcanic dust. Both these series of sketches were contributed by Mr. Ascroft.

In the reading room Mr. Frank Crisp exhibited, by means of an exceedingly prettily constructed little apparatus fitted on to the stage of a microscope, the combustion of different metals within the discharge spark of an induction coil; and by a supplementary spectroscope, also attached to the microscope, the spectra of the different metals so burnt could be studied and compared. In the same room Mr. Copprock exhibited a number of medical and other thermometers, in which the special feature of interest consisted in giving to the cross section of the stem of the thermometer a lenticular form, the two sides of the tube being portions of cylindrical lenses; by this means while there is no refractive displacement in a vertical plane so as to affect the reading of the instrument, the thickness of the mercurial column is magnified from eight to twelve times, and is therefore more easily read. Mr. Copprock also exhibited a combined sunshine recorder and sun dial for any latitude, and an anemometer for determining the velocity of currents of air in mines and other places. In the principal library, General Strachey, R.E., F.R.S., exhibited an interesting instrument, which would require the aid of drawings to describe, for tracing out sine curves, and by which the harmonic components of periodical phenomena can be represented by corresponding figures.

Mr. Andrews exhibited a series of photographs of fractures of railway axles, broken under breaking tests at the Wortley Iron Works, Sheffield; and Mr. T. G. Daw exhibited a specimen of his new type writer, by which, it is stated, a speech can be recorded and printed verbatim as rapidly as it is uttered by an ordinary speaker. This instrument exhibits great beauty of design and construction, and we intend to illustrate and describe it on an early occasion. Mr. G. Matthey, F.R.S., exhibited a number of beautiful specimens of objects of precision constructed of platinum and iridio-platinum. These consisted of (1) a series of iridio-platinum weights absolutely adjusted to a density of 21·566; (2) some unfinished weights for the *Comite Internationale du Metre*, also of the density of 21·566; (3) a coil of platinum wire of a diameter of 0·00075 inch prepared by simple drawing; and (4) a specimen of platinum wire produced by the Wollaston process, which consists of drawing a silver wire having a platinum core down to extreme fineness, and afterward dissolving away the silver in nitric acid, leaving the nearly invisible platinum core. Professor Hele Shaw exhibited some new applications of his very beautiful spherical integrator, which he recently brought before the Institution of Civil Engineers, one of these applications being a very simple and accurate instrument for computing the areas of inclosed figures.

Mr. J. J. Hicks exhibited one of Professor Herbert McLeod's sunshine recorders, which, by continuously photographing the luminous image of the sun as reflected by a spherical mirror or ball of silvered glass (the axis of the sphere and camera lying in the meridian), traces out on the sensitized surface a curve, the continuity of which is a measure of the prevalence of sunshine during the day, and the position of any break in that continuity is a record of the time at which the sun became overclouded. Mr. Hilger, who has now so high a reputation for high class accuracy and finish in physical apparatus, exhibited some exceptionally fine spectroscopes with diffraction gratings, and a very delicate star spectroscope fitted with prisms of Iceland spar and lenses of quartz, which he has lately constructed for the Observatory at Elphinstone College, Bombay. Mr. Hilger exhibited also a fine collection of large prisms and a very simple and accurate fan governor for controlling the speed of a telescope driving clock for the Observatory of Rio de Janeiro.

