

it would be unsafe to infer a resemblance of causes. The only inference to be drawn is that both are means of transporting the oxygen of the air on to certain combustible matters.

"For the production of acetification it is necessary that the mycoderm should be at the surface of the liquid; the process is arrested by submersion, and only recommences on the formation of a fresh film on the surface.

"The absorption of oxygen by this film is complete, and not a trace of this gas enters the liquid through it. When there is, as in Orleans' vinegar, a quantity of small eels—animalculi needing air to support life—a curious contest takes place between them and the mycoderm, the latter tending to engross the whole of the surface, while the former combine all their efforts to submerge it and expose the liquid in which they live to free contact with the air.

"The complete study of the manner in which this ferment acts and of the last interesting particulars will, perhaps, cause some progress to be made in the industrial preparation of vinegar; but the study of possible improvements must be left to the manufacturers."

#### THE OPENING OF THE FAIR.

Now is the harvest of the year, and now does the farmer gather in the crop he has so long toiled over. The fields give up their bounty; the orchards droop with their luscious loads; from the vines the clusters hang purpling in the sun. Why then should not the mechanic, who toils with a different steel from the farmer, reap his reward also, and in the fall of the year make harvest time of the fruits of his ingenuity? Let us all have our time of rejoicing together, and, by friendly competition, endeavor to work to mutual advantage and interest.

No reflective person can enter the Fair of the American Institute, which opened on Tuesday last, without feeling, in some degree, the immense interests and the importance of them gathered there. The machines, products and materials shown comprise but a small part of our immense resources, for in all parts of the country—North, South, East and West—the same scenes are being enacted, and each district has something novel which the others have not. Yet from this exhibition we can realize in a degree the importance, extent, and versatile character of the inventions annually made public. To classify them would be impossible. There are in the Fair machines for so many different objects; fabrics of so many different materials—combined and distinct, raw and finished; works of art so beautiful, and specimens of ingenuity to be met with so frequently, that the beholder is compelled to give each its due share of attention. The consequence is, that a long time can be usefully spent in examining the attractions, and not one, but several, visits made profitable.

The large armory of the Seventh Regiment, on Fourteenth street, near Sixth avenue, has been fitted up by the American Institute for the exhibition this year, and it is an excellent building for the purpose—the view in the main room being uninterrupted by massive columns, while the general character of the building renders all parts easy of access.

On entering the room the visitor beholds a large square apartment full of machines in active operation. In the character of a visitor we wandered down the aisles formed by the various tools, and noted what was to be seen. It is not our intention to give an exhaustive account of the contents of the building, but to simply note such things as seemed to us novel and of a useful character. We naturally went to the machines and among the tools we saw.

#### JAMES STEWART & SON'S LATHES.

These tools have won a great reputation for the makers by reason of the excellency of the workmanship on them. They are intended to be run by the foot, but are adapted to power as well. They are made of the best materials, well finished, with or without back gears and slide rest, and set on a neat work-bench with a chest-of-drawers for tools, etc. They are superior lathes in all respects, and will last "forever" with care.

We noticed, a little further along, "Pomeroy's Aerial Governor." This is intended for steam engines, and is an ingenious and excellent thing for

the purpose. It was illustrated on page 17, Vol. X., of the SCIENTIFIC AMERICAN. The controlling agent in the governor consists of two circular metallic disks at the extremity of two horizontal arms. These arms are attached to a spindle and have two steel rollers near the center, set so as to run on inclined planes formed on the column which supports the governor. When the disks are revolved with rapidity, they run up on the inclined plane, with any change in the original speed, and close the throttle valve—opening it as they descend again by gravity. Numerous testimonials from parties using them show the estimation they are held in. J. H. Pomeroy & Co., Syracuse, N. Y., are the manufacturers.

#### TUBE EXPANDERS.

Messrs. Thos. Prosser & Sons, of this city, exhibit some of their well-known tube expanders, for expanding the flues of tubular boilers. These articles have been in use for many years, and are indispensable. These gentlemen also exhibit wire brushes, and a general assortment of implements useful to engineers.

#### SNOW'S GOVERNOR.

This governor is on exhibition at the Fair, and the proprietors show many certificates of its utility. It is in appearance an ordinary two-ball governor, with the exception that the arms are very short; it is without the central spindle and diagonal arms common to the old kinds, and connects directly to the throttle. A large-sized governor, for marine engines, is shown; it consists of a flat bar with balls on the end, set at an angle in a shaft running horizontally. When set in motion the centrifugal action tends constantly to throw the bar at right angles with the shaft, and this action is taken advantage of to control the engine. G. W. Lascell, of 437 Broadway, is the exhibitor.

#### TWIST DRILLS.

The Manhattan Fire-arms Company, of Newark, N. J., exhibit a beautiful case of their tools. These drills, as is well known by our mechanics, are made in a machine specially constructed for the purpose, and are of uniform size and quality. They do beautiful work, and no shop should be without them.

