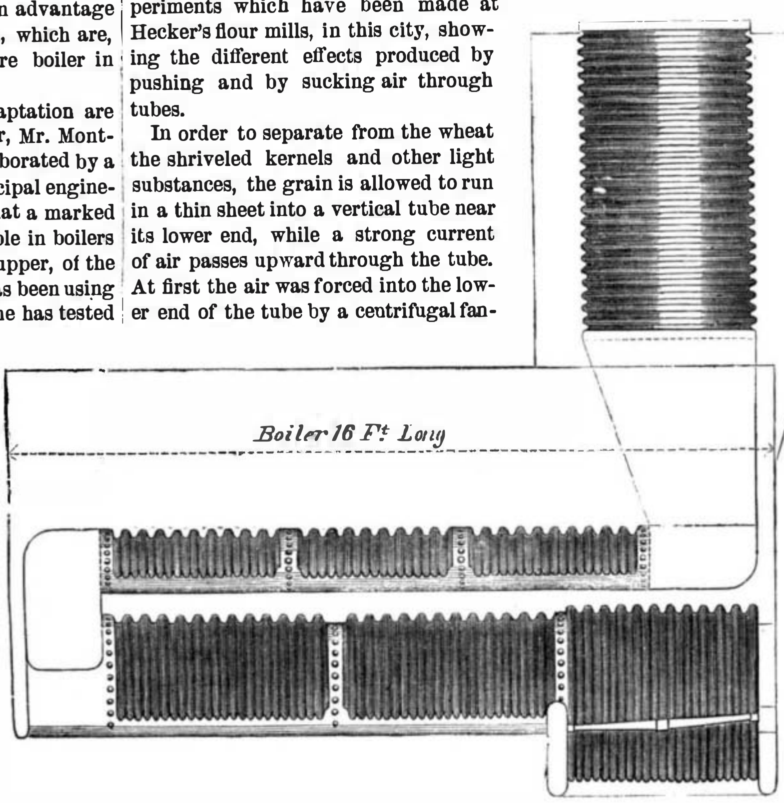
Improved Corrugated Iron Boiler.

The steam boilers herewith illustrated are peculiar in many respects; the chief point where they differ from others is in the character of the iron composing them. This iron is of the kind known as "corrugated," which means simply so rolling the sheets that instead of having a plain flat surface there are a series of arches throughout or over the whole surfaces. This method of treating boiler-iron renders it immensely stronger for the same weight of metal than a plain sheet, and this peculiarity is taken advantage of in the plans which are shown annexed, which are, a long cylinder boiler, also a low pressure boiler in section.

The advantages claimed for this adaptation are many, and it is asserted by the inventor, Mr. Montgomery—whose statements are also corroborated by a large number of certificates from the principal engine-makers and engineers of the country—that a marked improvement over old forms is observable in boilers now in use on his plan. Capt. C. H. Tupper, of the steamer *Troy* and others, states that he has been using this corrugated iron in a boiler and that he has tested it severely, having carried 150 lbs. to the square inch on an arch without a single brace upon it.



MONTGOMERY'S CORRUGATED IRON BOILER.

The chief points claimed for this corrugated iron are, that a boiler made of it is much stronger for the same weight; that more heating surface is afforded in the same length or dimensions in these than those made of flat iron; that being constructed wholly without braces the danger of scale collecting around the same, as in ordinary boilers, is obviated, thus preventing deterioration of the metal from this cause; and it is cheaper to make—a boiler of this iron costing about two-thirds of one of equal heating surface constructed of plain iron; and also a great economy in point of weight is manifest. The deposit of scale and sediment, which is such a source of injury to the ordinary boilers, is also claimed to be much less in this, if not wholly prevented. The mechanical reader will see, by referring to the section of the low-pressure boiler, that the corrugations extend across the crown sheet or arch, and that the expansion and contraction of the sheets, which is always going on when the boiler is "fired-up" from one day to another, and suffered to cool, does not permit scale to adhere, as from the causes above mentioned it is dislodged as fast as formed, and may be washed out with a hose and afterward drawn out of the hand holes. The use of this iron is also a

guarantee for the employment of the best quality of the metal, as in the process of manufacturing the sheets any inferiority is readily perceived and the plate rejected. The boilers of the *Isaac Newton*, recently burnt on the North River, weighed 51,448 lbs., if they had been corrugated the weight would have been 36,020 lbs.; instead of being 30 feet long they would have been 21 feet 6 inches; and in lieu of the heatingsnrface in the furnaces being 386 square feet, with corrugated iron it would have been 376 square feet. From these figures the reader will see that an obvious advantage is apparent in the use of this material. A large number of circulars, testimonials, &c., have been shown us from eminent engineers, all certifying to the value of this form of iron for all purposes where great strength, lightness and rigidity are required.