What were perhaps the most interesting contributions to the interest of the evening were those of Mr. Shelford Bidwell, whose name is well known to the readers of this journal for his very successful experiments in connection with both the phonograph and photophone. Mr. Bidwell exhibited a series of beautifully arranged experiments in illustration of the variations in the lengths of bars of iron, steel, and nickel produced by subjecting them to magnetization, and among others he showed the following most remarkable experiment. A vertical iron rod is placed in the axis of a magnetizing solenoid of insulated copper wire, its lower end is fixed to a rigid support, while its upper end is attached to the short arm of a long lever supported on knife edges, the longer arm of the lever actuating a small mirror by which the image of a luminous slit is caused to be projected on a vertical scale at the other end of the room, and by the displacement of which extremely minute variations in the length of the iron bar can be detected and measured. With this apparatus Mr. Bidwell showed that with a magnetizing current of electricity such as Dr. Joule called a saturating current—that is to say, a current of such a strength that the bar was magnetized to what was believed to be its maximum capacity, and beyond which it has hitherto been considered no increase of current could affect it—elongation is produced in a bar of iron or steel, a fact often demonstrated before; but by increasing the strength of the current to three times what was considered a current of "saturation," Mr. Bidwell has found and demonstrated, on the occasion to which we refer, that the length of the bar is unaffected on making or breaking the circuit, whereas on increasing the current to six times the "saturating" current, or twice that of the current last referred to, then the bar, instead of being lengthened, is considerably shortened.

Mr. Shelford Bidwell also exhibited an interesting experiment in physiological optics; he showed that if a vacuum tube, conveying an electrical discharge, is slowly rotated, it appears to be followed at an angular distance of about 30 degrees by a fainter spectral image of the tube, rotating at the same speed, and therefore always at the same angular distance behind it, and a still more remarkable phenomenon takes place if the rotation of the tube be suddenly arrested; for then, instead of the spectral image stopping at the same moment as the tube, and at the same angular distance from it as it remained during its rotation, or instead of disappearing at that moment, both of which effects might have been expected, it apparently goes on in its rotation, following up the tube itself and disappears at the point at which the tube appeared to stop. These experiments were very interesting, and attracted considerable attention at the soiree, which was very largely attended, and was in every way successful.—*Engineering.*

American Society of Civil Engineers.

The American Society of Civil Engineers will hold its annual convention at Deer Park, Md., from June 24 to the 27th inclusive. A special invitation has been extended to members and their families to arrive in Baltimore on Monday, the 22d, and take part in several excursions in and around the city. In the afternoon, two excursions are offered: one under the auspices of the Baltimore and Ohio Railroad, to visit, by steamer, the marine terminals of that road, and other points of interest in the harbor; and the other, under the escort of the Chief Engineer, to inspect the city waterworks. In the evening, invitations are extended for a concert at the Academy of Music.

On the 23d a special train will leave Baltimore in the morning, stopping *en route* to allow the tourists to inspect the Mt. Clare Shops, Harper's Ferry, and other interesting places, and will reach Deer Park in the early evening. Sessions will be held at the hotel during the continuance of the meeting, and visits will be made to the Cheat River Grade, Kingwood Tunnel, Tray Run Viaduct, and other points of engineering interest on the line of the Baltimore and Ohio road. President Graff will deliver the annual address at one of these sessions. Deer Park is beautifully located in the midst of the Alleghanies, 2,800 feet above tide water, and has a very attractive hotel, which will be the headquarters of the society. A better spot for a summer convention could scarcely have been selected. Already a large number have indicated their intention to be present, and the meeting promises to be one of particular interest.

The Ship Railway.

Recently, at the close of one of Mr. Corthell's lectures, in the large hall of the Massachusetts Institute of Technology, Boston, Captain Eads was introduced, and cordially greeted by the large audience present. We give a few extracts from his remarks:

"If we came before capitalists with a proposition to construct a canal across the Isthmus of Tehuantepec, possessing, as that location does, such great advantages over Panama and Nicaragua in healthfulness of climate and proximity to the United States, there would be no lack of money offered to build it; because everybody knows what a canal is. They are as old as the Pharaohs, and everybody knows that if one is wide enough and deep enough, a ship can be floated through it.

"We come before the world with a better and cheaper method of taking loaded ships across the Isthmus than any canal can posssibly be; but because of its novelty, we must overcome the same kind of unbelief which opposed the introduction of illuminating gas, the telegraph, the Atlantic cable, steam navigation, the power loom, the locomotive, and a score of other immense benefits which we now enjoy as commonplace things, but each one of which had to fight its way into popular favor against all manner of opposition, selfishness, prejudice, ridicule, and ignorance.

