The College Review, Maine State College, April, 1876

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The College Review.

Vol. 1. MAINE STATE COLLEGE, ORONO. April, 1876

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45 WEST MARKET SQUARE!
Where can be now seen on exhibition one of the most splendid Stocks of NEW GOODS, consisting of Broad Cloths, Diagonals, Basket Goods, and other varieties too numerous to mention for DRESS and BUSINESS SUITS. The PANT CASSIMERES are perfectly splendid in variety and styles,—are not to be surpassed, and the prices are marked BELOW competition.

With R. O'CONNER, the Custom Department is a Model of Completeness. The Stock of
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In presenting this paper before the public, we feel it is necessary to premise a few remarks relative to the causes which prompt its publication and the subject matter of which it is intended to treat.

We are aware that an erroneous idea prevails throughout the State relative to the course of instruction taught here; and a majority are thus censoring that which they know but little about; for which reason, we deem it necessary for the benefit of the institution and ourselves, to eradicate this growing evil, and place before the people the true state of affairs as it shall from time to time exist.

Four departments have been proposed which will be conducted by as many editors, each one having charge over his separate department; and it will be the duty of each to so conduct his department as shall best meet the exigencies of the people.

The Agricultural Department of this paper will be devoted to the discussion of topics which will be of practical value to the agriculturists of Maine.

Many valuable experiments are yearly performed on the College Farm, under the direction of the superintendent, Mr. Farrington, but few of which have been made public; and it is the intention to have the most useful experiments published in the columns of THE COLLEGE REVIEW.

Reports of agricultural meetings which take place in various sections of the State, will, from time to time, be given in this paper.

The Chemical Department will be devoted to essays, experiments, and general facts in the science of chemistry.

Chemistry is a science of peculiar interest, inasmuch as it is so closely related to the life and happiness of man; and we feel that even the short discussions on various subjects, which may be given in the columns of THE COLLEGE REVIEW, may not fail to supply a want which, if not appreciated, is surely existing among the masses of society.

We shall endeavor to lay before our readers accounts of experiments which may be performed in the laboratory, as well as some general facts in the science, which we hope may be found interesting and beneficial to those who may not be familiar with the processes by which the properties of matter and composition of bodies have been ascertained.

The Engineering Department will be devoted to descriptions of new and useful inventions, and accounts of the great and wonderful enterprises in engineering which, each year, become more numerous and grand; and which cannot be otherwise than useful and interesting to the general reader as well as the mechanic and engineer.

The reader will also learn through this department, the manner in which engineering is taught in this institution, of which a brief description will be given in this number.

In the General Department we shall endeavor to draw together such information as may be most profitable to our readers, not forgetting however, that facts, without proper habit, are dry. Therefore we shall reserve a share of this department for the mirthful as well as the more sedate reader.
Thoughts on Agriculture.

It is a fact generally admitted that agriculture, when wisely carried on, is one of the greatest sources of national prosperity.

It is closely linked together with all other industries, and, to a certain extent, they are dependent upon it.

Such being the case, the comparatively low state of agriculture must affect, somewhat, our national progress.

That it should be held in such low estimation by many of our people, is truly hindering our advancement as a State and as a nation.

How agriculture can be raised to the position it rightly deserves, and so do the work it is capable of performing towards increasing the resources of our State, is a question that should have the attention of all interested in its welfare.

This industry will never be advanced by those who preach the advantages the farmer has over those of other vocations. Any person with a clear understanding of the subject, can see what disadvantages the farmer labors under at the present time, socially and intellectually. And before the people of our State can expect a goodly share of her young men to direct their attention to this vocation, public sentiment must be changed in regard to it.

To change public sentiment, agriculture must be improved by the application of scientific knowledge. A thorough understanding of the properties of the soil,—the elements contained in it necessary to produce different crops, and what particular ingredients enter into the composition of vegetable structure—cannot be obtained otherwise than by a thorough course of training in that department of science relating to this subject.

Generally speaking, it is just as reasonable to suppose a man can be a skillful engineer without first learning the elements of scientific engineering, as it is to think that he can make farming profitable, to the highest degree, before learning the principles that have the most to do with its success.

By many farmers, the present mode of agriculture is mainly groping in the dark. No attention whatever is paid to the adaptability of certain soils to produce different crops; but the farmer puts in the seed for that crop he wishes to raise, without regard as to whether the soil contains the elements necessary for the production of the crop.

