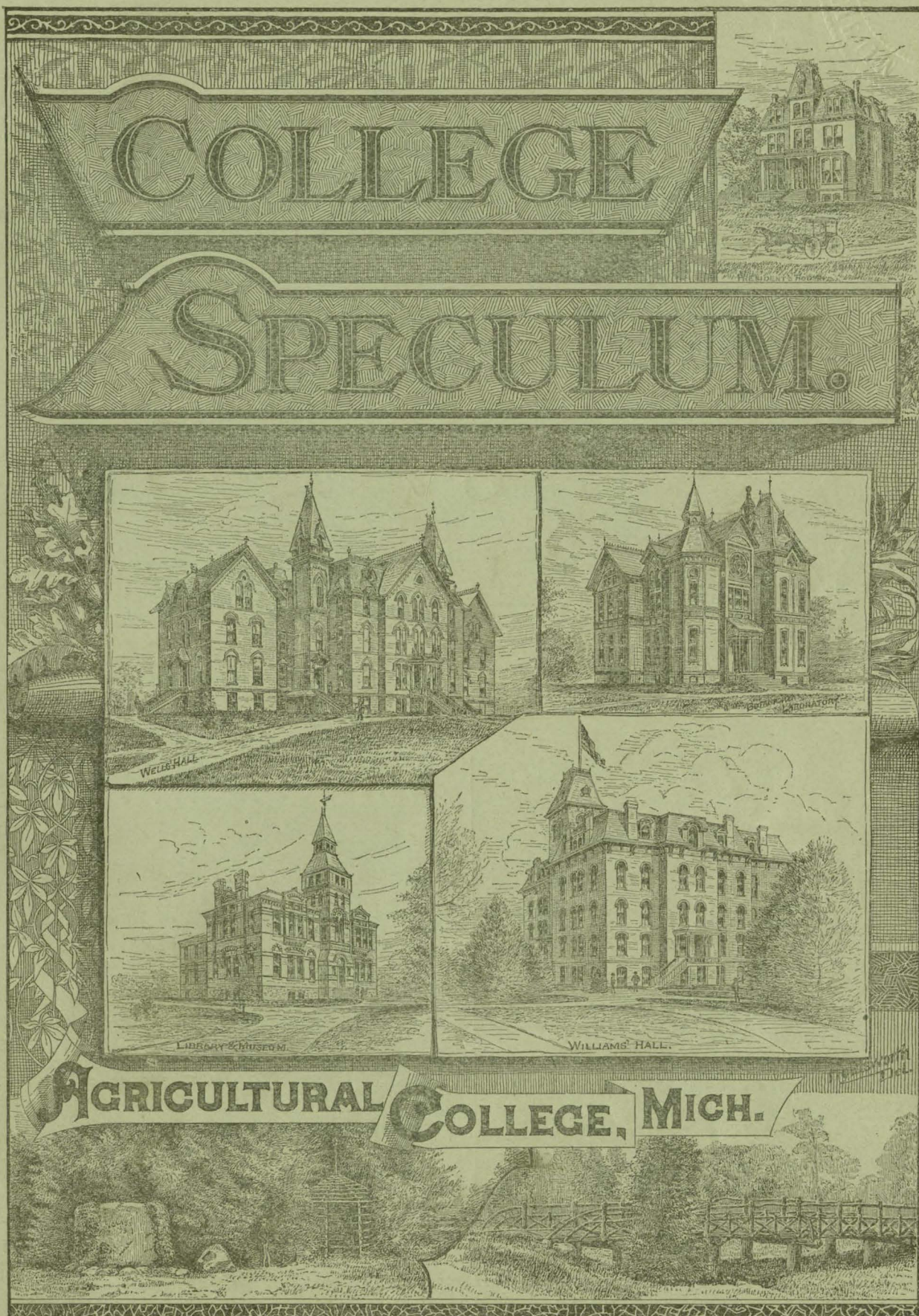




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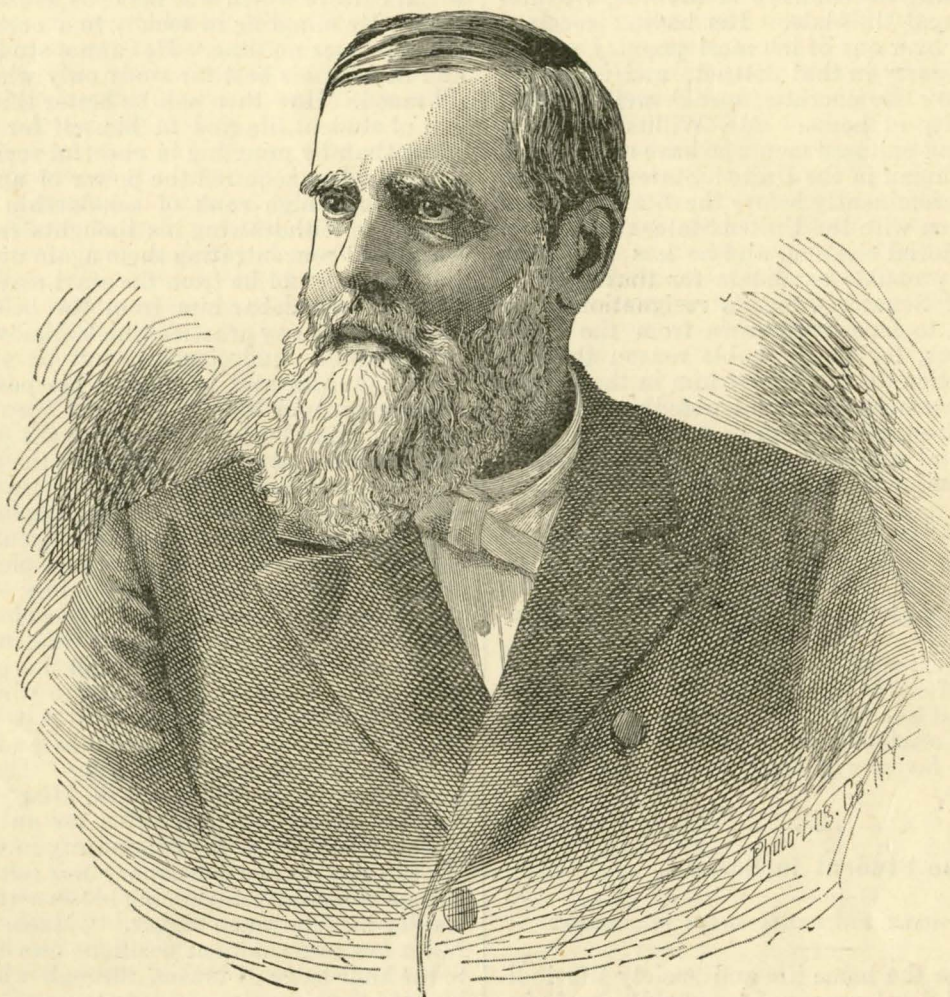
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THE COLLEGE SPECULUM.

VOL. IV.—No. 3.

AGRICULTURAL COLLEGE, MICH., APRIL 1, 1885.

WHOLE No. 15.



EDWIN WILLITS.

Hon. Edwin Willits, our new president, was born at Otto, Cattaragus county, N. Y., April 24, 1830, and hence enters upon the duties of his new position in his fifty-sixth year. Although not born in Michigan, he has become thoroughly identified with her interests, having removed to the state with his parents in 1836. He has grown up with the State, has been actively engaged and interested in her development, and has become one of her leading and most respected citizens.

He received his primary education in the common schools of Washtenaw county, and entered the State University, graduating from the Literary Department with the class of '55, and he has since won the degree of M. A. from the same institution. After finishing his course at the University, Mr. Willits entered upon the study of law in the office of Ex-Senator Christianity at Monroe, and was admitted to the bar in 1857. He has been very successful in his practice of the law, and has reached a position of prominence among the lawyers of southeastern Michigan. Notwithstanding his success in this direction he has been

attracted from his chosen profession by his adaptability to school labors and his fondness for educational pursuits. From the time of his graduation, he has been more or less interested in educational affairs, either as an instructor or as an officer in some department in the school system of Michigan. As a teacher he won marked success in the schools of Adrian, and he was afterwards actively interested in the business affairs of the Monroe schools. He was for twelve years, from 1861 to 1873, a member of the State Board of Education, and was one of its leading members. In 1882 he was made principal of the State Normal School at Ypsilanti, which position he has filled with gratifying success; the officers as well as the students of that institution very much regret the necessity which calls Mr. Willits to his new field of labor. He is thus not a man unskilled in educational affairs, but enjoys a wide and varied experience, extending through a long number of years, and is moreover intimately and practically acquainted with the school system, and with the educational institutions of our State.

He has also occupied political positions of prominence, and has been for many years a leading member of the Republican party in the State. He was prosecuting attorney of Monroe county from 1860 to 1862, and was postmaster of the city of Monroe from 1863 to 1866. Mr. Willits was also a member of the Constitutional Commission, which was selected in 1873 to revise the State constitution. He was elected to the 45th, 46th, and 47th Congresses from the second district, comprising the counties of Monroe, Washtenaw, Lenawee, and Hillsdale. His having received large majorities over one of the most popular men of the Democratic party in that district, and in a district which is now Democratic, speaks well for Mr. Willits' popularity at home. Mr. Willits is one of the most able and cultured men who have represented the state of Michigan in the United States Congress. His name was prominently before the State Legislature in connection with the United States senatorship at the last senatorial election, and he has also been mentioned as a probable candidate for that position in the event of Senator Conger's resignation. He seems, however, to have withdrawn from the arena of active politics, for the probable reason that his tastes and ambition do not attract him in that direction; and, furthermore, he is undoubtedly too conscientious and high-minded a man to stoop to the political chicanery and wire-pulling necessary to sustain himself in a prominent position before the Republican party.

Aside from his law practice he has the advantage of a practical business, of several years as editor of the Monroe Commercial. He, therefore, brings to his new position business as well as political and educational experience.

Mr. Willits is expected to enter upon the duties of his office soon after the close of the academic year at the State Normal School. The students of the Agricultural College anxiously await his arrival, and prepossessed in his favor, will warmly welcome him to his new position.

The Student in Society.

BY E. S. ANTISDALE, PHI DELTA THETA FRATERNITY.

Some things in the home life and society life indicate a one-sided development of many of the best educated men. We rarely find a symmetrical man. This lack of symmetry is often traceable to the habits of these men when students. Some faculties must have been cultivated at the expense of others. By close application to literary work some injured themselves physically. Some cultivated society at the expense of both mental culture and physical health; others divided their time between mental labor and physical exercise, and neglected social culture until after completing the college course.

From this neglect of society two classes are formed: those who feeling their need have derived a meagre knowledge of social customs, and those who, fully absorbed in other affairs have always neglected and still neglect social privileges and duties. The result of the first is stiffness and blundering; of the last disregard for others, carelessness in personal appearances, and insensibility to social amenities. In these classes are to be found many of the greatest and best men of the age, and it is unfortunate that they are deficient in any of the every-day courtesies and conventionalities of life; in little matters which the cultivated see at a glance. We wonder that men possessing so much wisdom and so many noble qualities should

tolerate these failings in themselves with such apparent indifference. In their college days these men neglected almost all social privileges, and they show how almost impossible it is to acquire good manners and a taste for society and its forms and enjoyments after arriving at the age of maturity.

If then "The boy is father to the man," we, while yet students should not only develop those qualities which shall characterize us as men, but secure that social culture which will make us at ease among other men. By mingling in society to a certain extent the student loses no time. He cannot study unceasingly, and he is at his best for study only when in a cheerful mood. How then can he better throw off the burden of student life and fit himself for more efficient effort than by mingling in cheerful society. The student who has acquired the power of application necessary to a high rank of scholarship has but little trouble in withdrawing his thoughts from the social world and concentrating them again upon his studies. Not only should he from the start avoid those habits which would debar him from the best society, and abstain from any practice which if known would make his company undesirable; but he should develop those faculties and talents in his possession which will recommend him to the best men and the best homes. In order to be at ease in the presence of the learned one must be familiar with the productions of the best authors and the current events of the day. He must know a few books, including the Bible, and be able to converse about them intelligently. It is possible for but few to tell a story in a pleasing manner, yet nothing is more entertaining; therefore this power should be cultivated, that incidents learned by traveling, reading, or in college life, may be related in an entertaining way. Skill in popular parlor games, which simply please and in which there is no harm, is not to be discarded until it is supplanted by something better. Reading clubs and choral societies are interesting and elevating. The student who cultivates a taste for these will, after completing his college course, be better fitted for an active part in the social affairs of the community in which he lives. He will not remain stationary nor retrograde, but he will be constantly advancing his own attainments and leading his fellowmen higher. "Music hath charms." Not a few in prominent positions owe their elevation to the knowledge of music, through which they were brought to the notice and into the society of people of influence.

