CONDITION OF THE PATENT OFFICE.

The calorific class, under the charge of Examiner Deane, is, we learn, close up with its work, as are some other classes.

There was a time when applications for stoves, furnaces, etc., remained unacted upon for several months, but thanks to Mr. Deane's industry the large batch of cases in his department have been worked off.

We hope soon to be able to report as satisfactory a condition of some other classes which are now sadly in arrears. If the fault rests with the Commissioner in not supplying adequate force, we hope he will see to increasing it. If it rests with Congress, in not legislating to pay ample salaries to the Examiners to stimulate them to perform their duties properly, we trust that body will authorize an increase of their pay which is unquestionably inadequate for the talent needed, and labors required. The inventors are taxed sufficiently already, but they are willing to pay more if necessary to insure the prompt action of the office upon their casee. Many applicants for patents in some Classes quietly demur at the delay in the examimation of their cases, others impatient or less amiable, are more imperative and demand a reason for the seemingly partial action of the Patent Office in examining some cases about as soon as the application is filed, while others remain unacted upon for several months.

Such disparity in the time taken for a decision under the different classes, causes much dissatisfaction which would be obviated by keeping every Class on the same level.

The examination of cases in the following Classes are those most in arrears, some of which are sadly so: Metallurgy, which includes Locks; the portion of Hydraulics which embraces Water Wheels; Farm Gates, Wearing Apparel, Fibrous and Textile fabrics, and Fine Arts, which includes games, toys, printing, copying presses, etc.

GLEANINGS FROM THE POLYTECHNIC ASSOCIATION.

The regular meeting of this branch of the American Institute, was held on Thursday evening, January 10th, Prof. Tillman presiding.

VEGETABLE WAX.

Among the novelties presented, was a specimen of vegetable wax from the island of Margaret, off the Texas coast. As it is found in connection with petroleum, the possibility of its being paraffine was advanced, but the composition of this substance is different, and more nearly resembles the tallow tree of Japan.

PLASTIC ANATOMY.

Some excellent imitations of natural fruit were shown, most perfect in shape and color and made from a composition invented by M. Julian Ledion. The same gentleman also exhibited a number of pathological specimens of plastic anatomy modeled in the same substance from cases in the hospitals of France, and which in minuteness of detail and fidelity to life were pronounced perfect by the medical critics present. A great advantage of the compound wax, which is generally employed in forming these models, is its firmness in retaining its shape in any climate.

PROFESSOR GRIMES.

The greater part of the evening was occupied by this gentleman in a labored attempt to overthrow the nebular theory of Laplace and to substitute therefor an original hypothesis. Statements were brought forward which could only support his position by an utter disregard for all the established and universally received laws.

PROFESSOR TILLMAN.

In closing the meeting, the chairman, in reply to an irreverent expression which had been used during the evening, spoke of the revelations of science as confirming more strongly our belief in an all-wise and all-powerful Creator. Modern investigations prove that the myriads of stars, or suns, are but parts of one grand system guided and governed by the same will.

Research shows that the known universe is pervaded by a subtile ethereal medium, in which all celestial bodies are immersed and through which an ubiquitous power is incessantly exerted: further we have reason to believe in the existence of a still more attenuated agency reaching to the very confines of the spiritual, and through which the Creator may communicate with his rational offspring. But this is a field of mere speculation, and we are compelled to confess, "His ways are past finding out." Science can only definitely testify to the presence throughout the universe of a unity of power and of design, that power being the Divine Energy, and that design a direct emanation from the Deity.

The Diamond Drill.

The apparatus for boring rocks with diamonds was originally patented in France by Leschot, in 1864, and was rendered practical by Pihet, in 1866. It consists of an iron tube, the end armed with a series of black diamonds of Siberia, which are set in such a way that by turning the tube they excavate an annular groove in the rock, and leave in the center a solid cylinder which enters the tube, and is easily broken off and extracted when the boring is finished. Fifteen such machines have already been manufactured. The progress is about three quarters of an inch per minute. The diamonds wear very little; it is known that this also is the case with the glazier's diamonds, and that the black diamond is a variety much harder than any other. The expense of boring with a machine of this kind is not materially greater than boring in the old way, although more work is turned out; but the great advantage is, that in the same space where three borers were attached, eight of these machines may work, requiring not more power to drive them. The expense of excavating tunnels with a single machine of this kind, in hard rock, was found in France to be forty or fifty francs per cubic meter, which corresponds to $6 or $8 per cubic yard.

HINTS FOR INVENTORS ON STEAM CONDENSERS.

[For the Scientific American.]