Without doubt, the observing farmer can, by experience, ascertain what soils are adapted to the production of different crops; and, by taking advantage of observations made, meet with a good degree of success in his labors. But a more extended knowledge of the principles of science relating to this industry, would undoubtedly make his labor more fertile of results.

When speaking of education in agriculture, some farmers say they are hindered in gaining information on this subject because scientific writers make use of technical language, which they do not understand. Such is not the case with the educated farmer. He both comprehends their language, and understands how to apply the principles conveyed by it; while with the uneducated farmer, if the scientist put his ideas in comprehensive language, he would be at loss to make correct application of the principles, not having seen their workings, and consequently being ignorant of their proper use.

Mr. Walter F. Robinson, of Hartford, has returned from the South to spend a few weeks at his home. We understand that he has purchased a farm of about 400 acres in the State of Virginia, to which he intends soon to return and cultivate. He was a member of the class of '76, but left at the close of the Sophomore year. He was very much interested in Chemistry, and would have taken the Chemical course had he remained. He regrets that he did not remain through the course. We doubt not but that he will enjoy his new life and take creditable rank among the best farmers of Virginia.

—W. Balentine, of '74, has a situation as Assistant Professor in Wesleyan University.
CHEMICAL DEPARTMENT.

Some of the Fruits of Theory.

In a science so emphatically the science of the *atom* as is that of Chemistry, from the very nature of the work, many theories must be advanced to account for the various compounds and reactions observed. But it is only after these theories have withstood the tests of time and attendant discussion, that they may be considered as in the domain of scientific truth.

Prominent among the fruits of theory, may be considered the so-called "hexagonal" formula which M. Kekulé assigns to benzine. He considers that benzine (C₆H₆) "represents a closed chain composed of six atoms of carbon, each of which unites to one of its neighbors by two atomicities and to the other by one. There remains thus one affinity free for each atom; the group C₆ would be hexatomic, and benzine, C₆H₆ saturated." Other compounds are derived from this by the substitution or addition of various elements or radicals.

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  H
 / 
C- C-H
H-C C-H
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Graphic Formula of Benzine.

But one of the most interesting examples of the value of theoretical deductions is furnished by the circumstances attending the discovery of the new metal, *gallium*. In the year 1869, Mendeljeff, a Russian chemist, published a paper giving all the principal chemical and physical characters of a metal which he prophesied would be found associated with aluminum and silicon. It had repeatedly been observed that *something* interfered in the analysis of certain zinc ores, when these metals were present. But a few weeks since, a hitherto unknown metal was discovered in such zinc ores, by M. Ducocq, of France; and what is most wonderful, it agrees exactly in all the properties given seven years ago.

The discovery rivals that of the planet Neptune, by Adams and Leverrier, in 1846—the result of the solution of the abstract problem: "Given the disturbances produced by the attraction of an unknown planet, to find its orbit and its place in the orbit." It will be remembered that these astronomers were able to calculate, almost exactly, the position of the new planet. In a similar manner, this chemist is able to say: Search between aluminum and silicon, and you will find a metal with such and such properties.

Without doubt the time is near when the value of purely theoretical deduction will be conceded, and a just estimation made of the fruits of the study-room, as well as of the more material products of the laboratory.

VENTILATION.

The first and most indispensable requisite of health or existence is fresh air. Nature, in the mechanism of the body, has provided a means by which this may be attained. What would be the effect of the air were it not regularly renewed in the chest? We learn that there is an element (oxygen) in the air which acts as a blood purifier in the lungs; that the blood comes to these organs loaded with the dead and cast off particles from all parts of the body, and that these particles, consisting of carbon, unite with the oxygen and form carbonic acid (CO₂). Thus, if the air were
allowed to remain in the lungs, it must become altered and contaminated; and, consequently, incapable of supporting life. If this be true in relation to the air in the lungs, it is no less true in regard to the air outside the chest. Suppose we remain shut up in a close room, where we have not taken the precaution to provide for ventilation; the air is breathed over and over again, and at every exhalation it loses a portion of its oxygen, which is the life-giving principle, and becomes contaminated with carbonic acid, which is fatal to life. It is estimated that a person requires at least ten cubic feet of air per minute, or six hundred cubic feet per hour. Admitting this, the air of an ordinary sleeping room, of a capacity of 1000 cubic feet, would become saturated with carbonic acid in one and two-thirds hours. History furnishes many sad instances of the effects of neglecting ventilation. In 1756, of one hundred and forty-six Englishmen imprisoned in the Black Hole of Calcutta, only twenty-three at the end of eight hours were found alive. Numerous instances have been recorded where passengers on board steamships, during stormy nights, have perished from being shut up in small cabins. From these cases we see the fatal results of re-breathing the impure air which the lungs have once thrown off. Even largely diluted carbonic acid acts as a narcotic, producing languor, and finally insensibility and death. The languor and sleepiness which we experience in closed rooms or crowded assemblies, are the effects of breathing this poison. We may note this still further in our personal experience. We sleep in a closed room and arise in the morning unrefreshed and unfit for labor during the whole day. We have been breathing over during the night the air filled with carbonic acid which the lungs have thrown out, and consequently have failed to get the oxygen so much needed; and, as a result, the blood, unable to rid itself of its burden of impurities, has become overloaded and sluggish. Yet the breath is not the only source of impurities in a close atmosphere where persons are assembled. If we hold the hand near a cold glass there is a thin coating of moisture condensed on the surface, and experiment has shown that there are gases constantly passing from all parts of the body which tend to contaminate and poison the atmosphere. We shun impurities in every form. We dislike to wear the clothes of another, to eat from the same dish; we shrink from contact with the filthy; and yet, sitting in the same room with them we inhale their poisonous exhalations without a murmur.