The student in society should be the same as out of society. "Be what you are. This is the first step toward becoming better than you are." He cannot afford to be underestimated. To secure the best reputation he must be pure in life. Tobacco and profanity, and intoxicants and debauchery, are sooner or later detected. Nothing is truer than that "Evil communications corrupt good manners." A person of principle, with a sound heart and a broad education, graceful and at ease in society, go where he may, manifests his superiority. Ease in society can be acquired only by mingling in society, and "good manners are only the out-croppings of a noble and generous nature." "The mind grows like what it feeds upon." If a student therefore is in the society of the noble and good he will be constantly inspired to nobler living until it is his very nature.

Let us then mingle in society as we have opportunity, and cultivate that true and noble character which is grand and beautiful in itself. May we in all our social intercourse use that discretion which will enable us to rise from life as we should rise from a banquet, "neither thirsty nor drunken."

Students and Faculty.

W. I. POWER, DELTA TAU DELTA FRATERNITY.

It is not an uncommon thing to notice in the papers published by various colleges accounts of difficulties between the students and faculty. These difficulties are not of a frequent occurrence, nor are they generally of a very serious nature. They usually arise as we believe, from a non-conformity to the rules on the part of the students. Yet the students, unable to see the matter as the faculty do, often think they are not receiving justice, and in order to obtain their so-called rights are willing to oppose the faculty, and in some instances quit college.

While it may sometimes be the case that students do not receive justice at the hands of the faculty, we believe that it is generally conceded by the people at large, that the students and not the faculty are in fault. Now it seems in a majority of cases this view is a correct one, although the students are unwilling to admit it. We must remember that the students and faculty occupy different positions, and so view matters from a different standpoint; so that what may seem right to the one may seem wrong to the other. The faculty we know have in view the present and future welfare of the institution, while the students are considering only their own present personal interests. This may not in all cases seem sufficient cause for the difficulties often arising between students and faculty.

Perhaps a more probable cause lies in the fact that the students as a general thing are young and inexperienced; consequently they are apt to judge hastily or come to wrong conclusions, and in many instances are unwilling to acknowledge themselves in the wrong, even when convinced that such is the case, while the faculty are older and more experienced and so are less liable to make hasty or wrong conclusions. Besides, does not a student when he enters college bind himself to obey the rules and regulations of the institution? He may not sign a written agreement, or make any promises concerning the matter, but he understands that there are certain rules and regulations to which he will be required to conform, and that unless he does conform to them, it is the right of the faculty to take any action which will compel him to do so. This, no doubt, is just where a great deal of the trouble lies, for many students as well as many others refuse to be compelled to do as desired. They may not object particularly to doing as the faculty wish, provided it does not appear that the faculty are compelling them to do so. But we ask, why should it not appear so? Is it not the right as well as the duty of the faculty to insure good order at all times? Although they may in some instances exercise this right to a greater extent than appears beneficial to all concerned, yet so long as they must exercise this right, can it be expected that they will always go just far enough to reach the desired end and no further? What is the verdict on this subject by men who have taken a college course? We venture to say that in nine cases out of ten it will be that the faculty were in the right and the students in the wrong; although at the time they were unwilling to acknowledge that such was the case. But in their mature years, when they come to consider the matter in all its phases, and from a practical point of view, it does not appear in the same light as when they were young, hot-headed students. Now we do not wish to be understood to say that the faculty are always in the right and the students in the wrong, for such we do not believe always to be the case, for as no one man so no body of men

is infallible; but in the majority of cases we are led to believe that the faculty is less liable to make mistakes. Of course all institutions to carry out their purpose well must have rules to govern the actions of their students; for it seems to be born in the nature of some men to rebel or to trespass upon the rights of others, and consequently they need some restrictions placed upon their actions. But just how far the faculty shall go in this matter, and just how much can be left to the students is a question which depends for its solution much upon the nature of the institution and the character of the students who attend it.

It is of course for the interest of both that the most amicable relations should exist between students and faculty. But just how to bring about this relation is a matter requiring a great deal of thought and study. We must remember that the first duty of the faculty is not to govern but to instruct, but in institutions like ours, where the students room in dormitories, more rules are required and the faculty will necessarily be required to give more attention to order and discipline than in institutions of a different character. The students should remember that they are here for self-improvement, and that although they may not receive what they consider as justice, yet it is better not to be too hasty or take any steps which they will be liable to regret in after life.

Future America.

E. A. WHITNEY, ECLECTIC SOCIETY.

In times of great national prosperity, when peace and progress are apparent on every hand, when the air seems to waft to our doors the echoes of peaceful foreign relations, and the blue sky above reflects the rights and liberties of a great and glorious people; then is the time for the statesmen and citizens of a country to examine her foundations to compute her future stability.

The unparalleled growth of our young Republic is looked upon by many as the forerunner of future evil. They argue from example, that because ancient Persia, Greece, and Rome fell, that we must decline. But the analogy is false; there is no material resemblance between these nations and ours.

Examine, for a moment, the natural advantages of our Republic. Situated as we are, between two great oceans; bounded on the one hand by five of the world's largest lakes, on the other by a navigable river and an ocean gulf; we are preëminently, of all nations, the best equipped for commercial intercourse with all parts of the globe; while our natural waterways afford us an unlimited field for domestic commerce.

The Mississippi, navigable nearly its entire length, forms the great pulmonary vein of commerce for a vast region of over two million square miles; while our rivers of the Atlantic system cannot be surpassed for manufacturing purposes. And again, being separated from the European nations by an ocean three thousand miles wide, we are not compelled to enter into any tangling alliances to preserve our equilibrium. Nor do our natural advantages end with our situation, for our mines of iron, coal, and copper are large enough to supply the world for ages; while our western El Dorado, by some new field of wealth, is annually awakening the world from her sleepy slumbers.

Let us for a moment examine our political foundations, for no matter what a nation's advantages may be, with a foundation which gives and crumbles at

every thunder's peal, they are for naught. Our form of government is too well known to need any discussion here. We know it has been a success in the past, and for that reason, and many others, we claim for it a triumph in the future.

Prior to the inauguration of our Republic, the nations of the earth had not had, since the christian era, an example of the republican form of government. And a majority of the citizens of this country, born and reared, as they were, under a monarchical form of government, little knew what was expected of them under the new system. The crowned heads and nobility of Europe looked upon us as a company of fanatics, and with much ado treated us as such. Dissensions sprang up at home, and with the jealousy abroad, it seemed as if the strain would be too much for our structure to bear. Nor has any part of our history been entirely free from these political dissensions at home and jealousy abroad. We have passed through all, however, with our foundations never shaken, even in the darkest days of rebellion, but growing more and more compact year by year.

From our success in the past, when laboring under such disadvantages, what may we expect from the future, when our people will be educated to understand the needs of our government? And to that end they are fast coming; for with our great school system, aided by our thousand colleges, the most needy of our land have the advantages to gain this knowledge.

It is only a question of time when the seat of the wealth of the world will be transferred to America. Already the money quotations from Wall street are ruling the great corporations of the world, while Pittsburg is fast becoming the acknowledged center for the products of the mines. In due time the commercial sovereignty of the world will be removed from England to America, and will be held in charge by New York on the east and San Francisco on the west. Here will be situated the manufactories of the world, while in the councils of our nation will be settled those arbitrary problems which have so long kept the Orient in a state of war.

As time increases so will our territory, until at last it shall extend from the blustering shores of the Arctic to the ever warm waters of the gulf. Through us other nations will learn that the only true form of government is: Of the people, by the people, and for the people. American civilization will be transplanted to all climes; and as the "star of empire crosses and recrosses the continent," there will be erected a structure, the pride of Americans, the light of earth.

SCIENTIFIC.

Considerations Respecting the Construction of Chimneys for Steam Works.

BY PROFESSOR R. C. CARPENTER.

The object of chimneys for any purpose is to carry off the results of the combustion and if possible produce a current sufficiently strong to draw all air needed for the combustion into the furnace.

REASONS FOR DRAUGHT.

The philosophy of draught in chimneys is well understood. It is due to the expansion of the gas which passes through the chimney caused by heat received from the fire. This makes the column of

heated air lighter, hence it is pressed upward by the cold air entering at the furnaces. The velocity with which it rises is in proportion to the square root of its height and directly to its temperature as compared with outside air. This rise is resisted by the weight of the particles in suspension, which go to make up soot, smoke or steam, and by the friction of the gases on the sides of the flue.

There is such a wide variation in the difference of temperature in different chimneys, and even in the same chimney at different times, as to make the theoretical values of difficult or doubtful application.

Neither theory nor practice shows any marked advantage in the tapering or expanding flue as compared with the straight one, so that this question is a practical one merely for constructive reasons. In all cases it is better to build that form that is most staple and the cheapest constructed. The motive force which causes the hot air to rise in the chimney is a small one, rarely exceeding the weight of three-fourths inch of water. When the temperature in the chimney is 600° and that outside is 62° , this upward force is equal to that of a column of water about $\frac{1}{17}$ part of the height of the chimney (deduced from Wilson on chimneys). As this is about the average temperature of climate and chimney we see that the measure of the draught in a chimney 103 feet high is the weight of a column of water $\frac{3}{4}$ inches in depth. The weight of so small a body of water is very small indeed, yet if this upward pressure fall more than $\frac{1}{4}$ of an inch a very poor draught is the result. There are many influences, such as direction of wind currents, strength of wind, etc., that are seemingly insignificant and yet are sufficient to overbalance the small force which causes the draught of the chimney. Even the form of the chimney top may deflect currents of air in such a manner as to neutralize or impair the draught. Surrounding buildings or hills may guide the air currents in some cases so as to make good draughts impossible to maintain.

The forces producing the draught being so insignificant and so easily overcome by surrounding circumstances or peculiar conditions of the air, show that no theoretical consideration can give absolute knowledge of the result in any case before an actual trial.

Theoretical investigation gives comparative knowledge of great value; it shows that our maximum economy of draught is obtained when the absolute temperature inside the chimney is to that of the external air as $\frac{3}{5}$. This would bring the internal heat to about 625° when the outside heat was 62° . Although the velocity of draught increases with the square root of the height, the friction increases still faster, and there is a limit to an increase of height which will improve the draught. This limit is about 600 feet for a chimney with a $3\frac{1}{2}$ foot flue. The draught caused by increased height increases slowly; in fact to double the draught the height would have to be increased four times. A chimney might have too large a section to be heated by the gases from the boilers, in which case there might be downward as well as upward currents in the chimney.

Despite all the refined formula evolved from the mathematics regarding the flow of heated gases, we depend principally upon certain rules of practice to determine the size of our chimneys. These rules differ very much from each other, yet as each seems to have given satisfactory results in practice, it merely goes to emphasize my former statement, that apparently insignificant and obscure circumstances can so demoralize the draft as to make it doubtful if in any two cases the same law applies.

The following practical rules have been extensively followed as a guide and may be of interest. Tredgold's rule has perhaps the authority of having been most extensively used. He advises however to build a chimney with twice the section given by his rule:

TREDGOLD'S RULE.

Square Chimneys, for Low-pressure Engines.

$$A^1 = \frac{112(Hp)}{\sqrt{h}} \quad \begin{array}{l} A^1 = \text{Area in sq. inches.} \\ h = \text{Height in feet.} \\ Hp = \text{Horse-power of engine.} \end{array}$$

Reduce A^1 to feet by dividing by 144.

$$A = \frac{A^1}{144} = \frac{7}{9} \frac{Hp}{\sqrt{h}}$$

Round Chimneys.

$$A^1 = \frac{90 Hp}{\sqrt{h}} \quad (\text{See Creasy.})$$

MILNE RULE.

$$Hp = \frac{\sqrt{h} d^2}{2} \quad \begin{array}{l} d = \text{least diameter in feet.} \\ d^2 = \text{about } \frac{3}{4} A. \end{array}$$

$$Hp = \frac{3}{8} \sqrt{h} A$$

$$A = \frac{8}{3} \frac{Hp}{\sqrt{h}}$$

This rule requires an area $\frac{1}{4}$ as large as that of Tredgold.

PROFESSOR THURSTON (SEE WRINKLES AND RECIPES).

K = coal burned per hour per square foot of grate surface.

$$2\sqrt{h} - 1 = K. \quad (\text{With good proportions.})$$

This we will assume to be $2\frac{1}{2}$ Hp., although it varies greatly in different cases. On supposition that consumption is 20 lbs. per square foot of grate surface and one Hp. is produced for each four pounds of coal burned, then

$$5 Hp = 2\sqrt{h} - 1.$$

$$Hp = \frac{2}{5} \sqrt{h} - \frac{1}{5}$$

The diameter is not given.

GENERAL RULE (SEE WRINKLES AND RECIPES).

Area of cross section of the chimney, either round or square, $\frac{1}{8}$ to $\frac{1}{10}$ the grate surface, and the height from 50 to 70 feet.

Wilson, in his work on boiler and factory chimneys, gives us a result of his calculations:

w = weight of fuel burned per hour.