The connection of condensers with steam engines, seeks, in general terms, to subserve one of two purposes, viz: (1) either the reduction of the vapor to fluid that it may as such be returned to the boiler, or (2) the restoration of it to the water state that it may be devoted to some other use.

The problem submitted to invention for solution under the first head, is to effect the condensation at the highest possible temperature and to return the product to the boiler as near the ebullition point as attainable. The conditions under which these two ends can be accomplished, are to be met in the apparatus, and to realize them is the task which mechanical and chemical talent has proposed to itself. He who comes nearest a full satisfaction of these *desiderata* will give the world a most valuable invention. In all attempts to reach these results, there are some well-settled facts to be borne in mind. Among them are the following:

That water contains a large quantity of air in a state of solution, and that by boiling it, this air may be liberated, so that the liquid contains less than any assignable measure: that water freed from air will not boil at all, but at 260° Fah., or thereabouts, explodes into steam with destructive energy: that water in this state and at the temperature noted, will burst into steam if so much as a drop of the fluid in its natural condition be thrown upon it.

These are facts familiar to the manipulations of the laboratory. Others belonging to the same family are as follows: that water in being crystallized is deprived of every atom of air—hence ice possesses not a particle of it: that ice, melted under oil to exclude the atmosphere, does not, upon taking the liquid form, boil at any temperature, but explodes with violence at about 260° Fah. These are facts not so familiar, but nevertheless well established and incontrovertible.

Related to the subject before us, and therefore embraced in the investigations of the inventor, are also the ensuing: that all fresh water used in boilers is impure: *i. e.*, invariably consists of something more than hydrogen and oxygen combined: that in heating it, the acid and alkaline matters existing or evolved form salts, which present themselves in solution or in incrustation: that in boiling it, the air contained is slowly set free and mingled with the gases generated in the formation or by the resolution of the salts: that upon depriving water of its air, the adhesure of its particles seems to be greatly intensified, and its elasticity destroyed, insomuch that a stream of it poured into a glass tube gives a peculiar metallic sound

In the presence of these three series of facts, it becomes us to inquire whether a steam condenser, which collects and returns to the boiler the vapor that the engine discharges into its exhaust, will not gradually separate the air incorporated with the water and thus (*a*) steadily advance the point at which steam can be raised from 212° to —° Fah: and (*b*) finally, at 260° Fah., cause an explosion of the boiler.

Another question, not yet answered by invention, though intimately blended with this, is whether by any means within practicable reach, the air set at liberty by ebullition can be re-combined with the water and thus preserve the liquid in its normal status.

In most condensers of the kind under review, provision is made for the escape of the gases generated by the impurities of the water, and with them, of the air upon which the vitality and safety of the fluid depend. Could not these gases be discharged without carrying the air with them? Or could they not be absorbed without taking up the latter also? These are practical and important inquiries to meet and satisfy.

If a steam engine could work without loss a condenser without leakage, and thus return to the boiler all the water originating from it, the probabilities are that it would prove a source of serious apprehension and not be a desirable thing under any circumstances. Hence another question arises, and that is, how much water in its natural state should be supplied to the "fountain of power" under assigned conditions, to prevent the boiling point from approaching too near 260° Fah: or rather, at what figure on the sliding scale from 212° to 260° Fah. should ebullition be secured in view of the greatest economy of fuel and of the highest safety of operation.

From these considerations it would appear that the more complete the condensation, where the water is restored to the boiler, the higher the ebullition point rises above 212° Fah: that as this point ascends the scale of 48°, the temperature at which the water can be returned to the boiler should be increased; and lastly, that the thermal line, if we may be allowed the expression, on which the steam will condense, passes upward correspondingly toward 212° Fah.

SUGGESTOR.

Goods for the Paris Exhibition.

The ship Mercury, bearing the second installment of contributions to the Paris exhibition, sailed for Havre, on Saturday, Jan. 19th, with about 1,500 packages, or nearly 1,000 tuns in measurement. A large proportion of the cargo comes from New York city and state, and comprises a large variety of the products of mechanical skill, such as machinery, agricultural implements, etc. The Western states are also well represented. California sends rich specimens of ores and various agricultural products. Illinois sends a school-house complete, the materials being sufficient in bulk to load three rail-cars. From Philadelphia there was received a huge machine weighing forty tuns, designed for working iron. Connecticut is represented by a contribution of fire-arms, and Massachusetts by fabrics from mills and workshops. A handsome street railway carriage, from the manufactory of John Stephenson, in this city, goes to the Exposition, on its way to Bombay, India.

A CLARK TELESCOPE is advertised for sale, in this number. We understand that a rare opportunity is presented of obtaining a fine instrument.

