The M. A. C. Record.

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A HALF DAY AMONG THE SOPHOMORES. IN THE SHOPS.

AS SEEN BY A FACULTY REPORTER.

On Wednesday morning a reporter visited the shops in order to note the work being accomplished by the present sophomore class of the Mechanical Course. As the reporter had not previously announced his intentions in regard to making a visit to the shops, it may be considered most probable that the work carried on during the morning was not in any way a departure from the ordinary routine, and the work may be taken as indicative of the nature of the instruction and practice given Mechanical sophomores. Some of the men, a few, were at work in the blacksmith shop, and the following operations were being carried on: Forging and tempering springs; shaping a pentagonal piece with the hammer, dressing a heavy tool. Most of the men were in the foundry, and these were working in groups, or sections, there being four such sections at work. During the morning the first section made molds for idle-pulleys—(these pulleys are to be used on a belt tightener in the wood shop) then made a mold for experimental purposes, the object being to note the effect of heavy and light chills; arranged a broken cast iron shaft in a mold preparatory to welding; finally, set cores in molds previously made. The second section "put up four flasks," that is, made four molds, for weights to be used in a testing machine now being constructed in the machine shop, and set cores in several molds. The third section "put up three flasks," and in these flasks were molds for two core-plates, two slide-rest pieces, and two pulleys. The fourth section spent the entire morning making cores, among these being cores for a hydraulic ram now under construction in the shops. The class was at work two hours and forty minutes. Mr. Hoyt, foreman of the foundry, informed the writer that on the following day castings would be poured, this being a part of the regular work.

AS SEEN BY ONE OF THE SOPHOMORES.
F. J. KLING '89 *m.*

Any one familiar with the methods of work in regular foundry establishments of the country, would be—to use a homely phrase—right at home in the foundry at M. A. C. He would find here the workings of the foundry reduced to a practical basis; instruction given by a practical founder; and patterns, molds, and castings put to practical use.

It is only necessary to visit the foundry, watch the students at work and notice the results obtained to readily accept the above statement. For the benefit of those who are interested in this work, but who cannot visit the foundry, a short sketch of a forenoon's work would, perhaps, be of interest.

The students are divided into four sections. Each section has a full kit of the necessary foundry tools and, at all times, work independently of the other sections. In this way opportunity is given to advance those most proficient in the foundry practice by giving them the more difficult patterns, requiring more skill to mold, while the simpler patterns are given to the other sections.

This is illustrated by the work done during a recent meeting of the class. One section was given the following patterns. The base for a hydraulic ram—two molds to be made; frame for a belt tightener; the two pieces of a broken cast iron shaft, to be placed in a flask ready for molding; and the pattern and chills for chilling a sample piece of iron.

All the molds were secured upon first trial and without much difficulty. Different methods were used in making the two molds for the base of the hydraulic ram. In the first, a three-part flask was used; but in the second, by one of those ingenious "shop kinks" with which a practical founder is always ready, a two-part flask answered as well. It, no doubt, would be of interest at this point to give a description of this particular "shop kink," but the writer feels his inability to make the description intelligible without an accompanying sketch or two which, unfortunately, he has not at his command. The outcome of these two molds will be watched with interest.

The mold for the belt-tightener frame was a simple pattern. A little extra care used in ramming and drawing was all that was necessary to insure a good mold. That little extra precaution, however, was omitted in drawing the pattern and resulted in giving opportunity for some neat "slick" work.

The welding of the cast iron shaft was accomplished in this way. The two broken ends of the shaft were placed in a flask, the broken ends joined, and the flask rammed up, a spine being in position on each side of the shaft opposite the fracture. The cope after ramming was removed. The two ends of the shaft were then shifted until about one-half inch space separated them. Gates were cut from both spine holes joining this opening. The cope was then replaced and the mold was ready for pouring. The weld is made by pouring the hot iron into one of the spine holes, forcing it through the opening between the broken ends of the shaft, up through the other spine hole and on to the floor, where it forms a pig. During its passage between the ends of the shaft, these are fused. When the pouring ceases the fused ends readily unite with the molten iron between them, thus forming one continuous piece. It takes from 225 to 300 pounds of iron to weld a three-inch shaft. The quantity varying directly as the heat of the molten iron.