A = area of chimney in square feet.

h = height of chimney in feet.

$$A = \frac{.07 w}{\sqrt{h}}$$

w being the coal burned in one hour, he takes 7 pounds for one horse power. He also gives

$$A = \frac{8}{10} \frac{Hp}{\sqrt{h}} \text{ for one boiler, and } A = \frac{5}{10} \frac{Hp}{\sqrt{h}} \text{ for several.}$$

He concludes that the best draught is found when the temperature inside the chimney is $\frac{2}{3}$ times that outside. This would be, on the average, about 600°.

Wilson gives as a common rule, from experience, that the joint area of flues or chimney tops should be from one-eighth to one-tenth the area of fire-grate, regardless of height of chimney.

As showing how closely these different rules agree, we will solve the following example by each rule. Example: Required, the area of a square chimney 100 feet high sufficiently large to answer for 100 horse-power of boiler, consuming 1100 pounds of coal per hour.

TREDGOLD'S RULE.

$$\text{Area} = \frac{7}{9} \frac{\text{Horse-power}}{\sqrt{\text{height}}} = \frac{7}{9} \times \frac{100}{10} = \frac{70}{9} = 7\frac{7}{9} \text{ sq. ft.}$$

MILNE'S RULE.

$$\text{Ar.} = 2 \frac{\text{Horse-power}}{\sqrt{\text{height}}} = \frac{200}{10} = 20 \text{ sq. ft.}$$

WILSON'S RULE.

(Page 26, work on chimneys for boilers.)

$$A = \frac{\text{Coal per hour} \times .17}{\sqrt{\text{height}}} = \frac{700}{10} \times \frac{7}{100} = 4.9 \text{ sq. ft.}$$

WILSON'S TABLE.

(Frontispiece to work on boilers.)

$$\text{Area} = \frac{100}{13.3} = 7\frac{1}{3}, \text{ about, square feet.}$$

WILSON TABLE.

$$\text{Area} = \frac{100}{\sqrt{h}} \times \frac{8}{10} = 8, \text{ if one boiler.}$$

$$\text{Area} = \frac{100}{\sqrt{h}} \times \frac{5}{10} = 5, \text{ if several boilers.}$$

THURSTON'S RULE.

$$\text{Consumption per foot of grate} = 2\sqrt{h} - 1 = 20 - 1 = 19.$$

$$\text{Grate needed to burn } \frac{700 \text{ lbs.}}{19} = 37 \text{ sq. feet.}$$

$$\text{Chimney } \frac{1}{8} \text{ to } \frac{1}{10} \text{ grate surface} = 4\frac{1}{2} \text{ to } 3\frac{7}{10}.$$

A New Insect Pest in Michigan.

A. J. COOK.

Our State for the past year or two has seemed to be a favorite place for new insect raids. Insects long known in the country, and supposed to be innocuous, all at once become serious pests in our State. Two years ago the *Anthonomus musculus*, Say., caused no small damage to the strawberry in the Northern Peninsula. The strawberry crown girdler *Otiorynchus ligneus*, Oliv., was last summer, for the first time, shown by Prof. Troop to be a great enemy to the strawberry; while the black army worm, *Agrotis fen-nica*, Tausch., was first described by me as a terrible enemy to all early garden vegetables. In the autumn of last year the wheat in the bin was seriously injured by a quite large striped caterpillar, probably a species of *Hadena*, but which I failed to rear.

Late last fall I received a new wheat stalk larva, which I think is an undescribed species. It is much like the old "joint worm" of Fitch, *Isosoma hordei*, in appearance and habits, though certainly a different species; and less like the "wheat stalk worm" of Illinois, *Isosoma tritici*, Riley. The little insect, of which I have reared a large number, is jet black, thickly set with gray hairs, finely punctured, and about three mm. long. The legs are partly yellow. The female is a little the larger and has a brownish yellow ovipositor. It differs from the *I. hordei* in having the antennæ and mouth parts all black, no white spot on the thorax, and in its habits; it lays its eggs on the wheat stalk in June, to the number sometimes of twelve. I have taken from five to twelve larvæ from the stalk, all close together, and presumably the fruit of one egg laying. The yellowish white larvæ work in the stalk, causing it to solidify, so that it is solid instead of hollow, and to become very hard. This takes from the vitality of the stalk, and reduces the yield and plumpness of the berry. The footless larva, when fully developed, rests in a little oval cell in the hardened stalk. The cells are 4 mm. long, the

larvæ 3 mm. The larvæ commenced to change to pupæ in September. These are $3\frac{1}{2}$ mm. long, and the same color as the larvæ. Their elbowed nine-jointed antennæ are plainly visible. The stalk, from which I have found as many as twelve larvæ, is much deformed, though not swollen as in case of the joint worm. It is creased and looks much injured. So hard is it that in threshing these hardened pieces, from one to one and one-half inches long, are broken off and come out with the wheat. These pieces of stalk were generally observed by wheat growers in Wayne and Washtenaw counties last fall, where these insects did no small mischief. These insects work anywhere on the stalk above the lowest joint, though I find few above the last joint the most being between the third and fourth joints. In this the insect differs from the joint worm. The insects which I have kept in a cold room are still in the pupa state; others kept in a warm room all winter commenced to come out as adult or mature insects on March 22d. The insects all have perfect wings and are about equally male and female. The hardened portion of the straw is full of little circular holes after the emergence of the imagos, there being as many holes as there are insects reared. These insects kept out doors, would likely have matured in June. The fact that I find a few insects even above the highest joint, indicates that the egg-laying must be as late as June, or at least the very last of May.

The only suggestion as to remedy that I can give now is to cut the wheat high and burn the stubble in autumn. This would destroy all but the few carried to the barn in the straw. These would be mostly left in the small pieces of straw with the wheat by the machine, and when cleaned out should be burned. In this way we could hope to destroy the pests, but not till they had done their mischief for the year.

As the joint worm has never continued very destructive many years, we may hope that the same will be true of this closely related insect. Already I have reared one parasitic enemy from it. But as the joint worm often did frightful damage, so we have reason to fear greatly the harm that may come from this new wheat pest of Michigan.

The Botanic Garden.

BY PROF. W. J. BEAL.

The two previous numbers of the SPECULUM have contained some account of other portions of the botanic garden.

Here, throughout the season, from the willows to the gentians and witch hazel, the apiarist can see what his favorite insects visit for nectar and pollen. And this is an important part of the business; for if plants of the right sorts are not plenty, they may be sown and raised.

The mints always attract the bees and they hum and crawl about the flowers of germander, blue curls, pennyroyal, spearmint, peppermint, watermint, cornmint, bugle-weed, horehound, dittany, hyssop, basil, majorum, thyme, summer savory, colaminth, balm, stone-root, sage, Oswego tea, bergamot, horsemint, blephilia, catnip, gill, dragon-head, cedronella, synandra, self-heal, skullcap, hedge-nettle, dead-nettle, and mountain mint. These and many more are all mints, every one, and they are much benefited by the visits of bees, which they reward with nectar for services rendered. The one who passes by can scarce help picking fragments for a nosegay.

The figworts, too, are scarcely less valuable, and to them belong the mulleins, toad-flax, snapdragon,

snake-head, penstemon, mimulus, pimperl, mudwort, the speedwells, blue-hearts, the gerardias, foxgloves, painted cup, chaff-seed, eyebright, yellow-rattle, lousewort, and cow-wheat. A part of these are not visited by honey bees.

The large sunflower family combines an abundance of asters and golden rods, iron-weed, blazing stars, thoroughwort or boneset, fleabanes, coreopsis, tickseed, yarrow, chicory, dandelion, hawkweed, rattlesnake-root, wild lettuce, sow thistle, and many more which are favorites for honey bees.

The man who likes his bees becomes interested in wild verbenas, lobelias, bugloss, borrag, the milkweeds, pickerel weed, the mustards, the cresses, alysum, the mallow, flax, geraniums, the balsams, sumachs, basswoods and willows; the maples, the clovers, cassia, the spiræas, strawberries, cinque-foils, the raspberries, the roses and hawthorns, the apples and crab-apples, the mountain ashes, and others, which help make up several hundred kinds of bee-plants found in almost every neighborhood.

The botanic garden is frequented by the enthusiastic Juniors who, with bug-net and cyanide bottle in hand, sweep in our insect friends as well as our insect-foes. The students learn to look for certain insects about the plants of a certain family. Water beetles and dragon flies, moths in the evening and butterflies by day are busiest, and hardest to catch as the mercury rises.

Here the landscape gardener can study the plants with reference to producing certain effects. Some are subtropical, some suitable for bog or pond, some for sunshine, some for shade. Some are best in masses of one kind, others are best massed with one or more sorts, some are eccentric, some noble, some clean, some straggling. With some the chief glory lies in their flowers; with others the foliage. Some are out early in spring, and go to rest during the heat of summer, while others barely get into flower when the frosts of September appear.

The plants of the heath family are difficult to manage. We have a leather-leaf and a huckleberry bush which have survived the rigors of winter, the summer floods, and transplanting.

A wild potato from Arizona, another from Mexico, shrubby bitterweed, matrimony vine, the night-shade, and some other Solanums show their affinities, as most of them are troubled with the aggressive potato beetle.

Most of the violets flower early in the season, but some continue all summer. As they seed freely, they are likely to get mixed if grown near each other. Have you ever looked in July to see the inconspicuous flowers of *Viola cuculata*, as they have no petals? These flowers are under the leaves and many times below the surface of the ground, yet they seed freely. Several other violets have the same habit; so have some of the polygalas. Near the violets is an *ionidium* or green violet, bearing inconspicuous flowers. It looks rather weedy.

Did you ever study the *martynia* or unicorn plant? It is an eccentric thing, noted for many sticky hairs, which often catch immense numbers of small flies, which the plant seems to digest and relish as articles of food. A part of the leaves are bilateral, while some are as unequal-lobed as those of the begonias. This coarse annual bears irregular flowers, and is so constructed that bumble bees and some large insects are needed to aid in fertilizing the stigmas. The flat stigmas are sensitive, and when touched in a warm day close in a few seconds. This helps to secure crossing, and prevents self-fertilization. It is worth a little time to observe these curious things.

It is the policy and practice of the SPECULUM to expose the manufacturers of worthless compounds, and denounce their wares, but no less ready is it to champion a really meritorious article.

In the February number of the *Popular Science News* we find a formula for a metal pomade, which formula concludes with the remark: "It is in every way preferable to the 'Putz,' as that contains mercury, and is in other ways objectionable."

It is probable that the *News* made that statement without subjecting the "Putz" to a chemical examination for mercury (otherwise it would not have been made), and judged simply from the peculiar white lustre imparted by "Putz" to brass and kindred metals, that an amalgam was formed necessitating, of course, the presence of mercury in the polish.

This lustre, if not the familiar is a natural one, and is due not to an amalgam, but to the production of a less uneven surface.

If examined under the microscope, the crystalline structure of the ordinary brazen surface, is very perceptible, especially if it has been in contact with oils of any kind, and it is this partially polished surface which, from its very irregularity and comparative roughness, presents the yellow lustre which we commonly learn to associate with brass as one of its qualities; but if the polishing process be continued with suitable materials, the minute crystals are worn down to a common level, and then is it that the light lustre is developed.

Interrupt the polishing of gold or silver at an intermediate stage, or examine a coin, and the surface is as unlike that of polished gold or silver, as is that of brass as ordinarily polished, to the finish, which it is capable of receiving.

Chemical examination shows the imported "Universal-Metal-Putz Pomade," (Vogt & Co., Berlin,) to be *entirely* free from mercury, its constituents being Colcothar, or Jeweler's Rouge (a peroxide of iron) Oil, and Nitro Benzole. But we cannot too highly condemn an article sold under the same name and made by an E. W. Bennett & Co., Chicago. It is not only worthless, but would ruin a fine metallic surface, as it contains but a very small quantity of Colcothar, its bulk being made up of a very coarse silica.

LIBRARY NOTES.—Over three hundred books and pamphlets have been placed upon the shelves since the spring term began. Valuable additions have been made to the collections of history, botany, veterinary science, and physics.

It is proposed to keep an account of the books drawn during the year with a view to answering the question, "What do students read?" The heads will be Criticism and Essays, Fiction, History, Natural Science, and Useful Arts.

A number of new periodicals are now to be found in the cases, among which are the Art Journal, McMillan's Magazine, The American, Harper's Weekly, Ohio Farmer, Le Journal d'Agriculture Illustrée, and others.