"It is but a few years since George Stephenson was pleading for the means with which to build the first few miles of that grand system of steel highways which now covers the civilized world with a network far more marvelous and beneficent than the wildest flight of a poet's fancy ever pictured, or the dream of an enraptured enthusiast ever compassed.

If Stephenson had devoted one tithe of the thought, energy, and talent to secure the capital for building fifty miles of a canal or a turnpike instead of that little piece of railway, he would have had an abundance of financial aid, because those means of conveyance are almost as old as Adam. But who now would invest a dollar in a stage coach if he knew that the locomotive would be its competitor? Who would take stock in an ordinary canal now, if he knew that a railway was to be built alongside of it?

"The ship railway is simply a proposition to carry larger burdens than have hitherto been carried on ordinary railways, and the same causes which tend to reduce the cost of transporting cargoes on the ocean in large ships instead of small ones must tend to lessen the cost of ship railway transportation below that of ordinary railways. For the same reason the ship railway must inevitably prove superior to the ship canal.

"When we proposed to deepen the mouth of the Mississippi with jetties, the people of New Orleans had so much more faith in the Fort Saint Philip Canal (a scheme to connect the deep water of the Gulf with the river, forty miles above its mouth) that their various commercial bodies were immediately called together, and forthwith sent two engineers of note to Washington to defeat our proposition, and the House, in response to the universal demand, actually voted eight million dollars with which to begin the construction of a canal which would have cost fifteen millions at least in money, and ten years in time, for its completion.

"Well, the controversy between that canal and the jetties is ended, and the country has been saved from a most expensive blunder. In four years afterward, and with one-third of the money, the old Father of Waters was made to open his mouth wide enough and deep enough to float the Great Eastern through it in safety to New Orleans.

"That channel has existed for the last five years, and it will continue, with a little care, to exist to the end of time. It has opened the immense agricultural products of a region one hundred and fifty times as large as the State of Massachusetts to all the people of the world who live to the east of our Isthmus. We now propose, through the grace of God and the simple means which this model illustrates, to open that mighty valley, with its illimitable stores of cereal wealth, its boundless treasury of food for man and beast, to all the rest of mankind who live to the west of that Isthmus.

"This work, when finished, will be the realization of the ardent wish of statesmen and philanthropists everywhere; the dream of kings and conquerors during the last three hundred and fifty years; and a fitting supplement to the grand achievements which have marked the progress of the nineteenth century."

An Ohio Gas Well.

At Shelby, Ohio, May 5, the largest vein of gas ever struck in Ohio was reached at a depth of 480 feet. The men were warned of its presence by a roaring sound, and fled for their lives, hardly escaping before the gas rushed from the orifice with a tremendous report, shattering the derrick and throwing the dirt and mud many feet into the air. A temporary pipe, seventy feet in length, has been laid, connecting with the well, and it furnishes a steady stream of fire twenty-five feet high. The discovery will supply the whole town with light and fuel for dwelling houses and manufactories.

Lumley Electric Light.

The Lumley system of lights and dynamo machines, which has been in use for two or three years in England, is now being introduced into this country; it comes to us with quite a favorable recommendation. The filaments in the incandescent lamps are arranged in the outline of a cross, and, according to the statements of the company, give more light to the horse power than can be obtained from any other system. They have not yet, however, been subjected, we believe, to any competitive tests. The filament is prepared from a fiber whose origin is kept a secret. The lamps range from 10 to 300 candle power, and are guaranteed for 1,000 hours, though there are lamps at the company's factory which are stated to have been burned over 4,000 hours without any apparent loss of power. The arc lamp is constructed to be run, when desired, in the same circuit as the incandescent. The dynamo is a modified Gramme machine, and has the merit of being quite cheap and very compact. Particular durability is also claimed for it, but as the life of any good dynamo is, with proper care, almost indefinite, the machine can do no better in this respect than to share the general merit of longevity. It is run at 1,600 revolutions, which may possibly account for the excellent results obtained.