But how are these impurities to be avoided? The means are always at our command and consist of the process of ventilation, which is the introduction of fresh air from without, and the discharge of contaminated air from within; and in such a current that the atmosphere at the end of the hour shall be as pure as at the first. Less than this will not meet the requirements, for every impurity which has collected in the atmosphere must be breathed by the occupants, and accordingly must retard healthy respiration in a corresponding degree.

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LOCALS.

—Codfish.

—Sawdust pie.

—"That's the vote I throw."

—O-o-o-oh "Dyar" how you talk.

—Don't blame the phrenologist, Joe, nature did it.

—One of the students would like to know if the chemist Remsen was not formerly a German.

—Which was it, cheese or rum? Ah! "Rum did it."

—It is not unconstitutional to vote for one's self, and it is too bad that public sentiment is against it.

—We all know about the shooting stars, but we forget that this world is a revolver.

—One of the Chemics came to the conclusion that Holly water could be used as a substitute for alcohol either in a lamp or in testing for strychnine.

—Fred A. Wilson, A. B., Professor at Hallowell Classical Institute, has been appointed to deliver the Master's Valedictory in Latin at the next Commencement at Bowdoin.
ENGINEERING DEPARTMENT.

In this number of The Review we are restricted, on account of our limited space, to giving the reader only a general idea of the course of instruction received here by the students in Engineering; but what we are obliged to omit in this number we will try to bring out more fully in succeeding numbers.

Although the students do not choose their course till the beginning of the third year, yet the studies are so arranged that each student receives the mathematical discipline needed to fit him for the higher studies and applications of mathematics in the engineering courses. The knowledge of Algebra as far as Quadratic Equations, and of five books in Geometry, is required as a condition of admission to the College; and the study of Algebra, Geometry, Trigonometry and Calculus, is pursued under the instruction of Prof. M. C. Fernald.

Second term, the Sophomores receive instruction in free-hand and mechanical drawing. Some practice in free-hand drawing is needed by the engineer to enable him to make sketches of bridges, machinery, etc., which he wishes to draw to a scale. Mechanical drawing is commenced thus early in the course, that the students may acquire facility in the use of instruments so as to be able to plat surveys which they make the next term.

Third term, the Sophomores take up the study of Surveying, together with field practice, under the instruction of Prof. G. H. Hamlin. The students receive instruction in running lines, parting off and dividing up land; and also in platting and calculating the area of fields of different shapes. In fact, they obtain a thorough knowledge of surveying both with and without instruments.

First term, the Juniors, in mechanical engineering, study the Elements of Mechanism by Goodeve, a fine elementary work on the construction of machinery. Second and third terms, the Juniors study Machinery and Millwork, by Prof. Rankine, the reputation of whose works is too firmly established to need comment. The Seniors pursue the study of the Steam Engine during the first and second terms under the instruction of Prof. Pike, who is at the head of both departments in engineering.

The third term, the Seniors make designs and specifications for machinery.

First term, the Juniors who take the Civil Engineering course take up the study of Hench's Field Book, together with the field practice in surveying railroads, and during the remainder of the course they pursue the studies of Civil Engineering and Applied Mechanics, by Prof. Rankine, treating of the construction of railroads, bridges, etc.