During last fall term a large number of Agricultural Reports were sent through the Smithsonian Institute to Agricultural Colleges in foreign universities and to Agricultural Stations. The first response to them comes from Madras, being reports on Saidapet Experimental Farm for the years 1881-82-83. They give a short account of the productions of the farm, of the school of agriculture, of seed sown and produce of same, of ploughing matches, of the manures used, of the live stock of the farm, of irrigation, and other matters. The School of Agriculture has sixty-nine students at the average age of 25 years. The course of instruction includes Agriculture, Veterinary Science, Chemistry, Botany, Mechanics, Arithmetic and Book-keeping, Mensuration and Building, Field Surveying, Physical Geography, and Meteorology; lectures are also given in Anatomy, Physiology, etc; students also have the advantage of military training. There is a veterinary hospital with instruments and drugs; Pisciculture, Sericulture and other industries receive attention; several experiments with vitality of maize, cheese making and other things are reported. These reports will be found with *Agriculture*.

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AGRICULTURAL COLLEGE, MICH., APRIL 1, 1885.

THE ATTENTION of our readers is called to the improvements made on this number of the SPECULUM. A new plate adorns the title page, an engraving of President Willits appears as the frontispiece, and the paper has been enlarged by one sheet, making four pages of extra matter. These improvements require a considerable increase in our expenditures, making it very necessary that all subscriptions should be paid at once. We therefore earnestly request that all subscribers settle their accounts without delay, and not wait until Alumni Reunion, as we need the money immediately. It is but a small amount for each one, but is sufficient to meet all our demands if all is paid promptly.

It is intended also to print an engraving of President Abbot in the next issue, can the required funds be obtained. We furthermore desire to make an especial point of interest in President Abbot's biography, the great work he has done for the College, and the successive stages of its growth under his long and efficient administration. And to this end we request that all alumni and others furnish us any information they may possess regarding the condition and development of the College during the twenty-five years that President Abbot has been at its head, and the twenty-eight years that he has been connected with the institution.

THE LABOR system being the peculiar characteristic of our college, has always been the subject of much thought and discussion. Ours is one of the first colleges which have succeeded in operating a system of manual labor with any very satisfactory degree of

success. We have on that account been the especial object of criticism by the opponents of industrial education, while at the same time our progress has been watched with solicitude and hope by those favoring the combination of manual with mental education.

It is claimed by a few that the labor system is a failure, while on the other it is as stoutly maintained that it is all that could be desired or expected. There are in discussing this problem many conditions to be considered, which the superficial observer, or the prejudiced critic, often does not duly take into account. It must be remembered that this is the pioneer institution of the kind, and that it cannot therefore draw its practical lessons from the successes and failures of similar institutions, an inestimable advantage enjoyed by literary and scientific colleges. On the contrary, ours must learn entirely from its own dear school of experience. Neither has it the advantage of scholars who have made the subject a practical life study, as distinguished educators in other systems of instruction have done. The system of labor education is in its infancy; its capabilities are undeveloped. For how many years have the schools of mental training been developing into their present proficiency? Why, therefore, should such early maturity be expected in this? There is also the prejudice against an agricultural college, of a large proportion of that class who are the promoters of education; and this, in its practical workings, is no small obstacle with which the supporters of such colleges have to contend.

Many hold that because the student does not in four years attain to a high degree of perfection in all the arts, and in the science of farming, the labor system is a failure. To expect such is wholly unfair and unreasonable. To become thoroughly successful in the management of a farm, and skilled in its various arts, requires years of experience and study. Do medical schools at once produce skilled physicians, or law schools eminent lawyers? Certainly not! They simply afford the discipline by which the graduate may train himself, and furnish the foundation upon which he may build. Why then should more be expected of an agricultural school?

Another very absurd idea entertained by many is that the labor system should be a financial success. Because the students' labor does not result in a direct profit to the State it is considered a failure. Any person who has any knowledge of conducting educational institutions will at once recognize the unreasonableness of such an argument. It is not to be expected that the labor performed will prove a profit to the State. In fact that is one of the greatest troubles in the system at the present time; the profitableness of the work to be performed is taken too much into account.

The system is further asserted to be wanting in success on the supposition that the students do not work well. We cannot agree with our critics in this matter, but are confident that, under proper manage-

ment, as good work is done in the department of manual labor, by the great majority of students, as is done in class-work; but because there are always a few lazy shirks who manage to pass away the time with accomplishing but very little, the whole college and the system itself must receive the odium of their unfaithfulness. When we say that students work well, we do not mean that they do a man's work; such ought not to be expected. In the first place they are not all men; besides working only fifteen hours a week, and engaged in mental labors the remainder of the time, does not leave the student in a proper condition for severe physical exertion.

We have thus endeavored to show some of the things that ought not to be expected of the labor system; what now should be expected of it, and how far does it meet those requirements? Perhaps the most important feature is that it creates and maintains a respect for the dignity of labor, and for the laborer. Four years in college without any discipline at manual labor, is almost sure to destroy the respect for labor, and the disposition if not the ability to engage in such. It is too frequent an occurrence that such students are disposed to look down on manual labor as being beneath the dignity of a college graduate. It is a noticeable and much commented fact, and one that is very forcibly used as an argument against higher education, that it unfits the graduate for the more common and practical walks of life by lessening their abilities and destroying their dispositions to engage in hard work. It cannot, however, be successfully disputed that this is not true to so great an extent with those students who combine their mental discipline with training at manual labor. This college boasts of its graduates being practical and successful men; and a large part of their success is without doubt owing to their abilities and dispositions to work. For it must be admitted that it is not always the men with the highest education or the best abilities that are the most successful, but it is the men who are willing to put their shoulders to the wheel, and being willing are able to push with effect; and therein, we claim, lies the great difference in the discipline afforded by the two classes of institutions.

In order, however, to reap these benefits, the labor system must be what it purports to be. Every student should be required to work each day, as it is from this regularity that he derives the benefits, and not so much from the great amount of work performed, although he should work fairly well. The student who works only when he feels so disposed, does not work very often, and derives a correspondingly small amount of good therefrom. It cannot have escaped the notice of all concerned that students work much better when they are required to work every day than when they work irregularly; neither is there so much dissatisfaction among the students with regard to laboring. Here, however, arises the difficulty of providing work for all at all seasons of the year. During the spring term and a portion of the autumn term

work cannot be furnished. Shops in which work could be done when there is no other, would be a great help to the labor system, and would go far toward solving the educational part of the problem.

Then not only furnish work but require that every one shall work. As it is now, any one with the usual school-boy ingenuity and plenty of money, can manage to escape nearly all the requirements of the labor system. Of course many students would loudly object to such strict measures, but such as are not willing to engage in the labor should seek their education at other institutions.

One of the most beautiful effects of the labor system is seen in its influence on the students at the college. There is to be found here no such thing as caste or aristocracy; all are on an equal; "Worth makes the man," and a degree of hearty good feeling and friendship exists among all the students, such as is found in few other colleges.

Aside from all these, the graduates of this college, whether farmers or not, with, we think, but very few exceptions, are in close sympathy with the agricultural classes, and take a lively interest in all public matters concerning the well-being of the farmer, and the improvement of his calling.

While we do not advocate that the system can be made practically educational to the extent that many think it should be, yet we know much may be learned from observing the excellent manner in which the farm and gardens are cultivated, and by observing the fine stock and their management. Still we think the labor system can be made more educational than it is. Too much stress is laid upon the attempt to make it profitable. A particular kind of work required to be done, a man who can do the work is searched out, and no attempt made to teach those who do not know how, because that would not be profitable to the department. Now there are many kinds of work in which instructions could be given, especially on the lawns and gardens. One good, practical workman, with a small number of students each day, could accomplish very satisfactory results in teaching many kinds of work.

The amount of time assigned to this department of the college course, is, we think, too much, and thus becomes a hindrance to its more successful operation. There are several reasons for this. All the good results of the work system would be accomplished in two hours' labor as well as in three; and, moreover, we are strongly inclined to the opinion that, under good management, nearly, if not quite as much work would be accomplished. A great deal of the unpopularity of the work system among the students at present arises from the opinion that they cannot afford to devote to it three hours a day. The student who works vigorously for three hours, unless he be a freshman accustomed to manual labor, will not, without some rest, find himself in a very desirable condition for hard study, and this results in much loss of time,

and is a prolific source of much of the shirking. Under the two hours' rule these objections would be largely done away with, and at the same time it would afford sufficient exercise to keep the student healthy and in a condition to do more school work than he otherwise could. This, too, would afford an opportunity for those who desired to avail themselves of military training, and thus aid in disposing of that perplexing question.

WHILE so many changes are being brought about and additions being made to the college, would it not be well to look to the matter of a preparatory department? The small number who enter the college, the deficiency of a large proportion of these in the common branches of study, and the failure of many to pass the required examinations, are very forcible reminders of the necessity of such a department.

The matter of raising the course of study could be easily accomplished in this way: Many of the present studies of the freshman year could be put in the preparatory department, others admitted into the regular course, and more time be given to some already in the curriculum, to which at present, an insufficient length of time is allotted to master them satisfactorily.

Several branches which are required neither in the course nor for admission, and of which every student should have a good knowledge, could be required for admission into the college proper. Among these might be mentioned United States history and book-keeping, and the requirements in grammar and arithmetic be raised. Thus the great majority of the students could be far better prepared to enter upon their college studies, and would be in a condition to more thoroughly comprehend them. The present standard of admission is altogether too low as compared to those required by other colleges, and this is certainly no compliment to our school. But low as it is, it is too high for many of those whom the college is intended to reach. Only a comparatively small number of the farming class are able to prepare themselves to enter the college intended for their especial benefit, hence the farmers of Michigan have a right to a preparatory department in this college, and should demand it. About the only additional expense would be the cost of engaging a principal. Recitations in that department could come in the afternoon; and the work-hours, if such should be required, could come in the forenoon. This could be made a great help to the college without involving any very great expense.

A WELL, affording abundance of good water is very much needed on the College grounds. The two wells from which students obtain water for use, at Williams and Wells hall respectively, have never been in every respect satisfactory. The well at Williams hall is a shallow drive well, so close to the sewer from the buildings as to render the water never free from suspicion; in addition the water is warm and badly

flavored, and in such limited quantity that no pump can be made to work satisfactorily. During the late cold weather the pump was broken and inoperative for several days. At Wells hall the well is 130 feet deep and thus free from any surface taintage, and the water rises to within about four feet of the top. This well, however, has not given clear water since 1883, and so far all efforts to improve it have proved futile. The water is so muddy as to be unsafe to drink. This has made it necessary for the students and cooks of the "clubs" to bring the water a long distance, either from the green-house or from the barns. Farther inquiry shows that there are few or no first-class wells on the grounds. During the last two years, a large number of flowing wells have been struck at a moderate depth in the city of Lansing, and even nearer the College, on the farm of Mr. James Turner. At the Reform School, which stands on high ground, the water from an artesian well is pumped by steam into the various buildings, thus affording an excellent supply. Mr. W. R. Coats, the engineer who discovered the recent flowing well at Lansing, and who made an exhaustive study of the water bearing strata surrounding the city, says there will be no difficulty in obtaining a strong flowing well near the river.

If a supply of good drinking water could be pumped into the various buildings, it would tend not only to the convenience but to the health of the students, while the expense would probably be but little, if any greater, than to maintain a number of wells, none of which are efficient.

VERY many friends of the college are urging either the advancement of the standard of admission to the college, or the cessation of granting the degree of B. S. There is no doubt that the requirements for that degree at the college are at present less than that required by any other college in the State. The effect is instead of drawing students who will compete in large numbers for that degree, to discourage their attendance, the idea being held by them that there is no reputation to be gained by obtaining so cheap a degree. The organic law establishing the college requires graduates of the common schools to be admitted. This has been interpreted by the faculty as requiring the admission of students who can pass an examination in arithmetic, reading, grammar, writing, and spelling. There is no doubt but that the organic law would be obeyed provided such students were admitted into a preparatory class, and the requirements of admission for the freshman class, advanced one year. The arguments in favor of this, concisely would be, to bring the course on a par with courses in other colleges granting the same degree; to permit more time for studies of general culture and discipline; to render the technical studies of the course more valuable.

There are, on the other hand, strong arguments against this. In the first place our agricultural stu-

dents must come largely from the country. They may not be able to stay more than four years, and cannot get preparation for an advanced course.

A compromise measure might be adopted which would give a degree of Bachelor of Agriculture at the end of four years, and the degree of B. S. at the end of five years, that might be satisfactory to all. It is a notable fact that the students of the college are at present overworked, and some change that will prevent this must be brought about.

THE RESIGNATION of President Abbot and the appointment of Mr. Willits to fill the vacancy, appears to have opened up a new era in the life of the Agricultural College. Other changes have followed in close succession, several improvements are being made and others are projected.

Mr. Willits is a man of strong intellect, he has a broad education, and is a gentleman of the highest culture. He has not only gained a commendable reputation as a teacher, but he has during his active and varied life obtained much practical knowledge in many other directions which cannot fail to be of great use in the executive management of an educational institution. He has had experience on all sides of the question, not only as a teacher but as the executive head, and also from a political and business aspect. Hence he must possess broader, more practical views, and a better knowledge of human nature than though his whole life had been occupied as a teacher and a student.