IMPROVED TRACTION ENGINE.

The accompanying engraving represents a traction engine embodying new and valuable forms of construction, and which may be employed to plow, saw wood, gin cotton, thrash and grind grain, haul, or to do any of the work commonly performed by a steam engine. Heretofore in the operation of traction engines a serious difficulty has been caused by the slipping of the wheels in passing over sandy or soft soil. The engine here illustrated overcomes this to a great extent, as the surface of the wheel in contact with the ground is practically largely increased. This is accomplished by means of a V-shaped chain connecting each pair of wheels, thus forming a track on the pulling or tight side of the chain, that is laid on the ground for the drivers to roll on. Besides increasing the bearing surface this enables the engine to utilize more of its power than it would if rolling on the ground. The pilot wheels are of the same width as the drivers, and the weight is distributed on all four points; the guiding of these wheels is accomplished with a short axle pivoted at the center of the face of the wheels, so that the length of the chains is not altered when turning a corner. The engine rolls on its own rail, the pilot wheels laying it down; and being connected with the drivers they help forward the latter by taking their proportion of the weight of the engine.

In regard to the work which this engine will do, the inventor, Mr. Geo. F. Page, of No. 5 N. Schroeder St., Baltimore, Md., states that "with my twelve horse engine, I pulled through the red clay mud, up a grade of one in twelve, ten tons in two six horse wagons. The engine made better time, with less water and coal, than the old wheels on a dry road of the same grade."

Discovery of the Missing Link.

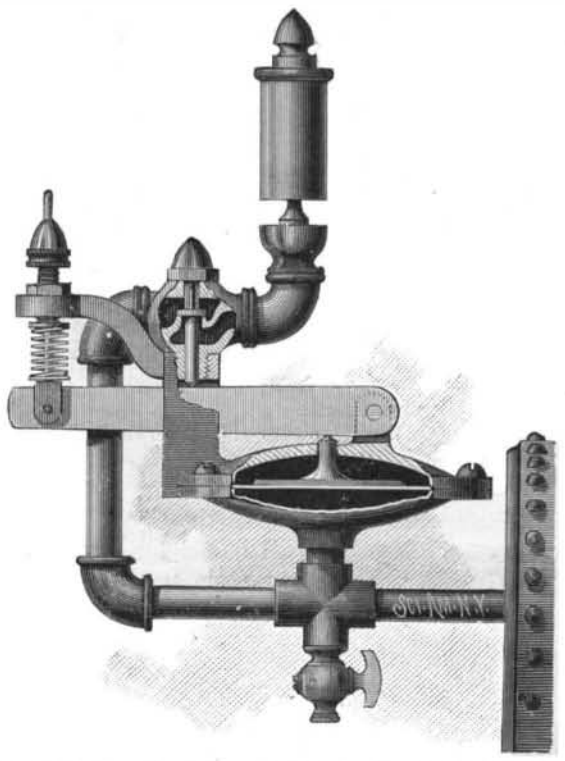
"They can talk all they please about their great scientists," said the brakeman to a Chicago *Herald* reporter, as he stepped between two freight cars and made his arms go up in the air, "but I did something the other day that Darwin, Haeckel, Huxley, and all them evolutionist fellers never could do, with all their larnin'. We were running along with about thirty cars, when our train broke in two sections. We stopped 'em, an' were goin' to couple up again, when we found we couldn't do it. Something was gone. 'Wait a minute,' says I to the conductor, and then I skipped out and run back along the track. It was then what I did what the crack scientists have never been able to do."

"What was that?"

"I found the missing link."

SAFETY VALVE AND ALARM FOR STEAM BOILERS.