The mold for the sample piece of chilled iron was something of an experiment. Under one end of the mold was placed a 1¼-inch chill; under the other a 1-inch chill with a narrow space between the two. The sample after casting will be broken, depth of chill and crystal structure, in each case, noted and compared.

This completes the forenoon's work of one section. Another section molded up a slide rest and pully cone for a lathe, also a pair of core plates. The third section secured molds of a bearing for a shaft hanger, a pair of ornamental steps and several molds of weights for a torsion testing machine used in the experimental room. The fourth section employed its time in making cores for the various molds in process of construction.

It is evident from the above list that the work is of a purely practical nature. As all the molds will be cast, it is needless to say that perfect molds were the only ones to pass inspection.

PARIS GREEN ON PEPERMINT.

Prof. R. C. Kedzie:

Dear Sir:—There is a large amount of peppermint grown in this vicinity, and the grasshopper is likely to cut the crop short. I would like to know if Paris Green, dissolved in salt water and sprinkled on the plant, would do any damage to the oil after it was distilled. I understand the hopper is very fond of salt. If you can suggest anything to help us out and save our crop we will appreciate it very much.

Kindly yours, J. P. W.

In order to answer this question satisfactorily, it was thought best to make an actual trial by distilling oil from peppermint plants that had been sprayed with salt water, holding Paris Green in suspension, and then examining the distillate for arsenic.

Paris Green being insoluble in water, and presumably insoluble in essential oils, it would seem to be safe to say that no harm would come from its use on the peppermint, and the question be settled on general principles at once and without experimenting. The safer way is to put the matter to the test directly.

Peppermint plants were furnished by the Farm Department for this purpose and sprayed with salt water and Paris Green. In twenty-four hours the mint was cut, allowed to wilt thoroughly, and then distilled in a tin still, so constructed as to imitate the conditions of distillation in the peppermint oil works. The oil and the water condensed in the operation were evaporated with a little Nitric acid and Nitrate of soda, the residue ignited to destroy organic matter, and the residue examined for arsenic by Marsh's test. A slight trace of arsenic was found.

The plants were so young and the quantity used so small that but little oil was obtained. The experiment was repeated, using peppermint plants as in the first trial, but adding to them a quantity of pepper-

mint oil before distilling, and so obtaining a larger amount of the oil, distilled in the presence of Paris Green and salt, as in the former trial. The products of distillation were treated the same as in the first trial, and the glass tube used in Marsh's test showed a distinct deposit of arsenic.

Possibly this investigation has not been pushed far enough to be decisive, but the mint season is advancing so rapidly, and the temptation to use something to check this plague of grasshoppers is so strong, that a word of warning would seem appropriate. It is true that the amount of arsenic recovered was very small, yet with so active a poison, *a little is too much.*

Chemical Department. *R. C. K.*

AT THE COLLEGE.

G. E. Hancorne, '90, is taking post-graduate work at the College.

Lawrence Ames, a nephew of Prof. Chamberlain, has entered College.

Mrs. James Moore, of Saginaw, is visiting her sister, Mrs. C. S. Brooks.

Dr. Harvey L. Rosenberry, Wausau, Wis., spent Sunday at M. A. C.

Mr. Bennett, from Mulliken, called on H. A. Williams last Wednesday.

Samuel C. Laitner, with '95 *m*, was a visitor at M. A. C. on Monday of last week.

President Snyder attended the national meeting of teachers at Buffalo last week.

Frank Carrigan, from Lapeer, visited his cousin, D. C. McElroy, the first of last week.

Miss May Butterfield returned Friday from a two weeks' visit at her aunt's, in Bay City.

Miss Mary Dodd, of Ithaca, N. Y., is spending the summer with her sister, Mrs. H. K. Vedder.

The freshmen defeated the seniors in a game of ball last Saturday afternoon by a score of 23 to 11.

Among the visitors to the Mechanical Department last week, was Mr. J. E. Newman, of the Portland Milling Co.