President Willits will teach Political Economy and Constitutional Law. His known ability, and his knowledge of these branches need no farther encomium; and we hope to see the time allotted to the study of these sciences increased in the near future. He is not expected to teach any other branches.

Ex-President Abbot remains in the college as professor of Mental, Moral Philosophy, Logic, and History. Dr. Abbot is a most excellent teacher as all well know who have been in his classes; and he has almost a wonderful knowledge of books. Relief from the duties involved in the Presidency will enable him to give his whole attention to his classes; consequently the students of the Agricultural College will have very superior advantages in those branches.

These changes have made it necessary to abolish the chair of History and Political Economy, thus causing the departure of Professor Harrower from the College. The students and the officers of the College very much regret the loss of Professor Harrower, as he is a young man of ability and a close student, an able teacher, and well informed in the branches of his profession.

This throws all the literary work on the Professor of English Literature, which is to be regretted as we fear it is overloading that department; but this may be relieved when increased teaching force is added on account of the new mechanical school.

In the Horticultural Department Mr. Bailey takes

the Professorship. He is a young man of ability and energy, a fine scholar, and an enthusiastic botanist. He has associated with him as foreman, Mr. Crandall of '73. Under their management no doubt is entertained that the Horticultural Department will not only keep up its present admirable condition, but will continue to grow in use, and improve in appearance. And it is to be hoped that an increased interest will soon be manifested in the study of horticulture. Mr. Bailey has faith in the labor system, and is confident of making the student labor prove more effective in the future than in some cases it has in the past.

The Military Department is struggling hard for recognition, and will add another feature to the College more or less attractive. The greatest question in regard to this matter now seems to be, what to do with the pesky subject.

With all these fair prospects we feel hopeful and confident of the future of our Alma Mater. May she grow and increase in usefulness and popularity, and not only maintain her proud position at the head of agricultural colleges, but far outstrip her own good record. She shall be an honor to her children who will glory in her good name, and the Agricultural College shall be the pride of our state.

THE CLUB BOARDING SYSTEM has now been in operation for over two years, and with results quite satisfactory, on the whole. In no case, we think, has there been any dissatisfaction with the quality or the quantity of board, but this has not been so universally true in regard to the cost. In most of the clubs the price per week has ranged from \$2.45 to \$2.75. One club, owing to misfortunes and laxness somewhere, has several times paid as high as \$3.00 per week. To guard against such in the future, the constitution was amended so as to provide for the election of an auditing committee whose duty shall be to examine the accounts of all the stewards each week; the committee was also instructed to furnish a uniform set of books to be used by the stewards in keeping the club accounts. These changes, together with the provision that the members of the auditing committee shall receive a compensation of one shilling an hour for their labors, are expected to secure greater vigilance in the business affairs of the clubs, and to raise the efficiency of the system as regards stability in the price of board.

We have therefore no complaint to enter against the system in so far as it goes, but we do not think it goes far enough. The board, perhaps, is as good as can be had for the price, but there should be some provisions made that provisions might be furnished at cheaper rates for those who desire to board at less cost. But just how to accomplish this seems to be rather a perplexing question. The present mode of having a committee to divide the students among the several clubs so there shall not be a majority of any class or of any society in a club, will have to be abandoned. Yet it would not be advisable to have a club

conducted exclusively by a class or by a society. If it could be arranged so that board could be had at different rates, according as the student desired to pay, and then allow each to select his own club, it would be a very desirable change. Would this not be an improvement very satisfactory to all, and if so, what is there to hinder this change being brought about at once?

The cost of board is one very great drawback to this college. There is no choice, all must pay the same, whether he would desire to have cheaper board, or whether he could afford to pay more and have better board. Nearly all other colleges are situated so as to allow more or less latitude in selecting the kind and price of board; and in some schools, as the Valpariso Normal, this is the principal attractive feature. It must be admitted also, that this is a vital consideration with a great many of those seeking a college education. This opportunity, then, of choice in the price of board, becomes a very valuable element in the advantages offered by a college, and such an opportunity must be provided here before the College can very largely increase in the number of students, and the sooner this is brought about the better. If it could be accomplished during the coming term, it would undoubtedly become a great help in securing an increase in the size of the class which will enter next year.

AN APPROPRIATION of \$17,000 has been asked by the State Board of Agriculture for a school of mechanic arts at the College, this being one of the conditions upon which Mr. Willits accepted the presidency. The act of Congress granting government land as an endowment by which the College was established, provides that the mechanic arts as well as agriculture shall be included in the course of instruction. Hence, this will only be fulfilling the provisions of the organic law of the College.

The prospects are now good that the necessary amount will be granted, and the department established and in running order by the beginning of the next college year. Fifty students have already promised to enter the school next September.

It is not intended that this shall in any way interfere with the agricultural department, but is simply a branching out, a broadening of the institution, and will be an entirely separate school, neither adding to nor taking from the course as at present required.

The shops are intended to furnish practical and educational work for the students, three hours a day, without compensation, under the immediate supervision of practical and skilled workmen. The works will be modeled after those at Worcester, Massachusetts. The labor performed will be upon machines of utility, and not upon models, while the products of the shops will be disposed of for the benefit of the mechanical school. This will necessitate the appointment of a professor of mechanics, and for this position, Mr. Louis McLouth, at present professor of chemistry and physics in the State Normal School, has been selected

should the appropriation be granted by the Legislature. For the first two years no larger additional teaching force than this will be required, as nearly all the studies in the first two years of the mechanical course will be found in the present curriculum. The last two years of the course, however, will require an addition to the faculty of two or three professors, as a French and German course with several other studies will have to be added.

It is expected that the shops, which will provide working facilities for fifty students, will be situated on the present site of the piggery, and that eye-sore will be removed to a place south of the granary. The horticulture barns will probably be removed to a position somewhere in the vicinity of the windmill.

This department will be a valuable addition to the College, and one which we hope soon to see in successful operation, and moreover, we hope some day to see it draw from the University the whole engineering college and thus concentrate here all the industrial schools, where they belong.

MR. L. H. BAILEY '82 has been elected Professor of Horticulture to fill the vacancy occasioned by the resignation of Prof. Satterlee.

The SPECULUM feels some little pride in this appointment as Mr. Bailey was its first editor-in-chief, and was one of the founders of the paper, he and Mr. Beaumont of '82 being, we believe, the prime movers in establishing it. The SPECULUM congratulates Mr. Bailey, and wishes him a long and successful career in his new position.

COLLEGE NEWS.

See our new cover!

'85 expects to graduate thirty-two.

Secretary Baird has nearly recovered from a severe sickness of some weeks.

Prof. Cook has been elected president of the Ingham County Horticultural Society.

Our librarian, Mrs. Merrill, spent the past winter in the University library at Ann Arbor.

An assortment of new ornamental trees and shrubs will be put upon the grounds this spring.

Some specimens will be added, by purchase, to the Botanic Garden during the coming summer.

There are 14 more Freshmen this spring, which number makes the enrollment of the class 65.

Mr. Frank Kedzie and Mr. L. G. Carpenter have had their salaries raised to one thousand dollars.

Mrs. M. J. C. Merrill, '81, our efficient librarian, was called to mourn the death of her mother, January last.

Houghton, Mifflin & Co. are publishing a book for Prof. Bailey. It is a popular "Talk About Botany."

The collection which the Botanical Department sent to the Centennial is now at the New Orleans Exposition.

The Triennial Catalogue will be issued about the 1st of July in a separate pamphlet from the regular catalogue.

We hope that none of our graduates will forget that the regular Alumni Meeting comes next commencement time.

Several illustrated articles on drainage, by Professor R. C. Carpenter, have recently appeared in the Indianapolis Drainage Journal.

On Friday evening, March 14th, the College Sunday School gave a social in the library. All that were present had a pleasant time.

Some of the students are doing volunteer work in the workshop this spring. More desire to do so but cannot be accommodated.

Prof. Cook has imported three fine Shropshire sheep for his farm. They were invoiced at 250 pounds each. Price per head \$50.

Hon. H. G. Reynolds was not re-appointed to a place on the "Board" and now the College has not an alumnus on its board of control.

A fine collection of shells and lavas from the Sandwich Islands was received for the museum not long ago, Miss Helen Norton being the donor.

The opening in the wall of Wells Hall, caused by frost, does not look very nice. It is to be hoped that the wound will heal when its cause is removed.

The stewards for the present term are as follows: Club "A," J. W. Matthews; "B," J. J. Jakway; "C," E. R. Lake; "D," J. E. Hammond; "E," A. L. Nichols.

Prof. Cook began the series of Wednesday afternoon lectures on the afternoon of March 18th, by presenting a fine discourse; "Alcohol Physiologically Considered."

The members of the Senior class chosen to deliver commencement orations are Bates, Chappell, Clark, Dart, French, Hemphill, Hinebaugh, and J. D. Towar.

A very fine ammonite was received from Dakota for the College Museum the other day. It is composed entirely of iron pyrites. Mr. Page, of the class of '84, is the donor.

President Abbott moved to Lansing last fall at the close of the term. He now drives out to the College daily. Dr. Grange and Lieut. Lockwood also live in the city and drive out.

A barn and tool shop are among the projected improvements at the greenhouse. New steam works are to be put in so as to economize heat more than the present system does.

Hon. C. G. Luce is now a member of the State Board of Agriculture. He being a prominent granger, his appointment is desirable as it will bring the College more prominently before the grangers.

Mr. Charles Knappen, son-in-law of Sec. Baird, died from consumption at Thomasville, Ga., in March, where he had gone for his health. His wife and son 8 months old, are now living with her father.

The Engineering Department, after considerable difficulty, succeeded in filling one of the large cisterns at the greenhouse with water. The department now supplies water at the barns for the use of the stock.

There is a bill before the Legislature for an appropriation for bulletins containing accounts of discoveries made at the College, which would be of value to the people. This was introduced by Senator Phelps of Mecosta county.

A large amount of work for the Chemical Department has accumulated in the form of the analysis of rock strata encountered in the boring for salt, the analysis of marls and ores, the testing of sugars and the examination of water for city supply.

Mr. Knapper now has full control of the greenhouse. He has furnished a large number of flowers to the Legislature, and still has many left. One hundred and fifty bouquets were furnished for the Governor's Levee, which was held in the Capitol.

According to the latest report, we are to have a bath room in the east ward of Wells Hall, with four tubs. This is something the students need. Prof. Carpenter says bath rooms are difficult to manage, and that is the only reason for our not having them sooner.

Dr. Kedzie brought some fine specimens of rock salt crystals from a mine near New Orleans. The specimens are for the special use of the Chemical Club for experiments in regard to radiant heat. He also brought a very highly polished cube of Mexican onyx.

Prof. Harrower continues as professor during President Abbott's term of office. When our new president, Hon. Edwin Willets comes, he is to teach the studies which Prof. Harrower now teaches. We regret to see so able a man as Prof. Harrower leave us.

The library has been rearranged during the spring term, and the catalogue thoroughly revised; parties looking for books will now be able to find them without assistance from the librarian. Books continue to disappear, now one, then another. Are we careless, or —?

There is an Alumni Album in the hands of Prof. Carpenter. An attempt has been made to make a collection of the pictures of the alumni. There is not yet all of the pictures of a single class. It is desired that the alumni bring or send in their photographs, as a full collection of them might be of use to the College.

The State Board of Agriculture, at their meeting March 24th, decided to have the military drill begin at 12:45 p. m. and close at 1:15 p. m. Work on the various departments to begin at 1:30 and end at 4 p. m. The time for drill is not thoroughly settled yet, but if it works well at this hour there will probably be no farther change.

In recognition of her efficient services in assisting in the care of the plants at the greenhouse during the past severe winter, the State Board of Agriculture has paid Mrs. Knapper \$100.00. Mrs. Knapper expects soon to make her long-delayed trip to the East to visit her parents, and also Mr. Knapper's brother, who is Jay Gould's gardener at Irvington.

The officers of the various societies are as follows: DELTA TAU DELTA FRATERNITY, E. A. Bartmoss, Pres., and H. E. Thomas, Sec'y; PHI DELTA THETA FRATERNITY, C. H. Hoyt, Pres., and P. B. Woodworth, Sec'y; ECLECTIC SOCIETY, H. T. French, Pres., and G. M. VanAtta, Sec'y; UNION LITERARY SOCIETY, G. C. Lawrence, Pres., and Claire Waldron, Sec'y.

L. H. Bailey, Jr., class '82, now occupies the chair of Horticulture and Landscape Gardening, in place of Prof. Satterlee, whose resignation was noted in the last SPECULUM. Prof. Bailey and family have moved into the new house for the professor of Horticulture. Prof. Bailey was a brilliant student while at College. He was the first editor-in-chief of the SPECULUM.