The object of the device herewith shown is to cause an alarm, in case the safety valve fails to open, by the use of a pressure detecter in conjunction with an ordinary safety valve, so constructed as to insure the invariable opening of the valve when the pressure reaches a given point. Connected to the steam pipe attaching the device to the boiler is a steam chamber, across

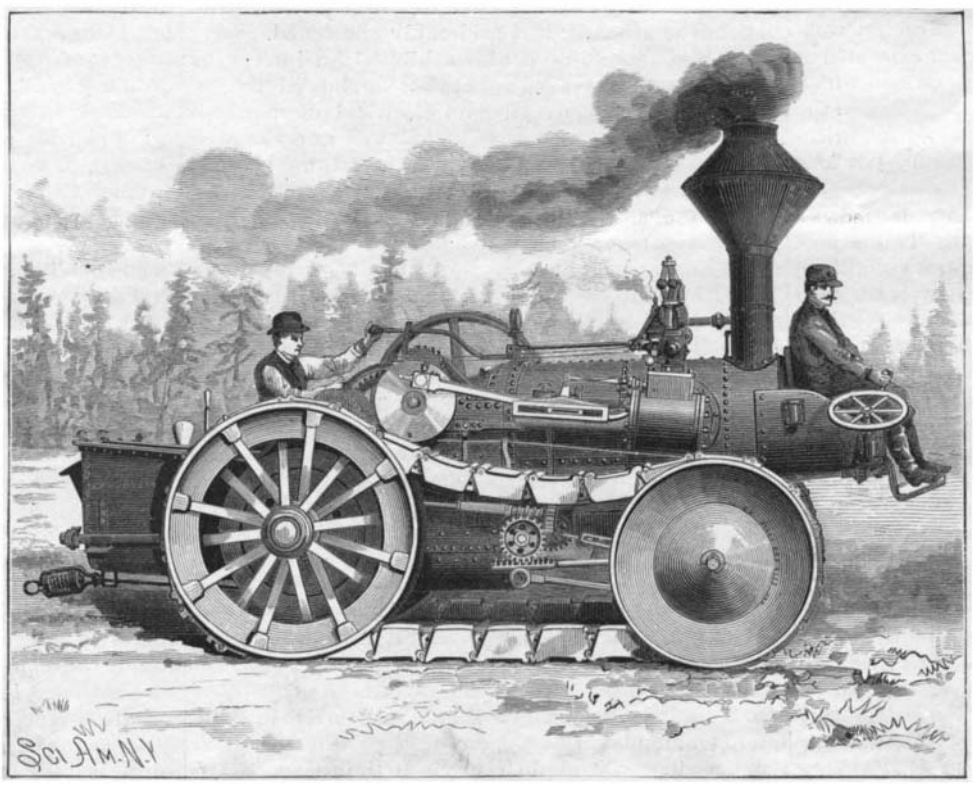


SAFETY VALVE AND ALARM FOR STEAM BOILERS.

which is secured a thin metallic diaphragm carrying a plunger extending through the upper side of the chamber into contact with a lever at a point near its fulcrum. The valve chamber is sustained by a slotted post through which the lever passes. To the outer end of the lever is pivoted a rod extending upward loosely through a sleeve nut screwed through the end of an arm projecting from the post; by turning the nut the tension of a spring surrounding the rod and the pressure on the lever can be regulated. Beneath the valve, the casing of which is broken away in the engraving to show the interior, is a slide pin extending through the lower part of the valve chamber to the lever. The valve stem extends upward into a guide mortise, and is fluted so to reduce the friction. A whistle is connected to the outer part of the valve chamber.

When used on a boiler provided with an ordinary safety valve, the lever is set by adjustment of the spring at the same pressure as the safety valve. In case the latter fails to open when the maximum pressure is reached, the steam, acting against the diaphragm, raises the lever, thereby pushing the pin and valve upward and admitting steam to the whistle. The form and arrangement of the valve are such that it is not liable to stick, and it opens easily and readily. When there is no pressure in the boiler, the lever rests on the bottom of the slot in the post, thus relieving the diaphragm of all weight.