Mr and Mrs. G. G. Hamilton, of Rhinelander, Wis., were the guests of Secretary and Mrs. Butterfield a part of last week.

On Thursday last, a brass "heat" was taken by students in the foundry. At that time the valves were cast for a hydraulic ram.

Mrs. Nellie S. Kedzie, Professor of Household Economy and Hygiene at the Kansas Agricultural College, is visiting at Dr. Kedzie's.

Two members of '95, Gerrit Masselink, Cass City, and Clay Tallman, Smyrna, returned to M. A. C. last week and will remain several weeks.

Mr. R. L. Frost, with '84, of Manistee, who is connected with the Manistee Iron Works, was a caller at the Mechanical Department last week.

Division C, of Mechanical sophomores, have finished work in the foundry, and last week began work in the Machine shop for the remainder of the term.

Instructor C. C. Pashby spent the Fourth at his old home in Constantine. Mr. Pashby's brother expects to become a student at the College next term.

There is an open barn at the College with stalls for the accommodation of fourteen horses. These are especially for the use of visitors. No feed is provided.

Prof. Smith, on Tuesday, showed some of the sophomores the various modes of shocking wheat, and they all took a turn at the work. This is the way to awaken an interest.

Sherman Blake, '93 *m*, visited College friends last Tuesday and Wednesday. He was on his way home from Auburn, N. Y., where he has been working in a draughting office.

H. L. Becker, '98, was able to take a carriage ride over the farm Wednesday. Many were the hearty handshakes that welcomed his appearance and recovery from sickness.

Prof. W. Babcock, Jr., was called to Milan last week on account of the sudden and serious illness of his father. Mrs. Babcock accompanied him, and will remain in Milan some time.

H. L. Fairfield, '98 *m*, bade farewell to his College friends last Wednesday. He goes to Grand Rapids for a few weeks to settle up the estate of his deceased father, after which he will go with the family to Arizona to live.

Bermuda grass is now in flower, a thick mat on the ground. Johnson grass is six feet high, growing on rather hard high land, and is now in flower. These are two of the most valuable forage plants for the southern states.

A visit to the Mechanical Department last Friday morning found Messrs. Hoyt and Newell busily engaged with work about the shops, although no classes were present for instruction. These gentlemen should be complimented for their display of industry.

The city officers of Lansing are showing considerable enterprise in attempting to keep bicycles off the sidewalks. On the fence, north side of Michigan avenue east, half way to the city limits, is a sign, not copyrighted, but just like some at M. A. C., on which occur these words: "Bicycles prohibited on this walk."

More than 300 peach and plum trees were treated by the entomologist of the Experiment Station last month for the peach tree borer (*sannina exitiosa*). About twenty different remedies were tried to see how many are of value and which will prove to be the most valuable. Similar experiments were conducted last year and probably will be for several years to come.

The "Bachelors' Club" has been closed to allow the erection of a second story on the wing of Abbot Hall. The "Bachelors" have scattered around among the other clubs. Before breaking up they presented Mrs. Backus, who had cooked for them since the organization of the club, a carving set. To Miss Edna Berry, their favorite dining-room girl, they gave a silver dessert spoon.

Near the green house, this warm, moist weather is pushing the bedding plants and others rapidly along. Last week the varieties of *Phlox paniculata* were in their prime. Two mixed beds of verbenas are splendid, golden wave coreopsis gay with yellow, double petunias in great variety and perfection, and the latter will be good for weeks yet, even if the weather be dry and hot.

Growing Russian thistles have very small, narrow leaves, the plants usually spreading out much the shape of a well-made haycock. Prickly lettuce is sent us very often by people supposing it to be the Russian thistle. Prickly lettuce contains milky juice, the leaves are flat, conspicuous, stick out well from the stem, and many of them turn one edge toward the sky and the other toward the ground. The two plants have very little resemblance.

The regular meeting of the Young Men's Christian Association last evening was in charge of the King's Daughters. Not for a long time has the College population been favored with such an interesting and helpful program, and we are sure all would appreciate it should the ladies consent to lead the Sunday evening meetings more often in the future. One of the most enjoyable features of the program was the singing of Misses Crosby, Callahan and Sellers of Lansing.