This mode of constructing boilers is the invention of Richard Montgomery, and has been secured by Letters Patent. Further information may be had by addressing Mr. Wm. A. Dodge, agent, 77 John street, New York.

EXPERIMENTS OF DRIVING AND OF DRAWING AIR THROUGH TUBES.

At the last meeting of the Polytechnic Association, Dr. Rowell gave an account of some instructive experiments which have been made at Hecker's flour mills, in this city, showing the different effects produced by pushing and by sucking air through tubes.

In order to separate from the wheat the shriveled kernels and other light substances, the grain is allowed to run in a thin sheet into a vertical tube near its lower end, while a strong current of air passes upward through the tube. At first the air was forced into the lower end of the tube by a centrifugal fan-blower. By this plan it was found impossible to raise the light grains more than eight feet, and unless the blast was nicely regulated some of the sound kernels would be carried over.

The fan was then placed at the upper end of the tube so as to draw the air upward. It was then found impossible to raise the light grain more than three feet; though this arrangement worked better than the first.

Then Dr. Rowell suggested to Mr. Hecker to substitute for the centrifugal blower a spiral fan, like a boy's windmill. This proved perfectly successful. The shriveled grains are drawn upward sixteen feet, not a single sound kernel is carried over, and the separation is completely effected. The centrifugal blower required a three-inch belt, but the spiral fan is driven by a belt one inch in width. The vertical tube terminates in a large square box, a round hole is cut in one side of this box, and the fan is placed just outside of the hole; the diameter of the fan being about one inch greater than that of the hole. The fan has four blades, each about five inches in width at the outer end, and about one foot in length.

On placing a thermometer at the lower end of the tube, Dr. Rowell found that the attenuation of the air reduced the temperature about five degrees.

EIGHT tuns of greenbacks were carried over the New Jersey railroad to Washington, one day last week. The money is said to be the collections of different Internal Revenue officers.

THE WORLD'S INDEBTEDNESS TO SCIENCE.

The fourth and last lecture of this course was given, according to appointment, on the 18th ult. The character of the lecture was much the same as those of previous ones which, it is almost needless to say, were of a high standard. Prof. Doremus paid a glowing tribute to Dr. Priestly as the discoverer of oxygen gas; and he then proceeded to state, in terse language, what an important element it was in the formation, not only of the globe itself, but of the plants and animals inhabiting it; three-fourths of our bodies, four-fifths of vegetation, and one-half of the crust of the globe being composed of this gas. So omnipresent and indispensable is it that it has been called "vital air," and its influence upon and absence from animated nature is very marked.

The economy of nature also occupied the attention of the lecturer; and he said that it was most beautiful to remark how the different processes went on without loss; for the gases respired by man, and which were noxious to his system, were taken up and absorbed by plants, to whose growth they were essential; these appropriate the carbon in the atmosphere and leave the oxygen, while man throws off the former and retains the latter. Experiments to prove that oxygen was essential to the perfect production of artificial light were then tried; these consisted, in one instance, of the introduction of ignited sulphur to a jar containing oxygen gas. In the atmosphere the combustion of the sulphur was but feebly supported; but in the presence of the pure oxygen it gave forth a brilliant light. A similar experiment with iron resulted happily. "Our bodies change every minute," said Professor Doremus, "from the action of this invisible but ubiquitous gas. I am not the same that I was a few minutes since, this audience is not the same; and, through the magic influence of oxygen, vigor is given to the intellect, power to the muscles, and vigor to the whole system." Professor Draper has beautifully said that this gas is "the cradle of the animal kingdom, but the grave of the vegetable one."

Some experiments with chlorine gas were next in order; and the effect this had on compounds of hydrogen—decomposition—was descanted on at some length; the great pecuniary value of this gas, as a bleaching and disinfecting agent was also alluded to. One instance of the value of chemistry, and especially the discovery of chlorine gas, to the commercial interests was exemplified in the fact that (as stated by the lecturer), before this gas was discovered, goods were sent from English factories to India, solely to be bleached; as the limited area and want of sunlight (which was formerly the sole reliance for producing white goods) precluded the possibility of doing it so economically at home. Nitrous oxide, about which so much has been published in the SCIENTIFIC AMERICAN, *pro* and *con*, was also highly spoken of as a means of producing insensibility during surgical operations; and the only objection to its use was the disgusting manner in which it was administered in general. The wonderful exhilarating qualities of this gas were commented on; and Sir Humphry Davy was quoted to prove that the "seventh heaven" must have an atmosphere of it.