This invention has been patented by Messrs. W. B. Railing and C. N. May, P.O. box 160, Mechanicsburg, Pa.



PAGE'S IMPROVED TRACTION ENGINE.

A Land Flowing with Wine, and the People all Drunkards.

Among the new missionary stations established by the American Board is that of Inhambane, on the east coast of Africa, situated in about latitude 24° and about 200 miles northeast of Delagoa Bay. The missionary at this station, the Rev. Dr. Richards, lately made an inland tour of 150 miles from the coast, to see what he could see, and in a recent number of the *Missionary Herald* is given a very interesting account of this journey, from which we abstract the following:

On the third day out the explorers came upon the Amakwakwa tribe, of whom Mr. Richards says: "They have no gardens at all. They are so frequently robbed by Umzila's *impis* (soldiers) that they have become quite discouraged. Another reason is that the native fruit is capable of sustaining life, and is abundant; and, again, the palm wine flows freely all over the country. This palm tree is usually four or five feet high, seldom ten feet. It manifests little life, save at the top, where a few leaves appear, looking like a flower pot on a stump. These leaves are all cutoff, and from the cut each tree yields daily about a pint of delicious juice, but highly intoxicating when allowed to stand for a few hours. There seems to be no limit to these trees, and we were surrounded on every hand by drunken men and women. Even little children were staggering about as ingloriously as their parents. It was difficult to avoid trouble with these people, yet our guns were respected, and a ball fired carelessly at a near tree would produce quiet for half an hour. They were coarse, rough, drunken fellows, often plundering, often plundered, and accustomed to quarrels and fights not altogether bloodless. One could scarce expect to find pleasure in passing among them."

Nobert's Ruling Machine.

The world renowned ruling machine of the late M. Nobert was exhibited at the last meeting of the Royal Microscopical Society. It has been purchased by Mr. Frank Crisp, one of the secretaries. The foundation of the machine is the ordinary dividing engine used in the graduation of circles and sextants; this, by a vast amount of delicate superposed mechanism, is made to rule lines at a very minute but determinable distance; strange to say, the lines are not straight ones, but portions of a large arc; the lines, however, not exceeding one-fiftieth of an inch in length, the curvature is not perceptible. The diamonds used for ruling are worked to knife edges, in some instances ground, in others chipped, but made with such delicacy that microscopical examination fails to detect any serrations; in this and the glass employed would seem to lie the secret of the fine quality of line produced by M. Nobert. The note book of the inventor accompanies the machine, and in it the performance of each diamond has been recorded, and much useful information that will probably enable the machine to be used. Experts who have examined the machine since it has been in England do not consider the mechanical contrivances the best that could have been devised; but the fact nevertheless remains that Nobert contrived to execute rulings which have not been equaled. The resolution of the nineteenth band, in which the distance of the lines—according to the measurements of Dr. Piggott—is 112·595 to the inch, and formerly supposed to be impracticable, is now accomplished without much difficulty. There is also an adaptation for ruling the longer and comparatively coarser lines for diffraction plates for spectroscopes.

Effects of Heat and Cold on Steel Tools.

There are steels and steels. Some of them act queerly. A planer man was much annoyed at the breaking of his cutting chisels every morning in the cold weather. He had become infatuated with a "high" steel that was worked at a low red heat and was not hardened for tempering, but was left to cool under the hammer. But his planer was near a basement wall on which the frost has stood every cold morning during this "open" winter. Soon as he started a chip, away would go the point or edge of the tool. At last he put his thinking cap on, and procuring a small alcohol lamp from a glue pot, he swung it on the crosshead saddle so that the blaze came up by the side of the tool. This heated the tool so that it was almost painful to feel it. He had no more snap breakages. After the tool got heated by the friction of its work, the lamp was turned off. Another machinist, working on threading taps, heats up the threading tool in the morning by grinding it on an emery wheel.