This year Kansas Agricultural College graduated 66 members, one-third of whom were women. The commencement number of the *Industrialist* contained no advertisements, but was filled with the reports of the week from the baccalaureate of President Fairchild to the last good-bye of the banquet. There were numerous cuts of the grounds and buildings and engravings representing every member of the graduating class, the whole covering eighteen pages the size of the M. A. C. RECORD.

The Heliostat, which is being published by the Junior class, will be the first annual produced at the College since 1889. The edition ordered is quite limited and the editors are anxious to have those who wish copies to order them as soon as possible, so that if necessary a larger number may be printed. It is especially desired that alumni and others living at a distance who wish the publication will send their orders early. Address, enclosing $1.15, W. R. Goodwin, Business Manager.

Appointments have recently been made to fill several vacancies at the College. D. B. Baldwin has been appointed engineer in place of E. A. Edgerton, who resigned to take the position of city engineer in Lansing. Mr. Baldwin was formerly engineer at the Industrial school, and he assumed the duties of his new position last Tuesday. E. S. Good, assistant postmaster, becomes clerk to the president. W. T. Leonard, of the Duplex Press Co., Battle Creek, will take the place of V. V. Newell, resigned, at the end of the present term.

The class of '93 is now well represented at the College. Last week R. B. Pickett came up from Jackson county for a stay of a few weeks; A. T. Stevens begins some review work this week; W. L. Cumings and V. J. Willey have been here some time; Mrs. Woodworth, Miss Lilian Wheeler, and D. J. Crosby are residents on the campus. Besides these, Miss Daisy Champion lives "just over the river;" and Miss Jennie Cowley, L. H. Baker, W. F. Hopkins, C. E. Holmes, and R. C. Bristol live in the city. When a baker's dozen of us are so near together, why not have a class reunion?

Not long ago some visitors while near the Library accosted us as follows: "Mr. where is the College? We want to see the College." Gentlemen, this College is not confined to a single building, where students meet for all of their recitations and lectures, but is spread all around you here on this spacious campus. There are more than fifty buildings, in many of which much is done for the education of students. There are ten laboratories, mostly in separate buildings, each containing class-roooms, to say nothing about the great number of "out-door" laboratories in field, orchard and garden.

The Mechanical Department recently received, as a gift, a Manistee pump, size B. The pump castings have been planed away at various points so that the interior arrangement of parts can be easily seen and the action of the pump readily comprehended. Donations of apparatus that enable our students to increase their knowledge of technical matters are greatly appreciated by both students and officers of the College, and all unite in thanking the Manistee Iron Works, through Mr. G. R. Ray, president of the company, for the pump model. Mr. R. L. Frost, with '84, inventor and owner of numerous patents, some of which are utilized in the Manistee pump, was instrumental in securing this pump for M. A. C.

One of the most pleasing events of the season was the lawn social given to the faculty and seniors by Mesdames I. H. Butterfield, C. D. Smith, L. R. Taft, and K. L. Butterfield, last Friday evening. The trees in front of Secretary Butterfield's residence were brilliant with Chinese lanterns, electric lights, and bunting; delicious refreshments were served by Mrs. Graves, of Lansing; and, all the while, Bristol's orchestra charmed the ear with sweetest strains of music. A large crowd, which included nearly all the employes of the College and their families, the lady students, the seniors, and several from outside, enjoyed the occasion most heartily. Among the visitors present were: Mrs. Nellie S. Kedzie, Manhattan, Kas.; Mrs. James Moore, Saginaw; and Mrs. Becker and her two daughters, Hesperia, Mich.

At its meeting last week, the M. A. C. Republican Club adopted the following resolutions:

"Whereas, Jason E. Hammond, a graduate of the Michigan Agricultural College, is a candidate for Superintendent of Public Instruction, and

"Whereas, We know Mr. Hammond to be a man of high moral character combined with intellectual ability and good business principles, and

"Whereas, We believe his early association with farm and College has placed him in hearty sympathy with labor and with the needs and requirements of the rural school, and

"Whereas, His position as examiner and commissioner of schools in Hillsdale county, and Deputy Superintendent of Public Instruction for the past four years has made him acquainted with the many duties of this most important office and given him a very broad acquaintance with those most closely interested in school work, therefore, be it

"Resolved, That the members of the M. A. C. Republican Club endorse his candidacy and that we as a club and individually, pledge ourselves to use all honorable means to secure his nomination and election."