Too much cannot be said in favor of the instruction the engineers receive at this institution in mechanical drawing.

The Juniors in Mechanical Engineering take dimensions and draw different kinds of machinery during the first term, while the Civil Engineers make complete topographical drawings of the railroad they survey. Second term, all the Engineers receive instruction in isometric drawing and casting shadows.

The third term, the Juniors in M. E. take weekly trips to the machine shops at Bangor, with Prof. Pike, and examine the different kinds of machinery,—noticing how the principles learned in books are made use of in actual practice, and taking sketches and notes which enable them to make drawings of the principal machines. First term, the Seniors in both courses receive instruction in Perspective drawing, making drawings of buildings, bridges, etc. Second and third terms, they make drawings of details, sections and elevations of engines, thus obtaining an idea of their construction which could be gained in no other way.

—A history of the College by Prof. Allen, is nearly ready for publication.

A. C. Mitchell, of the class of '75, has accepted a situation in the Baldwin Locomotive Works, Philadelphia.

A successful sheep-raiser of Nevada says that sheep are better than bonds; you can tear off a coupon every six months half as big as the bond, and the bond is left as big as it was.
The Channel Tunnel.

Probably the grandest piece of engineering now in contemplation is the proposed tunnel, which, when completed, will connect the countries of France and England, passing beneath the Straits of Dover. The idea of this tunnel, though proposed more than half a century ago, has not been seriously entertained till within a few years.

It has long been the study of engineers to provide some kind of a vessel by which seasickness might be prevented in passing between these two countries, as well as to insure a more rapid passage. Various inventions have been devised to lessen the rolling effect of the vessel and thus remove the cause of sea-sickness; but none of these contrivances have been entirely successful.

It was proposed by M. de Gamond, in 1833, to lay an iron tube in sections at the bottom of the strait, by means of diving-bells; but before this could be accomplished the bottom of the strait must first be leveled for the purpose. This scheme was abandoned as soon as proposed.

Several plans of bridges have been devised and rejected—the estimated cost of which ranged from £30,000,000 to £200,000,000. In 1865 investigations were made by Sir John Hawkshaw into the nature of the strata beneath the strait. Many borings were sunk and the bottom of the strait was thoroughly examined. These investigations proved beyond doubt that the bed of the channel consisted of a thick continuous layer of chalk, varying from 300 to 1000 feet in thickness. This thick and impermeable layer of chalk will afford a safe covering for the tunnel.

These investigations first led engineers to seriously entertain the project of tunneling under the channel.

The geological features having been considered, it remains to give some particulars concerning the engineering nature of the work. The length of the tunnel including its approaches, will be about 31 miles. In the first place shafts will be sunk on each shore to a depth of 450 feet below high-water mark; and from the bottom of these, driftways will be driven for the drainage of the work. The tunnel will commence 200 feet above these driftways.

The work will go on at the same time at both shores of the channel. In the execution of this work, a driftway, nine feet in diameter, will first be carried right through, and this will afterwards be enlarged to the full size of the tunnel.

The machine to be used works like an augur boring a hole in wood; it cuts off the chalk into slices, which breaks up and falls upon an endless chain which loads it into a wagon behind the machine. This machine advances through the chalk at the rate of about a yard and a half an hour. At that rate it will take a little over two years to complete the driftway nine feet in diameter.

The estimated cost of the driftway is £800,000. As soon as the driftway is completed the success of the undertaking will be assured. It has been estimated by experienced engineers, that after the driftway is finished, four years' time and £4,000,000, will complete the work.

Sir John Hawkshaw and the engineers associated with him think it prudent to double this amount; but perhaps we may reasonably look for its completion in ten years from the commencement of the work.

The progress of the work will be watched with great interest, and we shall hope from time to time to give further particulars of its advancement in the Engineering Department of The Review.

The Methodist Sociable and Supper, held at Town Hall last Friday evening, was a complete success. The Citizens, together with part of the College Orchestra, furnished the music for the occasion. The singing by Amateur Quartette of Bangor, was well received, and together with the duets and tableaux, made the evening pass off very pleasantly. A similar entertainment will be given by this Society some time in June.
GREAT CENTENNIAL VICTORY

'76 ALL RIGHT!

EVERY WARD CARRIED!

PROBABLY "RUM DONE IT!"

It is with considerable degree of pride and satisfaction that we have witnessed the exciting contest between the two factions in the campaign and elections during the last week; with pride, that we have seen the manifestation of so much honest principle and a determination to punish fraud; with satisfaction, because in the issue, as usual, Right has been triumphant and the Spirit of '76, though lying dormant, rose up and proclaimed its mighty power as in the days long syne.

