THE NEW SCHOOL OF MECHANICAL ENGINEERING AT HOBOKEN, N. J.

The most recent and, as it promises, one of the most complete of American schools of mechanical engineering, is that about opening in our neighboring city of Hoboken, N. J., the "Stevens Institute of Technology."

This noble institution was founded by a provision in the will of the late Edwin A. Stevens, who, as well as his brothers, John and Robert A., and father, Colonel John Stevens, before them, was well known to many of our readers as an able and successful engineer.

The bequest referred to provided that a lot of unoccupied land, in the finest part of the city of Hoboken, should be set apart from the Stevens estate for the purpose of erecting upon it "an institution of learning," and the sum of one hundred and fifty thousand dollars was appropriated for the building. Another sum of five hundred thousand dollars was set apart as an endowment, the income from which is expected to cover the running expenses of the school.

In accordance with these provisions, Mrs. Stevens and Messrs. Shippen and Dod, the trustees, have erected a fine building, of which our engraving gives an excellent representation, and which it was determined should be adapted for a school of mechanical engineering, in recognition of the evident necessities of the times, as well as with a view to the special appropriateness of such a disposition of funds furnished by a great engineer.

The building is now completed, a Faculty chosen, and an announcement is just formally issued. The Faculty are: as President, Professor Henry Morton, the brilliant lecturer on physical science, and former editor of the *Journal of the Franklin Institute.* As Professor of Physics, Dr. A. M. Mayer, formerly of Lehigh University, and well known among scientists by his valuable original researches in magnetism and other branches of physics. As Professor of Mechanical Engineering, we find the name of R. H. Thurston, late of the U.S. Naval Engineers, and a member of the Academic staff of the United States Naval Academy. Professor Thurston was formerly from Providence, R. I., where, under the eye of his father, then senior member of the well known firm of Thurston, Gardner & Co., steam engine builders, he obtained his practical workshop and office training. He was educated at Brown University, taking the course in engineering; and at the breaking out of the rebellion, entered the United States navy as an engineer officer, serving ten years, and meeting with every variety of practical work, as well as recently doing duty as "Lecturer on Natural and Experimental Philosophy" at the Naval Academy.

Prof. Albert R. Leeds, the Chemist of the Institute, was lecturer at the Franklin Institute of the State of Pennsylvania, at Philadelphia, and is a rising man.

Col. Hascall comes from West Point to take the department of mathematics; and we judge that the others of the Faculty are equally chosen.

These gentlemen are now engaged in collecting apparatus and a library, and fitting up their several departments preparatory to the opening of the college, September 20th, next.

The *curriculum* begins with an extended course in mathematics, including the applications of the calculus, a course in chemistry, and the usual college course in physics, and also courses in French and German. Having thus laid a foundation, the superstructure is erected. This consists of an advanced course of qualitative and quantitative chemical analysis in the laboratories, a course of practical work in the physical laboratory, and the course in mechanical engineering; in other words, the course of applied science. The course of instruction in the physical laboratory is one seldom offered by our colleges, but is of especial importance to the mechanical engineer. It places in the hands of the student the barometer, the manometer, the densitometer, the balance, and the vernier, and every other instrument of physical investigation, and teaches him their use by actual practice,

Drs. Morton and Mayer have collected a splendid set of apparatus for this department; the optical collection—including the whole of the celebrated "Bancker collection" of Philadelphia—is the most complete in the world, and contains many instruments of great historical as well as practical interest.

For the mechanical department, large orders have been given, and others are in course of preparation.

In this collection are to be selections from the catalogues of Schötter, of Darmstadt, and Schöder, of Frankfort, as well as heavy drafts upon Salleron, of Paris. There may be found here the engine and boilers of a steamboat used by Colonel John Stevens, on the Hudson, sixty-seven years ago, the boiler being tubular, and equal in design to many of the "safety" tubular boilers of the present day, and the screws —*twin* screws—of as good form as many now running; here are models complete and incomplete, large and small, of the great, and once wonderful, Stevens iron clad battery, which still lies—modernized by General McClellan and Engineer I. Newton—in the same spot in which the keel was first laid.

Here is a most beautiful model of the oscillating engine and feathering paddle wheels, as built by the well known English firm of Penn & Son; here are pumps and engines, rotary and reciprocating, boiler models of all styles; and we are promised so much that is interesting that we hardly know where to stop cataloguing them.

In the workrooms and machine shop, where the student is taught the principles involved in tool using and in the trades auxiliary to engineering—pattern making, molding, and founding, nd amachinists' work—is to be placed a small collection of carefully selected tools and machines.

Already a drill, by the Putnam Machine Co., and one of Browne & Sharpe's beautiful "universal milling machines" are in; and, in selecting other tools, the difficulty will probably be to determine which of our manufacturers shall be allowed to place their tools there, where they will be so continually on exhibition.

A course of instruction in drawing, under the direction of Professor McCord, accompanies and illustrates, and its earlier work precedes, the course in engineering, extending through the whole four years, and in all of the courses of instruction we are promised that great care will be taken to make each branch assist the others, and, in all, to give special attention to all principles having a directly practical bearing upon the student's professional work.

It seems to be the intention of those having charge of the institution, to go about the business of preparing young mechanical engineers for their profession in a thorough and business like manner, and we wish them the full success that they are evidently determined to command.

THE STEVENS INSTITUTE OF TECHNOLOGY, HOBOKEN, N. J.

Correspondence.

The Editors are not responsible for the opinions expressed by their Correspondents.

Motive Power of Ammonia.