AMONG OUR EXCHANGES.

In the vicinity of Lansing hail fell to the depth of four inches last Friday, and crops within a circuit of twenty miles have been destroyed.—*Holland City News.* If this refers to Lansing Mich., we will have to credit the editor of the *News* with a creative imagination. We have had no hail this summer and crops were never in better condition.

The officers of the St. Clair County Farmers' Institute and Kenyon Butterfield, representing the Agricultural College, met at the office of Judge Harris in Port Huron on Thursday of last week. The question of a state farmers' institute was discussed and it was decided to nold one in Emmet, in January or February next.—The *Yale Expositor.*

One of the most interesting studies of our College course is a term in Entomology under the instruction of Prof. A. B. Cordley. The term's work consists of a

systematic study of all the principal injurious insects which are now found in Oregon. The study includes a description and life history of each insect, and the most practical preventatives and remedies. This year's class, besides studying thirty-four insects, have studied the best remedies, and the principles underlying their uses; the anatomy of insects, by dissecting and studying under the microscope several typical insects; and have put in a good deal of time in catching and classifying the insects to be found in the neighboring woods and fields.—The *College Barometer*, Oregon. This is just what we expected would come to pass when we recommended Mr. Cordley, of '88, for the position he now holds.

At Yale College, among the notices posted for disposing of personal property have been the following: "Fine bookcase for sale; has been braced up after two attacks of nervous prostration, and is now all right except for a little palsy when you try to sleep on the top shelf. Call early and often. Must be sold. No extra charge for the palsy." A student frankly tells the public through the medium of an elm-tree placard: "All my furniture is as good as new, for I wasn't in my room but twice this year. My books are not thumb-soiled, for I never used them."—*New Haven Register.*

For originality and force of expression, saying nothing about the unique illustrations, we think the above is not a whit ahead of Butterfield and Buck at M. A. C., as displayed on their bulletin board concerning their supply of journals and newspapers.

The *Farm Journal*, of Philadelphia, in the July number, contains a good illustration of the familiar face of our Professor of Agriculture, Clinton D. Smith. The honor is certainly worthily bestowed. The followirg is the last part of the text: "At the Michigan station his work is telling in the increased amount of time given to instruction in practical agriculture and the improved condition of the station farm. As a lecturer at farmers' institutes he has been an earnest and convincing exponent of better methods of farming. His wide knowledge of dairy work has been especially valuable to Michigan dairy interests. A long experience as a practical farmer gives him exceptional advantages as a lecturer on farm topics, and he has never failed to recognize the conditions surrounding the majority of farmers and teach accordingly." It is not many months since a similar distinction was shown our Professor of Horticulture, L. R. Taft, and at earlier dates also, Prof. A. J. Cook and Dr. W. J. Beal. The editors of the *Farm Journal* hold M. A. C. in high esteem.

FACTS CONCERNING FARMING FROM THE REPORT OF THE SECRETARY OF AGRICULTURE.

"During the fiscal year 1895 the United States exported to foreign countries domestic commodities, merchandise and products aggregating in value $793,000,000. The aggregate value of the agricultural products included in that sum was $553,215,317. Thus the farmers of the United States furnished 69.68 per cent of the value of all the exports from this country during the year 1895." Of these exports 79 per cent were received by Europe. There are 4,564,641 farms in the United States, having an average of 137 acres each. These farms are valued at $2,909 each, or an aggregate value of $13,000,000,000. The mortgage indebtedness of the American farmer is 16 per cent of the capital invested, while railroad mortgages represent 42 per cent of the capital invested in railroads.

The average amount of capital invested in an American farm (including implements, domestic animals, etc.), is $4,000.

The number of persons engaged in agriculture in 1890 was 26,146,856, or 42 per cent of all Americans engaged in gainful occupations—a decrease from the census report of 1880 of 2 per cent.