We can fully sympathize with the defeated party with a due appreciation of the honors of the stage "Commencement Day;" but since we have been so unfortunate, let us mildly submit to our fate with the consolation that next Centennial, we may "Quack The Victory."

Our Reading-Room.

We look with a little pardonable pride on our Reading-Room and a few words as to how it is conducted, may not be out of place in The Review. Ever since the college was first opened we have had a room for this purpose, though, for the greater part of the time, it has been a sorry affair. This has been no fault of those who have had charge of it, for they did the best they could; but the Reading-Room was "run" by a society which represented only a small part of the students, and the consequence was that there was continual dissatisfaction with its management. At the beginning of this term, therefore, it was determined to organize a general society, composed of all the students, with a membership fee sufficient to furnish the room with periodicals and meet all other necessary expenses. This was done, and a society styled the "State College Reading-Room Association," took control of affairs. A comfortable room on the first floor of Brick Hall was secured, furnished with a long desk, and lighted in the evening by a chandelier and wall lamps. The membership fee of one dollar each furnished the society with ample funds, and a good representation of the best magazines and papers was subscribed for, which, in addition to the large number of State papers generously furnished by their publishers, abundantly provides us with reading matter. There are now three dailies, forty-seven weeklies, and eighteen monthlies on the list, and a few others have been ordered.

Commencement Day.

The following are the students who are to grace the platform and edify the audience with their oratorical talent:

Electives:—Edmund Abbott, Winterport; Florence H. Cowan, Orono; C. P. Allen, Presque Isle; Horace M. Estabrooke, Linneus; Wm. T. Haines, W. Corinth; Philip W. Hubbard, Hiram; Nelson H. Martin, Linneus; Hayward Peice, Frankfort.

Civil Engineers:—Elbridge H. Beckler, Livermore; Fred M. Bisbee, Livermore; Luther R. Lothrop, Leeds; Frank R. Reed, Roxbury.

Mechanical Engineers:—Edward S. How, Portland; Herbert A. Long, Machias; Charles W. Rogers, Richmond; William L. Stevens, W. Waterville.

Chemicals:—Newell P. Haskell, New Gloucester; Henry J. Reynolds, Dennysville.

Agriculturals:—Chas. M. Brainard, Skowhegan; Arthur M. Farrington, Orono.

We extend our thanks to Mr. Eben Webster of Orono, for a cut of the College Buildings, which will be found in this issue.

C. M. Brainard of '76, has been making a chemical analysis of butter, an account of which we hope to publish in the next number of The Review.
Buzzell & Shaw.

We are receiving every week the latest styles of Boots and Shoes HATS, CAPS, &c., which we offer at prices lower than ever. We buy our goods direct from the manufacturers and save one profit, besides we give our customers BOOTS that we know are good and can warrant. We keep a very large stock of all grades, and can suit almost everybody.

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WE HAVE THE BEEBE SILK HAT, Philadelphia Silk Hat, Stiff and Soft Hats, CHILDREN'S HATS in great variety.

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THE COLLEGE REVIEW.

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La Bastie's Fire Proof Lamp Chimneys.
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Solid Gold Jewelry made to order. Watches, Clocks
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Established 1843.

CAN GOODS.
MUST BE SOLD AT ONCE.

<table>
<thead>
<tr>
<th>Item</th>
<th>Price</th>
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<tbody>
<tr>
<td>7 3-lb. cans Best Tomatoes</td>
<td>$1.00</td>
</tr>
<tr>
<td>6 3-lb. cans Best Squash</td>
<td>$1.00</td>
</tr>
<tr>
<td>6 2-lb. cans Best Blueberries</td>
<td>$1.00</td>
</tr>
<tr>
<td>6 2-lb. cans Sugar Corn</td>
<td>$1.00</td>
</tr>
<tr>
<td>5 3-lb. cans Mallroy's Best Peaches</td>
<td>$1.00</td>
</tr>
<tr>
<td>13 lbs. Prunes</td>
<td>$1.00</td>
</tr>
</tbody>
</table>

These goods are warranted the best in this market.

TEA WHITE'S COFFEE STORE,
Kenduskeag Bridge, Bangor.
PRINCIPAL BUILDINGS OF THE MAINE STATE COLLEGE, ORONO.

Brick Hall and Boarding House.

White Hall.

Laboratory.