To the Editor of the Scientific American:

In your valuable journal of July 29, 1871, page 70, there there appears an article headed "Ammonia as a Motor," in which you describe the principle of the ammonia engine so clearly that I would not have troubled you with any remarks, had it not been for the following:

"The report of the examining committee, headed by General Beauregard, approves of the invention in terms which are too indefinite to be conclusive."

As one of the committee, I wish to be understood as indorsing liquid ammonia as a motor just as capable of running an engine as the liquid water, because heat applied to liquids expands them into steam or gas if not opposed by pressure. Water at 212° is confined by the pressure of the atmosphere 14·7 pounds in the square inch. So is ammonia equal to 14·7 pounds at 40° below zero, which is its boiling point. But if we add 120° to water and raise its temperature to 332°, it is held as liquid at a pressure of 100 pounds to the square inch; and I know from having examined the gage in connection with the ammoniacal boiler while running, that the pressure was over 100 pounds when the temperature of the atmosphere was at 80°. If we add 40° below to 80° above zero, it is just 120°, so that the power or pressure in ammonia has been got up at the same expenditure of heat—namely 120°—as the water. But if the water be allowed to expand into steam, and the temperature kept up to 332°, in an engine of the proper size in accordance with the heating surface in the boiler, the pressure will be constant, and never above 100 pounds on the square inch. It is exactly so with liquid ammonia. At 80° it exerts a pressure of over 100 pounds upon the square inch, and this force has been got up by 120° of heat.

When the heating surface is equal to the demand, the pressure is kept up so long as any of the liquid remains; and this heat is furnished by the atmosphere, which can never rise above 120°; hence the pressure cannot exceed 180 pounds upon the square inch. To this extent only can liquid ammonia be used as a motor without the application of fire; and wherever fire cannot be applied to raise steam, I conside ammonia the best and cheapest substitute for steam, especially when I consider that a man can carry a bottle of this liquid in his pocket that will run a sewing machine constantly for a week, or, at the option of the operator, it may last for a year if used only occasionally, and will always be ready to do its work.

Hence my opinion is not indefiuite but definite, that liquefied ammoniacal gas as a practical motor is just as much a fixed fact as steam is.

JOHN ROY.

No. 60 Camp street, New Orleans, La.

Plumbago in Virginia.

To the Editor of the Scientific American:

We desire, through your columns, to give to the public a short account of a remarkable deposit of plumbago, recently discovered near this city. This deposit is about 400 yards from the James River canal, a few miles below Lynchburgh. Though only a partial and very superficial examination has yet been made, the mine is found to extend over an area of one mile in length, and a quarter of a mile in breadth. It appears on the surface in parallel strata, of from one to two feet in breadth. The shallow diggings which have been made into it, show a rapid increase in the width of the veins, and improvement in the quality of the mineral below the surface. These veins, most probably, unite at no great depth, and form an immense mass of this valuable substance. Specimens taken from the surface show this plumbago to be of fine merchantable quality, and the quantity is believed to be almost inexhaustible. It is, indeed, the most extraordinary deposit of plumbago yet discovered. Being entirely free from rock, it may be mined with little expense, and its proximity to the canal affords the cheapest transportation to the northern cities. The multiplied uses and increasing demand for plumbago make this discovery of great importance to the manufacturing interests of the country. We send you a few small specimens of the mineral from different veins, as taken from the mine near the surfaec.

A. F. ROBERTSON & CO.

Lynchburgh, Va.

Rolling Bodies.

To the Editor of the Scientific American:

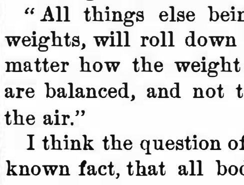
In the SCIENTIFIC AMERICAN of July 22, page 69, is the following editorial answer of L. C. to E. W.:

"All things else being equal, two wheels of different weights, will roll down the same plane, in equal times. No matter how the weight is distributed, provided the wheels are balanced, and not taking into account the resistance of the air."

I think the question of E. W. looked beyond the generally known fact, that all bodies, without regard to difference of weight (other things equal), would descend by gravity in equal times, and whether the theory found in standard works were true, namely, that with two wheels similar in all respects, excepting in the distribution of the weight being respectively near the center, or circumference, that the latter would be a longer time in descending the plane than the wheel with the weight near the center? If we use the equivalent of an inclined plane, in the form of a circular arc, on which the wheel should roll, or vibrate, the difference in time (if any) could be easily detected—and we are presented with this difficulty on the supposed trial on the arc of a circle: What becomes of the retarding force of the circumference weight, when arrived at the bottom? It is now accelerative, and a greater distance on the ascent is inevitable, with the extraordinary result of a weight raising itself to a point, higher than its original position, and so continually gaining in hight at each vibration. Make a pendulum of a large disk (no rod) suspended at the edge, having the weight around, to contrast with a similar disk, excepting the weight being near the center.

By the alleged error in the books, the starting, stopping, and reversal of the partial rotations of the outer weight, should cause slower vibrations than with the centrally weighted disk. But their vibrations would be in equal times.

I digress from the immediate question, to note the mistake of engineers, in ascribing a loss of power by the reciprocating motions of a heavy lever beam, or other weight. There is no loss (apart from friction) when attached to a crank, which is thereby equally and alternately aided and retarded.



Let the figure represent a wheel or cylinder on a horizontal plane. Bisect vertically—then no part of the half, *a*, can move in the direction of the arrow, without decrease of velocity in that direction, and therefore becomes accelerative to the half, *b*. No part of the half, *b*, can move in the direction of the arrow without increase of velocity in that direction, and is therefore retardive to the half, *a*. These counteracting forces are always equal, on all planes, inclined or horizontal,