The area of tilled and productive fields in 1890 was 357,616,755 acres of land. Estimating the population of the United States to be 65,000,000 at this time without making deductions for food given to domestic animals, each citizen of the nation in a per capita distribution of products would be entitled to the "cereals, vegetables and other products evolved from 5½ acres of cultivated land."

The probable value of agricultural products in America for 1895 was $2,300,000,000.

T. Warner referred to the fact that the men who had done the most to develop this country obtained their education in the schools of experience and successful work, rather than in the colleges and universities.—Brighton farmers, in *Michigan Farmer.*

TREES IN THE COLLEGE YARD.

For several reasons we think all will enjoy the following from the *Harvard Graduate's Magazine.* The advice is not needed as far as M. A. C. is concerned, but it would be appropriate for some streets in a city not many miles from our campus, and very likely for other portions of our state:

My Dear Dr. Hill:—I have been meaning to speak to you for some time about something which I believe you are interested in as well as myself, and, not having spoken, I make occasion to write this note. Something ought to be done about the trees in the College yard. That is my thesis, and my corollary is that you are the man to do it. They remind me always of a young author's first volume of poems. There are too many of 'em, and too many of one kind. If they were not planted in such formal rows, they would typify very well John Bull's notion of "our democracy," where every tree is its neighbor's enemy, and all turn out scrubs in the end, because none can develop fairly. Then there is scarce anything but American elms. I have nothing to say against the tree in itself. I have some myself whose trunks I look on as the most precious baggage I am responsible for in the journey of life; but planted as they are in the Yard, there's no chance for one in ten. If our buildings so nobly dispute architectural pre-eminence with cotton mills, perhaps it is all right that the trees should become spindles; but I think Hesiod (who knew something of country matters) was clearly right in his half being better than the whole, and nowhere more so than in the matter of trees. There are two English beeches in the yard which would become noble trees if the elms would let 'em alone. As it is, they are in danger of starving. Now, as you are our Kubernetes, I want you to take the 'elm in hand. We want more variety, more grouping. We want to learn that one fine tree is worth more than any mob of second-rate ones. We want to take a leaf out of Chaucer's book, and understand that in a stately grove every tree must "stand well from his fellow apart." A doom hangs over us in the matter of architecture, but if we will only let a tree alone it will build itself with a nobleness of proportion and grace of detail that Giotto himself might have envied. Nor should the pruning as now be trusted to men who get all they cut off, and whose whole notion of pruning, accordingly, is "ax and it shall be given unto you.". Do pray take this matter into your own hands—for you know how to love a tree—and give us a modern instance of a wise saw. Be remembered among your other good things as the president that planted the groups of evergreens for the wind to dream of the sea in all summer, and for the snowflakes to roost on in winter, and believe me (at the end of my sheet though not of my sermon) always cordially yours, J. R. LOWELL.

Elmwood, Dec. 8, 1863.

WORKING ON THE ROAD.

"Road work is in full blast in many sections of our state. Immediately after corn planting the farmers were 'warned out,' and they have been putting in time on the highways the past two or three weeks. The resultant makes one blush for the fair form of his state. Three years in succession the writer has travelled over a piece from Fennville to Lake Michigan during this season, and each year has encountered the same distracting waste of labor in manipulating the road. The clay and sods are scooped out of the gutter and put in the middle of the road and harrowed into a fine dust interspersed with clods of turf. This is done just at the opening of our dry season, and the road is a mass of dust for a few months, followed by a slough of mud, which squeezes the mass again into the gutters ready for another day of scooping and scraping into the center. But what shall be done? Plain enough what ought to be done. Even if no gravel is hauled on, the road scraper and roller should be ready for use the moment in the spring that the soil is fit for it, and the perfect turnpike kept in shape to turn off the water."—*The Michigan Cyclist.*

The above was most likely prepared by Hon. C. W. Garfield, '70, of Grand Rapids. The topic is one that interests or should interest all M. A. C. people. If we can do nothing to change the old, slow-and-easy system of working the highway, let us strive to awaken an interest in all of our students, that they may know something about road-making when they leave us. Two or three of our professors of late have taken it upon themselves to attempt a reform in road-making in the immediate vicinity of the College, and already gratifying results are apparent.