#### SODA FOUNTAINS.

Mr. William Gee exhibits a set of his soda fountains in working order. By recent improvements in such apparatus, Mr. Gee furnishes a very different article from that commonly offered. Thirsty persons may have noticed that the rush and sparkle of soda water is soon lost generally, and the mighty "fiz" with which it issues, turns to a vapid "fizzle" at the close, long before the bottom of the glass is seen. Mr. Gee's soda water is quite another thing. It issues as placidly from the fountain as a jet from a pump, but the sparkle and effervescence of the gas escaping is mighty, and the beverage is pungent to the last. We never before tasted soda of such excellence.

#### ROOT'S STEAM ENGINE.

The machinery was not in operation at the time of our visit, but will be before this article is published. Root's engine, which was at the Sanitary Fair last year, is to be seen this year, and of all the compact engines, this is the thing. In the space of about 18 cubic inches a machine, capable of giving out 15 horse-power, is placed; and that they give great satisfaction is shown by the number sold. Some of these engines are in Government cutters. Manufactured by the Root Steam Engine Co., New York.

#### THE NAVAL ENGINE CONTEST.

The trial of the two vessels—the *Winooski* for the Navy Department, and the *Algonquin* for Mr. E. N. Dickerson—has not yet begun in earnest. There have been some preliminary experiments, but what the result is we are unable to state. At the time of our visit, however, on the 15th inst., the *Winooski* was turning her wheels with great ease and rapidity, while the *Algonquin's* engine was stopped, and had been for some time. Boiler-makers were at work on board, and some engineers were examining the piston, but the cause of this delay and repairing was not given, as the engineer interrogated, prudently knew nothing about what was going on. On visiting the naval vessel we were informed that the 96-hour trial would come off next week, possibly Tuesday. The conditions are, that each vessel, having the same sized wheel and draught of water, shall receive 1,600 pounds of coal per hour, and make fifteen revolutions per minute. Of course the en-

gine that can make this speed with the least fuel will be the victor. This point being decided, the vessels will proceed to Sand's Point, and run from thence three times around Fisher's Island, a distance of about 750 miles; then the contest will be ended and the result made public. We shall publish the facts and figures of the trial when the same is concluded.

#### A SENSIBLE GOVERNOR.

Brown University, at Providence, R. I., enjoys the honor of having commenced, under the direction of its former able President, Dr. Wayland, that great reform in education which is spreading through all our colleges—the establishment of a scientific department in addition to the regular classical course. The sound practical sense evinced by this reform seems to be broadly diffused among the people of that State. At the commencement of Brown University, on the 6th inst., Lieutenant-Governor Duncan C. Pell, spoke as follows:—

"I thank you, Mr. President, for your courteous introduction; and if any thing could console me for the absence of the Governor it would be your kindness. The State, so far as I have served it, has prospered finely. Governor Smith takes charge of the Providence Plantations, and I take charge of the State of Rhode Island. From the day I was inaugurated to the present, I have not heard the slightest complaint. I consider it to be a great honor to be the Lieutenant-Governor of the State of Rhode Island. But I felt it to be a greater honor to be President of the Board of Education of the City of Newport—an office I held for some time. During that period I had an opportunity of ascertaining the character of the literature read at the firesides of many different classes of our citizens; and I tell you that I never have been more amazed than in witnessing the sound nature of the reading matter I have found in the houses of comparatively humble people. I sometimes, when the great cares of State will permit, go a fishing; and I have put up at the houses of plain farmers, where I have found complete sets of the SCIENTIFIC AMERICAN, and the owners have mastered me on every article contained in it."

#### NEW BOOKS AND PUBLICATIONS.

SECOND EDITION OF GESNER'S COAL OILS.—Messrs. Balliere Brothers, No. 520 Broadway, New York, have published a second edition of Dr. Abraham Gesner's treatise on coal, petroleum and other distilled oils. As the death of Dr. Gesner has occurred since the publication of the first edition, this second edition is prepared by his son, George W. Gesner, consulting chemist and engineer. It is a book of 181 pages, containing a history of petroleum and distilled oils, with the modes of refining, and a summary of the principal patents relating to the manufacture of aniline dyes, all illustrated by wood cuts of the apparatus employed.

POETICAL TRIBUTES TO THE MEMORY OF LINCOLN.—This is a compilation in one elegant volume, by J. V. Plott, of many beautiful poems, by different authors, upon the occasion of the death of the immortal Lincoln. The work contains poems by Bryant, Bickerstaff, Alice Carey, Daganne, Gurley, Holmes, Stoddard, Mrs. Stebbins, Tuckerman, Willis, and a host of excellent writers. The book should have a place in every library. J. B. Lippincott & Co. publishers.

#### Trial of the New Jersey Flying Machine.

We are informed that the flying machine which has been in process of construction in Jersey City, and which has been incorrectly called the Government flying machine, as the Government had nothing to do with it, has been completed and tried. It of course failed as every body of any judgment knew that it would. They could not get it off the ground.

A WAGON which was passing through the Rue de Rivoli, Paris, one day last month, was seen to be suddenly enveloped in ghastly blue flames. It was loaded with phosphorus, which had caught fire from the friction occasioned by jolting over a rough piece of new macadamization. One of the passers-by, who hastened to render assistance, was himself covered with the half-melted substance and severely burned.