Dr. Beal has added considerably to the collection of forestry. Slabs of trees showing bark and wood have been added, and pieces of the same species of different strength, as brittle and tough hickory. There has been included, also, sections showing defects in logs, besides numerous monstrosities in the form of crotches, gnarls, wood affected by insects, and wood affected by fungi. Dr. Beal intends to make several trips to the north during the term with a view to obtaining more specimens.

On the evening of Nov. 16th, the students and faculty gathered in the Library, where they presented to President and Mrs. Abbot, as a token of their regard, a fine silver tea service. Secretary Baird made the presentation speech expressing the regard and appreciation which both students and faculty felt for President Abbot's services, and their regret on account of his resignation. President Abbot very feelingly responded in behalf of Mrs. Abbot and himself.

Dr. Kedzie has recently been to New Orleans for the purpose of attending the meeting of the Sanitary Council of the Mississippi Valley. In the council he was chosen chairman of the committee to formulate methods of quarantine and the coöperation of health authorities of the Mississippi valley, to secure the exclusion of Asiatic cholera and yellow fever from the South and West, and to limit its spread in case of an invasion of either of these foreign epidemics. He also took occasion to visit the World's Exposition.

The greenhouse looks particularly fine this spring. None of the plants were affected by the extremely cold weather last winter. Every plant looks bright and healthy. The roses are doing exceedingly well. The flower bulbs received from Jay Gould's conservatory have sprouted nicely. Mr. Knapper thinks that he has the finest lot of carnations in this country. There are also some very fine foliage plants which visitors try in vain to buy. Various garden seeds are being tested in a systematic way. The results of the tests will be published in due time.

L. G. Carpenter, assistant in mathematics, at the request of Pres't Ingersoll of the Colorado Agricultural College, spent a portion of the winter vacation at that institution, acting as professor of mathematics and engineering until the vacancy could be permanently filled. He spent some time examining the irrigation system of the state, and took an extended trip through the mountains and the famous canyons of Colorado, visiting the gold and silver mining regions. On his return he visited the state agricultural colleges of Kansas, Illinois, and Indiana.

Dr. Beal has been laboring on his book at grasses this winter. He has the popular part nearly finished. There will be given in the book a description of about eight hundred species of the grasses of North America.

"Dr. Beal does well to say that books are an aid in the study, and not the proper source of knowledge at all. One examination of a plant will teach more than the perusal of fifty books. Every student of Botany may profit by taking counsel of Dr. Beal."—*London Gardeners' Magazine*. This is one of the many flattering newspaper notices of Dr. Beal's essay THE NEW BOTANY.

The following members of the faculty attended farmers' institutes during the winter: Jan. 12th and 13th, at Plymouth, Prof. Cook, Dr. Beal, Prof. MacEwan, and Mr. F. S. Kedzie; Jan. 15th and 16th, at Flushing, Prof. Carpenter, Prof. Johnson, Secretary Baird, and Dr. Kedzie; Jan. 19th and 20th, at Albion, Dr. Beal, Prof. Johnson, Prof. Carpenter, and

Secretary Baird; Jan. 20th and 21st, at Paw Paw, Prof. MacEwan, President Abbot, Dr. Grange, and Prof. Johnson; Jan. 21st and 22nd at Manchester, Prof. Johnson, Prof. Cook, Dr. Grange, and Mr. F. S. Kedzie; Jan. 21st and 22d at Monroe, Dr. Kedzie, Dr. Granger, President Abbot, and Mr. L. G. Carpenter.

A new feature of the Horticultural Department will be the fruit garden, to be located on the dry and warm knoll east of the farm house, and extending to the apple orchard. This garden will comprise four acres. It will be surrounded by a wind-break of evergreen and deciduous trees. In this garden will be tested all the hardier blackberries, raspberries, and cherries; also currants, gooseberries, strawberries, whortleberries, Russian apricots, Russian apples, Japanese peaches and pears, and other fruits. An attempt will also be made to grow some of the more promising of our wild fruits. It is expected that the supply of small fruits for the college tables will soon be derived from this garden. The Board of Agriculture has granted Prof. Bailey the use of means to carry on these experiments.

The College now has a Professor of Military Science in the person of Second Lieutenant J. A. Lockwood, 17th U. S. Infantry. Lieut. Lockwood seems to be the man for the place. He was appointed Second Lieutenant from civil life in 1880, after passing an examination at the head of twelve who were also candidates for commissions. He has served with his regiment in Dakota and Montana. He graduated in the class of '83 from the U. S. Infantry and Cavalry School for Officers at Fort Leavenworth, Kansas, and was chosen by the "Board" for his present position, on the recommendation of Gen. P. H. Sheridan. At present Lieut. Lockwood is drilling a squad of Seniors in one of the class-rooms. After the weather becomes endurable outside it is intended that these Seniors will assist in drilling the remainder of the students. Lieut. Lockwood advises the adoption of a neat and servicable uniform by the students; because a uniform is essential to a well conducted drill, and; because a uniform tends to cultivate habits of neatness and soldierly bearing.

Resolutions adopted by '87 on the marriage of Mr. St. John: Whereas, Erwin St. John has knowingly broken one of the most sacred rules of the class '87, and in a willful and premeditated manner, without the authority of the class or the advice of a single member thereof, has taken to himself a wife, therefore be it Resolved, that we, the class of '87, do extend to our unfortunate brother our deepest and most heartfelt sympathy. Resolved that if ever in the future further misfortune shall come upon him, he be requested to apply to the class for a name. Resolved, that he be requested to forward immediately to the secretary of the class the picture of the aforesaid wife. Resolved, that on these conditions only he shall be pardoned for the deed, and further Resolved, that if he fails to comply with these conditions he shall be haunted by the first five members of the class who shall pass in their checks. Resolved, that these resolutions be spread upon the minutes of the class, and a copy duly signed by each member of the class be forwarded to the aforesaid St. John, and a copy be published in the COLLEGE SPECULUM. H. S. Chapin, Pres't, E. W. Redman, Sec'y.

The bill for the appropriations for the College has passed the "House" with the exception of \$5,000 for drill room and armory, and \$1,500 for the Zoological Department. The bill is in charge of Col. McCreery and Mr. Chamberlain. From reports, it is very certain that the bill will pass the Senate without having any farther reduction. As the bill now stands it calls for about \$53,000. \$17,000 is for a mechanical department, of which \$10,000 is for the work shop, \$4,000 for professor's salary, and \$3,000 for residence. Prof. L. M. McLouth, professor of Chemistry and Physics in the State Normal School at Ypsilanti, will take the position of Professor of Mechanics. It is intended to make a full course for those who take the work in mechanics. The work in the shop will not be remunerated, as it will be entirely educational. The student taking this course will not take the lectures in Agriculture and Horticulture, and perhaps other studies, but will take Drawing, Mechanics, and Calculus. Thus there will be two distinct courses at the College, and probably the number of students will be greatly increased. It is to be hoped that the bill for this appropriation will pass, if nothing else does. The estimate for the Veterinary Hall was given in our last issue.

The extreme cold weather just before the opening of the term, proved too much for the steam pipes in Williams Hall. It is the custom in order to save expense to shut steam off from the buildings during the winter vacation. On turning steam on a few days before the term opened all the buildings heated nicely excepting Williams Hall. In that building the cold was so intense as to condense the water and freeze it, breaking the pipes in several places in the basement and in four rooms occupied by students. By employing several men and working night

and day, the engineering department was not able to get the rooms into a fairly comfortable condition by the first of the term, but did all that was possible under the circumstances. The extreme cold weather has made it exceedingly difficult to properly heat the buildings. Professor Carpenter says this is largely owing to the rickety condition of the windows. The rooms that are not open to every breeze that blows are, with few exceptions, comfortable at all times. As it is complaint of cold rooms has not been made by more than ten students. The engineer, Mr. James Wiseman, is giving general satisfaction, and is attending to all repairs of steam works very promptly. The amount of work and anxiety occasioned the engineering department by the cold weather is difficult to realize. Despite the unprecedented cold weather the buildings are heated as well this spring as ever before. Professor Carpenter says, however, that he will not be satisfied until all the rooms are warm during hours when steam is on.

The experimental feeding of stock at the college, during the past winter, was carried on with a view to determine how much flesh could be laid on with a given amount of food. Grain fed consisted of corn and oats in proportion of 2 — 1, bran and oil meal. The greatest gain was made by a thoroughbred short-horn steer 20 months old. Average daily ration, 11.74 lbs. of grain, and 15.55 lbs. hay. Average gain per day during period of three months was 3.35 lbs. A thoroughbred Ayrshire steer was fed the same ration and made an average gain of 2.64 lbs. per day. A thoroughbred Short-Horn cow, and a cross-bred Short-Horn and Galloway, were fed equal amounts in daily rations as follows: Grain, 13.59 lbs.; hay, 18.97 lbs.; gaining respectively 1.85 lbs. and 1.84 lbs. per day. A thoroughbred Jersey steer was fed a daily ration of grain 9.78 lbs. hay 11.06 lbs., and made a gain of 1.94 lbs. per day. Two lots of pigs were fed; one cooked food, and one uncooked food. Lot 1 fed cooked meal gained 1 lb. for every 4.62 lbs. of food consumed. Lot 2 fed meal which was soaked from 8 to 12 hours in cold water, gained 1 lb. for every 4.71 lbs. of food consumed. Two lots of sheep were also fed for a period of two months to determine how much hay a sheep would consume. For lot 1 five Merinos were selected. Lot 2 five Southdowns were taken. First month lot 1 consumed 9.9 lbs. of hay per day, with a slight loss in weight. Lot 2 consumed 9.8 lbs. per day with a similar result. Second month each lot consumed 12.7 lbs. of hay per day, with a gain of 6 lbs. in each lot, or an average of 1.2 lbs. per head. Cut hay was fed in every instance. A report of experiments in detail will be published soon.

FARM DEPARTMENT.—Last fall at the Fat Stock Show, Prof. Johnson purchased for the college herd, five head of well bred cows and heifers. The Rose of Sharon was bred by Geo. Fox of Elmhurst Hall, England. Victoria 71st is from the celebrated Cruikshank herd, of Syltinton, Scot'and. These are very superior specimens. Prof. Johnson thinks that the college has as good a Rose of Sharon cow as there is in this country. The third one of the purchase is a fine young Mary cow, Jennie Baldwin. She has taken several first premiums at State fairs. The other two are a Princess and a Phyllis heifer. Three of these have dropped calves since they were brought to the College, thus making quite a fine addition to the College Herd.

Two short-horn heifers, a Victoria Duchess and a Rose of Sharon, were lately sold from the College Herd to E. L. McKee, of the class of '81. Prof. Johnson remarks that Mac. seems bound to have good cattle.

The stock has been cared for, during the past winter, in a very desirable manner by H. T. French, of '85.

The day of the Short-Horn sale was fair and the attendance was good. Mr. J. A. Mann, of Detroit, was the auctioneer. He disposed of the stock quickly and satisfactorily. At 10 a. m., eight head of swine were sold, at an average price of \$13.50. At 11:30 a. m., about 200 men were served with lunch at the farm house. At 1 p. m., the sale of cattle began. The 26 head of Short-Horns sold at an average of \$112.50. The total receipts of the sale, including fat cattle and Jerseys was \$3,418. College Peri Duchess 2d, sold for \$240 to Hon. John C. Sharpe of Jackson. College Duchess sold for \$230, to C. G. & J. R. Learned of Port Austin. These were the highest bids. Mr. J. C. Sharpe bought four other head, and the Messrs. Learned three others. These were the heaviest buyers at the sale. Hercules 2d, a fine young Harriet bull, one year old, was sold for \$175 to S. Barnard of Ypsilanti. Horatio 4th, another Harriet bull, considerably less than a year old, was sold for \$125. The stock was well distributed through the State. A few head went out of the State to Dakota. The fat stock was sold to Fred Bertch, a butcher of Lansing. This stock was that fed in the Experimental Barn and was in very fine condition. Governor Alger, Ex-Congressman Horr, and Mayor Estabrook of Saginaw honored the sale by their presence. This sale was not for the purpose of closing out the Short-Horns, but to dispose of the sur-

plus animals—nearly all of them young. Representatives of every family offered will be retained for breeding on the farm. The State Board of Agriculture has in contemplation, the holding of an annual or biennial sale, at which the surplus stock of the farm shall be offered. They believe that in this way the State Farm may contribute, most successfully perhaps, in the good work of distributing animals of approved blood among the farmers of the State.

RESOLUTIONS ON THE DEATH OF LYMAN A. ROSS.—Whereas, in the midst of the cordial greetings of brothers and classmates after our return from the long winter vacation, we are called upon to mourn the sad and early death of our former fellow student, Lyman A. Ross; who, when a student, was identified with every active movement; an acknowledged leader in athletic sports; a jovial and hearty friend, and a true and faithful student. And, therefore, desiring to express our appreciation of his merits, and also from the many suggestions of classmates and loving friends, all intent to contribute something to that wreath with which our affections desire to crown his memory, we, the undersigned, committee appointed by the Students' Organization, do, at this our earliest opportunity, submit the following resolutions:

Resolved, That in the death of Lyman A. Ross, we sustain the loss of a friend whom we had all hoped to greet again in the halls of our college, and extend the same heartfelt welcome as we were wont to do in the happy times when he, as a student, was among us.