Correspondence.

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

The Water Spouts of Tusquitta.

MESSRS. EDITORS:—In a recent issue of the SCIENTIFIC AMERICAN, "D. C." gives a very interesting account of the effects of water spouts at Tusquitta; but to an unscientific reader like myself he fails to give any easily understood theory as to how such perpendicular-sided cuttings could have been made by the mere falling of water. He says: "These canals could only have been cut by the force of a descending sheet of water." I also can easily imagine the water must have been descending; but I can hardly believe it was only in a descending state.

From his description of the awful state of the elements at that time, and of the impetuous closing together of two such vast and overcharged clouds, it is easy enough to conceive that the immense body of water which they each contained must have had its natural tendency to descend, thwarted or neutralized by a swift rotary motion of the whole mass, given to it perhaps by a still swifter motion of a vast enveloping ring of electricity, flying round and round it vertically—that is, over and under it—and thus confining the water within its folds, and imparting somewhat of its own velocity to it. The result of two clouds under such circumstances coming together and both rotating in the same manner and in the same direction, would be a sudden flattening and spreading out of the parts in contact, giving, probably, a still more increased swiftness of motion to that part of the clouds thus flattened and extended.

D. C. says that when they met they shot instantly upward. Yes, and no doubt they shot as instantly downward, and not only so, but circularly too, though such fact might not and would not be perceived.

At this stage of the imbral combat, the under part of the periphery of this gyrating cloud wheel coming in contact with the earth, acted on it like the edge of a swiftly revolving circular saw, cutting for itself a clean sided channel, where it first struck, and widening the cutting, and leaving it less clearly marked as it continued its descent and lost its electrical power; until, by degrees, the volume of water thus discharged on the sides of the mountain would follow its natural laws, and the electric phenomena obeying also the great fiat of nature's God, would quietly subside.

This view of the matter would easily account for the peculiar appearance of the chasm at the spot so evidently first struck. One can scarcely conceive that water alone could be capable of cutting the roots of trees as clean off as though done with a knife, while it is easy to imagine the electric fluid to have been the author of it in some way or other, if not exactly in the way I have ventured to surmise.

J. H. HODSON.

Perspective Drawings.

MESSRS. EDITORS: A sentence in the article on Perspective Drawings, in the SCIENTIFIC AMERICAN (No. 2, this volume) is likely to give trouble to some artists, judging from what I had myself, and for the same reason: that of supposing that, because a photogram of a street scene exhibits a convergence of vertical lines, therefore a *true* perspective drawing should have the same convergence. I therefore proceeded to various nice experiments, even to place myself in the same position whence the photogram was taken; but it was of no avail: the vertical lines would persist in remaining parallel and perpendicular to the horizon. But as something must be wrong, whenever two operations conducted on the same principle do not agree, I determined to find where the error was, and therefore proceeded to examine more closely the photogram, notwithstanding its reputed infallibility. The cause soon became plain: When a photographer takes a street scene from a certain altitude, he has to incline his instrument a few degrees, thus giving the sensitive plate a slight inclination forward. The plan is no longer a vertical one, and hence the *necessary* convergence of vertical lines. If the plan had an inclination of 45°, both vertical and longitudinal lines would converge alike. Continuing the inclination downward, the longitudinal lines will converge less, and the vertical ones more, until we reach the horizontal position, in which the plan exhibits no convergence either in longitudinal or transverse lines, but all vertical lines converge more or less according to distance. Yours, respectfully, E. ROSE.

Ottawa, Ill., Jan. 14, 1867.

The Amazon.

The Emperor of Brazil has decreed that the vast inland system of the Amazon and its great tributaries, the Tocantins and San Francisco rivers, shall be freely opened to the commerce of all nations. Prof. Agassiz tells us that the climate of the immense valley of the Amazon is delightful. A cool breeze goes up the river at all times, the thermometer varying between the extremes of 72 and 92 degrees, and averaging 84. He says that although warned beforehand that he was going into a region of death, he found that there were no dangers and hardly any discomforts to be met with. Perhaps the Professor was unduly propitiated by his unprecedented haul of fish. The whole region is a vast plain—an unbroken expanse of wood and water—having a descent of only 210 feet in 3,000 miles. The annual swellings of the river rise from 30 to 50 feet, and convert the whole into an ocean for some months of the year, centering in June, and communication is then carried on by boat paths among the tree tops. The primitive and universal forest is almost impenetrable, and filled with the choicest timber, of which 117 costly varieties cut from a tract half a mile square, were lately displayed at a provincial exhibition in Para. The length of the valley