The time passed rapidly with such information; and the Professor, at the close of his lecture, alluded to the want of facilities in this city for thorough scientific culture, and argued his cause with much eloquence. Judging from the frequent manifestations of approval given by the audience, there is no doubt but that it was "seed sown upon good ground." It is certainly extraordinary that, in a city like New York, this reproach should be uttered with truth. "The first battle of Bull Run" said the Professor, "was lost for want of topographical knowledge, or familiarity with the nature of the country; and the second was like unto it, for, as the authorities remarked, it was not probable another battle would ever be fought there."

The conclusion of this course of lectures is sincerely regretted by many, as the interest taken in them by the public was too marked to escape notice.

THE FARMERS' CLUB.

The regular weekly meeting of the Farmers' Club was held at their room at the Cooper Institute, at 1½ P. M., on Tuesday, February 23d; the President, N. C. Ely, in the chair.

FERMENTING WINE.

The President read a letter making some inquiries in relation to fermenting wine.

Col. Haraszthy—"During its fermentation, wine must be excluded from the atmosphere, otherwise it will become sour. We close the fermenting vats perfectly tight, and carry off the gases produced by fermentation by means of a siphon, which terminates under water in another vessel."

CULTIVATING ALMONDS.

Mr. Robinson read a letter asking further information in relation to the cultivation of almonds.

Col. Haraszthy—"I plant the almond pits in the spring, and during the season the trees grow to the hight of four or five feet. In the autumn they are budded with good varieties, and the next spring the seedling is cut off above the bud. In three years they begin to appear, and, in California, they have never been troubled with leaf-curl or mildew or anything else. The almond is a hardier tree than the peach. When I was in Wisconsin, I raised almonds there successfully, though we sometimes had the thermometer indicating 30 and 35 degrees below zero."

Mr. Carpenter—"Experience has shown that some varieties of the almond will bear this climate and others will not."

Dr. Trimble—"Is the pulp of the almond good to eat?"

Col. Haraszthy—"It is very poisonous. It is so full of prussic acid that it is a convenient source of supply for that substance."

GRASSHOPPERS IN WINTER.

Mr. Robinson—"I have here a communication saying that a farmer's club has been formed on Long Island, and, at their first meeting, the crop of a crow was presented, and it was found to be full of grasshoppers."

Mr. Carpenter—"I saw the crop, and I think there was a mistake in calling them grasshoppers. I should say they were crickets."

The President—"Will the naturalist of New Jersey please tell us whether grasshoppers live through the winter?"

Dr. Trimble—"I have seen the crop, and should call them grasshoppers not fully developed; they had only the rudiments of wings. In this state they live through the winter. They lie at the roots of the grass, where they are partially protected, and afford a favorite food for crows. One morning, during the cold weather this winter, I found, on the paved walk at my house, a fully formed katydid, frozen as hard as a bone. It was a striking object at the time, as you know the color is a bright, delicate green. I took him into the house and put him into a box, and he soon came to life. I then put him into the greenhouse, but in a few days he disappeared."

After a long discussion on the Wilson Strawberry and other subjects, the Club adjourned.

THE Fire Department of Philadelphia has 36 steam fire-engines and 38 hand engines.

WHAT INVENTION HAS DONE FOR THE BLIND.

Very few of our readers, probably, are aware of the great improvements which have been made, in this country, to ameliorate the condition of "the blind," or the name of the person from whom those improvements have originated; and it affords us pleasure to make even a brief record of some of the facts, and at the same time to pay a well merited tribute to the inventive genius of one of our own countrymen, through whose skill and untiring industry, the blind, in all parts of the world, have been so truly benefited and cheered in their sad life of "perpetual night." It is to the talent and exertions of that well-known inventor, Mr. Stephen P. Ruggles, of Boston, that the blind, in this country and Europe, have received more real and substantial good, in facilities for learning, than from any other source—or all other sources combined.