Resolved, That his native town loses a zealous and energetic young man, and the family of which he was a member a loving and affectionate son and brother, who promised, in time, to be an honor to their name.

Resolved, That we, students of the Michigan Agricultural College, unite in extending our sincere and heartfelt sympathies to the family and friends of the deceased, in this their hour of affliction.

Resolved, That these resolutions be published in our organ, the SPECULUM, and a copy forwarded to the family of our departed fellow-student.

J. E. HAMMOND,
C. F. SCHNEIDER, } Committee.
E. R. LAKE,

ROSS.—Whereas, It has pleased an Allwise Providence to remove by the relentless hand of death, our highly esteemed and beloved classmate, Lyman A. Ross; *Therefore be it Resolved*, That while we bow with reverence to God's immutable law, we deeply mourn our sad loss, and shall ever cherish his memory. *Resolved*, That in the death of our late classmate we have lost one of our most worthy members; his native city a valuable citizen, and his family a kind and affectionate son and brother; and that we as a class deeply sympathize with his family in this their deep affliction, and would also extend to them that sympathy and consolation which warm hearts can give who feel that their sorrow is our sorrow and their loss our loss. *Resolved*, That a copy of these resolutions be forwarded to the bereaved family, and presented to our college paper for publication.

A. L. NICHOLS,
W. A. KINNAN,
T. O. STANLEY,
Committee.

HORTICULTURAL DEPARTMENT.—The plum trees by the President's house have suffered from the severe winter. The general fruit prospects are poor.

The Professor of Horticulture has selected Mr. Chas. S. Crandall, of the class of '73, for foreman of the department. Mr. Crandall has entered upon his duties. He is a practical gardener, and the department will no doubt profit by his labors.

The old garden office in the basement of College Hall has been enlarged and refitted, so as to form a temporary office for the Professor of Horticulture and the foreman.

For the first time, the hot-beds have been constructed in the vegetable garden, where they are protected by a tight fence on the north and west.

Among the experiments contemplated by the Horticultural Department are the testing of new varieties of small fruits, experiments with native wild fruits as stocks for cultivated sorts, and investigations in regard to cross-fertilization and hybridizing. Opportunities will be given students to prosecute educational labor in the garden and orchard.

NATURAL HISTORY.—At the meeting held March 13th, Dr. Beal gave a little talk on the classical question, "Does Chess grow on Wheat?" The Dr. read some extracts from recent newspapers which declared that chess does grow on wheat sometimes. He then explained how spiklets of chess sometimes become lodged in a head of wheat, and showed specimens. He prepared some of these himself and said they beat any that he

had ever received through the mail, because they were made in a scientific manner.

Mrs. Merrill read a paper on "Mold." She described some of the many fantastic forms of mold, and illustrated her paper by means of diagrams. Mold is much more common than many suppose.

Prof. Bailey made a few remarks on the winter killing of plants. He states that the winter killing is not from the bursting of the cells by the frost as many suppose, but from some other cause not yet known. He has experimented with house plants by freezing them stiff, and with these tender plants he could find no cells ruptured. He said that the center of a fruit bud is often killed while the remainder of the bud is not injured. He was unable to determine whether the pistil or stamens were destroyed in this case, but thought it was the pistil. The effect of severe freezing upon the plant is to render the cell walls flaccid, allowing the liquid contents of the cell to ooze out into the intercellular spaces. In these intercellular spaces the sap comes in contact with air and becomes oxidized, causing it to assume the sere brown color which is characteristic of winter-killed branches. In the case of herbaceous shoots, the lessening of the turgidity of the cells from the oozing out of the cell contents, causes the collapse of the cell walls, and the consequent wilting of the shoot. With the exception of apples and sour cherries, the fruit upon the College premises is badly injured.

Prof. Cook presented a paper on the winter killing of bees. He has received numerous specimens of bees from apiaries in this State and New York, where a great many bees have died. On examining these bees he found pollen grains in their intestines, and there was a peculiar offensive odor. He examined healthy bees from the College apiary and found no pollen grains in the alimentary canal. His theory in regard to the matter is that pollen grains contain much matter which the bee cannot digest, and as the bee will not soil its hive, the effete matter remains in the alimentary canal, causing irritation and disease. When the weather is severe, the bees being diseased, succumb to it. The bees in the College apiary are supplied with cane sugar in the fall and thus have no pollen grains in their food. This probably accounts in a measure for their being healthy, while others are dying from dysentery, not cold. Some bees received from Mr. James Heddon were dead, which had been fed entirely on cane sugar syrup. These, however, showed no signs of diarrhea, but the syrup in the intestines was so entirely undigested that it was wholly unchanged in taste and odor. These bees had, without doubt, frozen to death.

Mr. Doolittle of New York, had sent bees said to have been fed in the same way. But these bees had died of diarrhea. The microscope showed bacteria in the feces of all these bees, pollen grains in some of them, while Dr. Kedzie found abundant nitrogen in the excreta of those which showed no pollen husks or grains. Mr. Doolittle states that these bees were breeding in February. Bees cannot breed without pollen or other nitrogenous food. The conclusion is that a warm uniform temperature of about 45° F. about the hives, and food of pure carbohydrates is necessary to winter bees in our northern states.

PERSONALS.

THE Editor of this Department desires the earnest co-operation of the alumni in aiding him to fill these columns with interesting items. Give occupation since graduation, what offices held, whether married or not, etc. Let this receive prompt attention from every alumnus.

B. S. Palmer, of '81, is dentist at Paw Paw.
R. J. Coryell of '84, is teaching in St. Clair county.
J. W. Beaumont, of '82, is practicing law at Chicago.
C. F. Lindsay, of '83, is school inspector at Highland.
J. D. Hill, of '84, is teaching school at Montpelier, Ohio.
L. J. Gibson, of '84, is in charge of the schools at Lyons.
L. K. Woodman, with '84, runs a roller rink at Paw Paw.
Will Shelden with, '83, is married and farming at Climax.
L. A. Potter is physician and druggist at Altoona, Dakota.
R. Lillie, '70, is likely to be postmaster at Coopersville, Mich.
D. C. Postle is manufacturing drain tile at Lillie Chappell, O.
E. E. Vance, of '84, is working his father's farm near Ionia.
Willis Liesenring, '84, teaches near Bangor, VanBuren county.
Charles B. Long, of '85, is married and teaching at West Leroy.
T. B. Cressey, is running for Regent on the Prohibition ticket.
F. A. Sessions of '71, is still cashier of the First National bank of Ionia.

Richard Hargh, of '69, is manager of Bowen's clothing store at Paw Paw.

Sherman Upton, of '81, has gone into the hardware business in Dakota.

W. H. Bristol, once with '84, has been prospecting in Texas the past winter.

C. S. Park, with '82, graduated at the Detroit Medical College, March, 1884.

E. P. Clark, of '83, has been teaching the past winter at White City, Kansas.

Thomas McEwen, with '71, has a nice home and is doing well at Bancroft, Mich.

R. M. Brooks, with '73, sold his farm at Wacousta and has returned to Ashley.

R. D. and W. Jay Sessions, of '77 and '74 respectively, are farming at Lebanon.

W. V. Sage, of '84, has been teaching near his home at Goblesville the past winter.

W. S. Kedzie, '83, has bought a farm of 40 acres near Breckenridge, Gratiot county.

A. J. Chappell, of '82, is teaching his second year at Westville, Montcalm county.

W. D. Barry, of '84, is salesman for the Mutual Union Tea Co., of Cleveland, Ohio.

Prof. Satterlee, '69, has received a clerkship in the Board of Health office in Lansing.

G. E. Kedzie, of '73, is mayor of the mining town of Chihuahua, Summit county, Col.

M. S. and W. L. Thomas of '79 and '80 respectively, are married and farming in Dakota.

C. P. Gillett of '84, is taking a post graduate course under the instruction of Professor Cook.

H. A. Haigh's book on Farm Law will be published in two months by W. S. George & Co.

J. J. Tobias, a student in '81, was married March 25th, 1885, to Miss Mattie Foster, Meridian.

H. P. Jenny, of '74, is teaching his second year at Jeddo. He is married and has two children.

Prof. Harrower, after leaving College in July, contemplates spending a year or two in Europe.

E. J. Rawson, of '78, is buying grain and seeds at Decatur. He served one term as township clerk.

E. J. Fletcher, of '83, spent the past winter in Washington, but returns to his Minnesota farm soon.

Miss Alice Johnson, of '84, taught school the past winter and expects to teach the coming summer.

J. L. Maurice, of '73, was elected treasurer of Emmet county, the only Republican elected in the county.

A. C. Bird, of '83, is teaching in St. Clair county. He takes a position in a bank at Flint the 1st of May.

Prof. Dickey of Albion, once a student of the College, has an appropriation of \$50,000 for his department.

T. E. Dryden, of the class of '80, is prospering in the hardware business of the firm of Dryden & Son, at Allegan.

Jason Woodman, '81, is managing a fine two hundred acre farm at Paw Paw, Mich. He has a wife and baby.

Prof. W. W. Daniels is Professor of Chemistry at the Wisconsin University. He visited the College the past winter.

C. A. Smith, with '81, is assistant surgeon in the Wabash R. R. hospital at St. Louis, Mo., on \$1,800 a year and board.

W. M. Cline, with '82, is State senator from his district. He is a lawyer of the firm of Chadwick & Cline of Port Huron.

S. Crissey, with '73, is train dispatcher on the Mackinaw division of the Michigan Central, with his office at Bay City.

Charles Baker, of '84, is at home doing chores, and trying to earn money enough to get back to the college next August.

W. H. Burgess, of '81 (of Ann Arbor, '84), is at Port Huron waiting to find a place to locate. He expects to go to Idaho.

A. W. Page, Jr., is in business with his brother at Broadland, Dakota. He is not married as reported in the last SPECULUM.

H. A. Danville, of '83, taught school near Grand Ledge last winter. He returns to Dakota this spring to attend to his land claims.

H. D. Luce, of '84, clerked for a time in his brother-in-law's store, general merchandise, in northern Indiana. He is now a partner.

Arthur Jones, of '81, received severe internal injuries from a fall at Muskegon last winter. He is now with his people in Lansing.

E. F. Law of '83, has been teaching in St. Clair county the past winter. He soon returns to Marlette to attend to surveying business.

W. H. Fuller, four years county treasurer of Otsego county, was found short in his accounts, but made it up with his own property.

J. E. Coulter, of '82, has discontinued his charge of the wheat ranch at Stephen, Minn., and is now station agent at Calumet, in the upper peninsula.

Fred Hodges, '84, who is now a student from the Chicago Medical College, is taking a post graduate in chemistry at the Agricultural College.

Prof. F. A. Gulley, of '68, of the Mississippi Agricultural College, will visit the New Orleans Exposition with about 200 students of the college.

H. Bamber, of '81, has been assistant engineer on Good Lot No. 8, Monongahela River Improvement. He lately visited his home at Highland, Mich.

A. W. Troupe, '81, is practicing medicine at Springport and is doing finely. He was married Nov. 18, 1884, to Miss Carrie Sloan of West Windsor.

J. M. Hollingsworth, '82, is in Sheridan at present, but has rented the farm of George Stanton and will move on the farm when spring opens.

W. W. Palmer, of '81, is unmarried, and stock raising in Iowa. W. W. and B. S. Palmer were called home during the winter by the death of their mother.

F. C. Snyder, '82, has been lecturing in Montcalm county for the county grange. He teaches near his home, Greenville, when not otherwise engaged.

W. E. Hale, of '82, is still farming at Eaton Rapids. He has not yet entered the matrimonial state, but says he is going to get married as soon as he can.

The SPECULUM editor visited H. W. Meeker some time since. Honnee has a pleasant home and a fine farm, and is very happily situated near Olivet, Mich.

A. E. Smith, of '81, graduated last year from the Rush medical college, Chicago. He has not yet located but is visiting his wife's people at Belmont, N. Y.

Professional papers of the Signal Service, No. XIV, consist of charts of relative storm frequency for a portion of the northern hemisphere, by John P. Finley, of '73.

George Antisdale, with '85, is at his home at Nyack, N. Y. He was obliged to leave Cornell University last fall on account of sickness, and has been unable to return.

Dr. C. E. Bessey, of '69, has entered upon the work of his new profession in the Nebraska University. He is Professor of Botany and Dean of the Agricultural Faculty.

A. W. Mather, of '83, taught school near Battle Creek the past winter. He returns to Esler, Stutsman county, Dakota, where he is perfecting a land claim of 480 acres.

F. J. Annis, '75, Fort Collins, Col., is a member of the firm of Hayes, Dunning & Annis, attorneys, with offices at Greeley and Fort Collins, and are doing a prosperous business.

H. A. Haigh, of '74, was assistant secretary of the Republican State Convention. B. A. Nevins, C. C. Lillie, W. Hale, Will Langley, Geo. A. Farr, and J. I. Breck were delegates.

Will Dothany, '84, is clerking at Farmington, and under the favoring smiles of the new administration, hopes to secure a position as mail agent on one of the Michigan railroads.

F. F. Rogers, of '83, is still associated with E. F. Law, of '83, in the surveying business at Marlette. Mr. Rogers visited the State Engineers' Association at Lansing the past winter.

W. R. Hubbert, '81, who graduated from the Detroit Medical College March 4th, 1885, was married March 24th, at Detroit, to Miss Emmaline E. Pilgrim, of Finborough, Suffolk, England.

Frank Hodgeman, of '62, is chairman of the committee on the manual of State Engineers' Association, and has had the editing of the manual put into his hands. The work will appear in May.

C. A. Bemis, of '74, is in his sixth year as principal of public schools at Portland, and is giving entire satisfaction. Since graduating, he has purchased a library of more than fourteen hundred volumes.

J. R. Monroe, of '78, went to Colorado after completing his course in law at Ann Arbor, but has returned to Kalamazoo, where he is cashier of the savings bank of which his family own a controlling interest.

Hon. C. J. Monroe, of '61, is doing grand work for the college in the State senate, as chairman of the Committee on Agricultural College. He was renominated by acclamation, and ran far ahead of his ticket.

L. A. Lilly, of '77, is managing a seven hundred acre farm at New Sharon, Iowa. He keeps a few Short Horns and Jerseys, besides grades for beef. He has a family of a wife and two children, a boy and a girl.

O. L. Hershiser, of '84, taught in Eaton county the past winter. He soon returns to Water Valley to take charge of the apiary of E. C. Hubbard, and not of Mr. Jones, as given in the last number of the SPECULUM.

W. M. Badcock, with '86 is now in New York city, attached to the Charity Organization, which aims to bring about a coöperation among the different charity organizations of the city, and to suppress beggary and its consequent evils.

C. E. Sumner, of '79, was married Dec. 17, 1884, to Miss Matie Ryan of Huron, Ohio. Mr. Sumner expects to graduate from one of the Washington law schools this spring, and soon after to enter on the practice of his profession.

W. H. Goss, of '82, visited New Orleans this winter and reports D. C. Holliday, of '83, as chief baggage agent, with a salary of \$125 per month. Goss is Worthy Master of the Bangor Grange. He is on his father's farm at Bangor, VanBuren county, one of the best in the State.

B. A. Nevins, of the class of '75, is still at Otsego. He is doing an extensive manufacturing business, employing from twenty to thirty men, and using half a million feet of lumber annually, with trade extending from Georgia to Dakota, and from Massachusetts to California.

W. L. Porter, with '75, has a small farm in the outskirts of Greeley, Col., which he devotes to market gardening. In addition he possesses an apiary of 110 swarms. He is also testing various varieties of different kinds of fruit, to find those suitable for that dry climate.

Charles Schlappi, with '84, is associated with his brother in conducting a large wheat farm at Michigan, Dakota. They raised about 3,000 bushels of wheat last year, and he says the more they raise the poorer they are. He had to send to Michigan for money to winter on.

H. W. Collingwood, of '83, has resigned the position of editor of the *Southern Live Stock Journal*, and is at present instructor in English Literature and Rhetoric in the Starkville, Miss., Female Seminary. R. H. Gulley, of '78, has also left the business management of the same journal.

W. D. Place, of '68, is now doing well. He has a fine dairy farm just out of Ionia. He has within the last three years fitted and planted a piece of ground about a mile from Ionia for a cemetery. It is now the favorite burial place for Ionia, and Mr. Place is in a fair way to reap some reward for his labors.

Line Avery has been studying law for the past two years at Port Huron and expects to enter Ann Arbor this fall. He is also secretary of the board of examiners, taught in the county normal last summer with eighty-five students, and is engaged for next vacation and expects one hundred and twenty-five students.

B. D. Halstead, of '71, Harvard D. S. in '78, later managing editor of the *American Agriculturist*, at \$2,000 a year, is now Professor of Botany in the Iowa Agricultural College, the place vacated by C. E. Bessey. The *Rural New Yorker* says, "We congratulate the Dr. in escaping from the *American Agriculturist* and going into the good Iowa Agricultural College."

E. O. Ladd, '78, left the employ of D. M. Ferry & Co., last August, and is now in partnership with his father on the "Old Farm" at Old Mission. He says he takes pride in getting back to the farm and being classed with the farmers. He is giving especial attention to fruit growing. Mr. Ladd is president of the Peninsula Farmers' Club, and taught school last winter.

A. C. Redding, of '83, is teaching near Berlamont, with an enrollment of 51 pupils. He thinks he will continue teaching for some time yet, as he sees no prospect of getting married. He will expound the evil effects of alcohol and narcotics on the human system at the meeting of the VanBuren county teachers' association, to be held at Hartford, April 17 and 18.

J. L. McClear, of '82, graduated from Ann Arbor March 26, 1884. He then formed a partnership with F. O. Gaffney, purchased a library of five hundred volumes, and located at Lake City, where he now has a fair practice. He was elected prosecuting attorney and circuit court commissioner of Missaukee county last election, the only democrat elected in the county.

Edgar Grimm, '83, is Professor of Agriculture in the Agricultural College at Conolles, Oregon, and is having rather a hard time of it. The college is just being developed in a new country, and has been under the control of the Methodist church, which is not very enthusiastic on the subject of agriculture. The college is now under the control of the State, and Prof. Grimm is more hopeful. However, he is the only man of the faculty who has any knowledge of an agricultural school, or any ambition to develop one.

W. F. Hoyt, of '83, now an M. D. of Starling Medical College, Columbus, received the prize for highest scholarship, his percentage being 97½. While a student, Mr. Hoyt won considerable honor by showing the parasitic origin of certain skin diseases, known as "Pan Handle Itch," "Sciota Scratches," etc. His researches were highly commended by the Columbus *Daily Times*.

James Troop, of '78, now professor of horticulture and entomology of Purdue university, was married Dec. 30, at Livonia, N. Y., to Miss Cora L. Chamberlin. The flowers were furnished for the occasion by Mr. Knapper. Prof. and Mrs. Troop and Prof. and Mr. Latta expect to visit the college next commencement. Prof. Troop delivered an address at the Marion horticultural society, held at Indianapolis, Feb. 28, 1885; subject, "The Harmony of Nature."

H. S. Hampton, of '76 is district attorney at Albion, Idaho. He went from Michigan to Nebraska in 1879, remaining there two years, teaching most of the time. He has been at Albion something over three years, teaching at first; afterward employed as deputy county recorder and treasurer, doing most of the county business for two years, till his legal practice obliged him to give it up. He was admitted to the bar June 2, 1883, and elected district attorney in 1884. He is unmarried. Mr. Hampton says A. B. Peebles, of '77, was engaged in the ministry at Salt Lake City, Utah, but had gone east, whether to return or not, he did not know.

COLLEGES.

Only a few European institutions edit college papers.

Amherst claims to have the best gymnasium in the country.

Professor Agassiz has resigned from the Faculty of Harvard.

It is said that President McCosh has graduated from six colleges.

Students of Wellesley are not permitted to publish a college paper.

The three wealthiest colleges in America are Columbia, Harvard, and Cornell.

The libraries of Germany are more extensive than those of any other nation.

In Yale students studying German exceed in numbers those studying the classics.

Vice President Hendricks will deliver the annual address at the Yale commencement.

Students of Berkeley, California, University have "rushes" on the campus, each Friday afternoon.

The Yale Alumni recently gave a dinner in New York, in honor of Prof. Phelps, the new minister to England.

Leading educators in Japan propose to effect a substitution of the Latin alphabet for the one now in use in Japan.

Charles L. Colby, whose father endowed Colby University, has given one million dollars for founding a new university in Wisconsin.

Bowdoin boasts of having among her alumni, a governor, two councilors, and seventeen senators and representatives in the state legislature.

Harvard University and the Maine Historical Society are recipients of copies of the bust of Longfellow, now in Westminster Abbey.—*Ex.*

At a number of colleges students have formed mock congresses, which follow as nearly as may be the modes of the United States congress.

One man in every 5,000 in England takes a college course; in Scotland one in 615; in Germany one in 213; in the United States one in 2,000.—*Ex.*

Endowments of some of the colleges of the United States are as follows: Girard, \$10,000,000; Columbia, \$5,000,000; Johns Hopkins, \$4,000,000; Harvard, \$3,000,000; Princeton, \$2,500,000; Lehigh, \$1,800,000; Cornell, \$1,400,000.

A recent writer advocates the establishing of a National University, this university to be located at Washington, because of the superior advantages that are thrown around the student. "Every department of government," he says, "is really a branch of a great university."

In New York state there lives a philosopher, so-called, who maintains that the earth is a huge animal, and offers the following as proof: First, the earth breathes, which fact is shown by the action of the tides. Second, the earth has great longevity, as shown from the fact that the largest animals live longest. Third, the earth has heat.

The history of college journalism begins with the Dartmouth *Gazette*, which was first issued in the year 1810; and it is a noteworthy fact that Daniel Webster lent his first literary efforts to this college journal. To-day there are fully two hundred college papers regularly published.—*Chronicle.*

Prof. T. W. Hunt says that "The reform of our spelling is a necessity," and that "no reform of modern times can present so goodly a list of advocates; and while by no means unattended with objections and difficulties, it is so substantially valid and judicious as to be safely commended to the schools for immediate adoption, and to all English speaking people for intelligent discussion and approval."

EXCHANGES.

One by one he turns them over,
Scowls at this one, smiles at that;
This one marks across the cover,
Throws that to the office cat;
Here he clips a commendation,
There he writes a blue grim "set;"
Marks here a slanderous allegation,
There steals all that he can get.
Through what wide realm his fancy ranges
The man who edits the exchanges.

—*Cornell Era.*

The *Kalamazoo Index* is quite prone to criticize its exchanges, this being one of the principal features of that paper. In one of its issues it took occasion to review some of the literary articles in the *SPECULUM*. Without considering whether or not the articles merited the criticism, it did not come with very good grace from a paper, every one of the literary articles, of which was copied; as was nearly, if not quite two-thirds of its entire matter. The March number of the same sheet comes out with a magnificent list of four personals, and in its exchange column says: "It is not safe to judge an institution by the paper it publishes unless we know that the brains, which the literary matter bespeaks, really belongs to the students and editors." Considering the small amount of original matter in the *Index*, further comment is unnecessary.

The exchange editor of the *Niagara Index* has been connected with journalism for sixteen years so we are told. We have long wondered at the superior knowledge of this renowned critic, this author of a new literature, and now we read his wonderful productions with more awe than ever before.

The College Transcript for March 14th contains an article entitled, "One Phase of College Life," which anti-fraternity men will do well to read. A few of the principal points, frequently used as argument against fraternities, are ably discussed.

The *College Student* for March is the best number of that journal that we have yet seen. Among the many articles of interest "Scholasticism in the Middle Ages," "Too Late to Go to College," and "The Unit," deserve special attention.

The March issue of the *Pleiad* is a good one. It contains a very interesting lecture delivered at Albion College, by Rev. T. DeWitt Talmage, in reply to Ingersoll's lecture on Talmagean Theology.

The *Pleiad* is very much opposed to having the name of their college changed to Asbury Centenary University. They say, "better have a first-class College than a second or third-class university."

We have just formed the acquaintance of *The Owl*, and are favorably impressed. Its bright well written pages, however, present quite a contrast to its rather rusty looking cover.

We think the *Student* has not been correctly informed on the subject. The Agricultural College expects to have a Mechanical Department fully equipped by September next.

There is a movement on foot to transfer the Department of Mechanical Engineering from Ann Arbor to the Agricultural College at Lansing.—*Hesperian Student.*

After a long absence, the *Emory Mirror* has again found its way to our tables. We hardly feel like complimenting the editors on the form of their paper.

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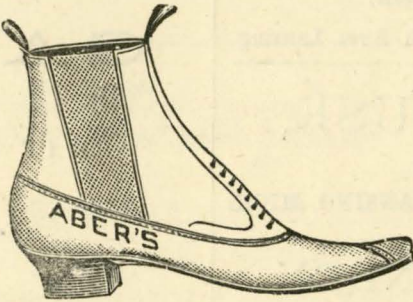
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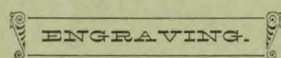
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CALENDAR FOR THE YEAR 1885.

February 25th Spring Term begins. May 20th Spring Term ends. May 27th Summer Term begins.
August 19th Summer Term ends; Commencement. August 26th College Year begins; Entrance examinations at 9 o'clock A. M.

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