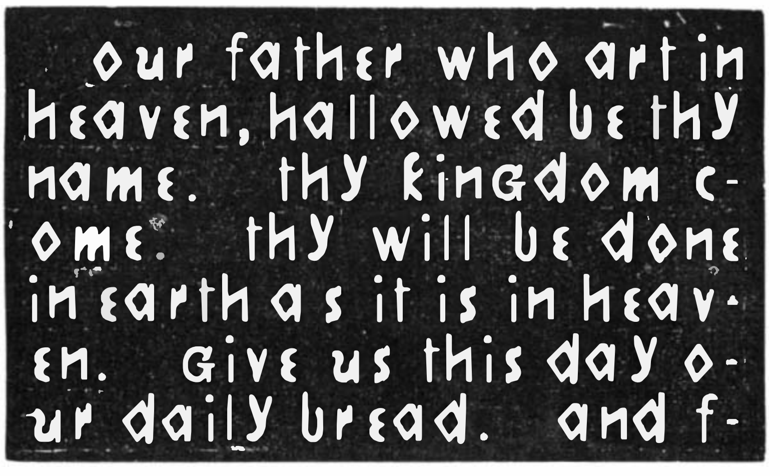
Mr. Ruggles first turned his attention to devising means for facilitating the education of the blind, as early as the year 1835, at the Perkins Institution, in Boston; and it was esteemed a most fortunate circumstance, that a gentleman of such acknowledged skill and fertility of invention should have determined to devote his best energies to their instruction. He applied himself with philanthropic ardor and enthusiasm, for several years, to the careful study of all their requirements and capabilities, by constant daily observation amongst the pupils in their hours of study and recreation. The first and most important step, was, of course, to give them books. By the old method, as practiced in Europe and this country, the books were so bulky, so unwieldy and costly, as to be of no practical value. He soon became convinced that he could produce a type of less size, and less hight of face, which the blind could read with the greatest facility; providing the raised impression was hard and sharp, and the angles of the type adapted to the touch of the fingers. After many experiments he finally succeeded in reducing the size of the type and the hight of its face so as to place books, of comparatively very small dimensions, in the hands of the blind students and pupils. The size of the type now in use, the hight of its face, and the peculiar bevel of its face, are all his own invention.

He next invented and built the first press ever made for printing for the blind. The press was very powerful, giving an impression of about three hundred tuns to each sheet printed, yet was so contrived that the blind could do their own printing.

After succeeding perfectly in the construction of his type, and as well in the construction of the ponderous press for printing, a new and unexpected difficulty presented itself. There was no paper in the market adapted to this kind of printing or embossing. That which was hard enough would crack and break through when printed; and that which was flexible enough not to crack, would flatten down when pressed upon by the fingers of the pupils while reading. His reduced type required a new kind of paper. The peculiar and definite bevel, and hight of the face of the type, and the texture of the paper printed on, were most intimately connected, and it required a long series of experiments, in the manufacture of paper, to get them so harmonized as to work well together. But at last he succeeded in producing the article required.

After getting his new method of making books perfected, Mr. Ruggles next invented an entirely new mode of making maps for the blind. His plan was, a raised character, similar to his type; but arranged with such combinations that, at a trifling cost, he could produce a succession of maps of any size. Maps made in this way were never before known, and the Perkins Institution immediately issued, from this plan, an "Atlas" of the United States, and also a "General Atlas." It would, by most persons, be thought impossible that separate type could be so contrived as to admit of their being arranged in such a manner as to produce a map of any country and then to use the same type to make a map of any other country. Yet, all this was perfectly accomplished by this new invention—every piece of type matching its neighbor, with miraculous cunning, while following the crooked lines and angles, or graceful curves of rivers, coasts, islands, &c., with which such works abound.

Mr. Ruggles next produced the plates for a book on geometry, on a plan similar to his maps. These works proved very valuable and interesting to the blind—for with these books they could pursue there studies without the assistance from seeing persons which, before this, was necessary.



Mr. Ruggles's next production was a colossal globe, with the land and water, cities and towns, rivers and boundaries, &c., all distinctly marked by raised characters on its surface. This globe is thirteen feet in circumference, handsomely mounted, with a meridian and the signs of the zodiac. Astronomical problems are worked by it, and the blind scholars answer promptly all the usual questions, quite as correctly as scholars, of the same ages, in our high schools.

In the brief space allotted to this article we cannot mention all the improvements which Mr. Ruggles has made for the education of the blind; but the school apparatus, generally, now in use, is his invention. We must especially notice their slates as being very ingeniously contrived, and the constant theme of praise by those scholars who remember the "old slates."

In 1838 Mr. Ruggles went to Philadelphia and established one of his powerful presses for printing for the blind in the Institution in that city; and a year or two later placed another press in the Institution for the Blind in the State of Virginia. The perfect success of his method for reducing the size and expense of books for the blind, inaugurated a new era in the history of this kind of work, and the books were rapidly multiplied and sent all over this country and Europe. To show the effect produced abroad, by the appearance of his improvements, we quote the following from the most reliable sources:—

A French writer, formerly a teacher of the Paris school, writes thus: "The Americans have effected a revolution in the art of printing for the blind."

In a report made by order of the Belgian minister of Public Instruction, on the establishments for the Blind and Deaf, the Abbé Carton, commissioner appointed for the purpose, writes thus: "You will be able to perceive that the American print, while it is sharper and more legible, does not occupy but half the space of that of Paris."

Ramon de la Sagra, an able Spanish writer, after some discussion on this subject, which he critically examined in 1835, remarks: "As to the clearness of the relief, and the perfection of the press-work, the Boston books may be presented as models—it is the