In using a road grader a few years ago, where the sides of the road had become higher than the middle, it was necessary to cut down the tough sods on either side. The foreman, after rounding up the track, sods and all, quite insisted on leaving it that way, saying: "It will soon wear down." "No sir, we cannot afford to leave it that way, because of the profanity that you and I shall be responsible for during the next month. Every man that passes over these sods will curse the man who left them there. Now, run the scraper on the last trip, so that the sods shall be shoved each side of the track, but not far enough out to cover the untouched sod. In this way the track will be a good one at once." The plan worked well. In a month or so the sods had nearly all perished; a second move destroyed them. With a little attention in using the scraper as soon as the road dries out sufficiently in spring, and perhaps two or three times afterward, all the little holes can be kept filled and the water will run each way into the gutters. It seems that few understand the great damage done to a road or a path in digging up the surface. As a rule, disturb it as little as possible; only just enough to keep the grade all right. Where it is sandy, leave the road flat, put on a load of clay in a place, spread it and pack it—even by travel, then add half a load or less of gravel in a place and when this is packed put on a little more. By this means the teams will at once keep on the track where needed, instead of running all summer on each side of a long pile of dry gravel. Preserve each year in good condition all the gravel road previously made and add as much more as possible. The neighbors, seeing these improved methods of fixing the road, are taking notes and following the example. Still, we must admit that some of them do not discriminate nicely between sand and loam from the pit and the best grade of gravel.

Those of us who have ever seen the great pains and expense taken by lumbermen in grading their roads ready for use the following winter, can readily understand why it is done. These roads are often sprinkled to make an icy covering, over which for miles they draw immense loads of logs or lumber or both—and yet they find it profitable to thus prepare the roads, even though they need them for only a year or two. This is business or private enterprise in high contrast with the public spirit often shown by farmers, some of whom need the roads every day in the year for a long and never-ending number of years. Every township needs a little leaven by way of a piece of the highway managed in the most approved manner. Dairymen in their daily rounds teaming milk or cream throughout the year need this "starter" towards good roads as much as they need the proper "starter" for the production of an even grade of butter of the best quality.

Botanical Department. *W. J. B.*

The American hog surpasses vension,
Bear meat, coon or fowl,
Goat meat, mutton or 'possum,
Or from turkey down to owl.
We long for a plate of quail
On toast and other things we see,
But the delicious breakfast bacon
Is good enough for you or me.

Retired farmers who've moved to town,
Live on codfish and macaroni,
Old cow beef mackerel and halibut,
Or terrapin and dried bologna.
They are invited back to our farms,
They are welcome as they can be,
And they'll find broiled hams
Good enough for them or me.

—G. W. Franklin, in *Prairie Farmer.*

Kalamazoo has every reason to be proud of the record made by her athletes at the M. I. A. A. meet last week at Albion. Monday morning at chapel a special jollification meeting was held when the ball team entered with bats draped in mourning, followed by the relay and track men bearing aloft the relay cup followed by the men with five gold medals and six second medals of silver. Prof. Williams, of the faculty board of control of athletics, took charge of the meeting and announced that at her first appearance as a member of the M. I. A. A. Kazoo had broken five records, and complimented the men very strongly upon their gentlemanly conduct.—The *Free Press.*

The M. A. C. Record.

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Subscribers for the *Speculum*, who had paid in advance for that publication, will receive THE M. A. C. RECORD instead, unless we receive an order to the contrary. Subscribers would confer a favor on us if they would inform us of any irregularity in their paper.

* * *

DURING the sophomore year, especial attention is given by the students to various things pertaining to the farm proper, saying nothing about portions of the other three years. Prof. Smith and his assistants are devoting much thought to devising plans for making the work interesting and profitable. For a portion of one afternoon, while rust of wheat and rye were attracting much attention, Dr. Beal gave an illustrated talk on the subject for twenty minutes. In like manner, more recently, Prof. Wheeler has spoken to them of corn smut. Prof. Barrows, just in the nick of time, spoke of the Hessian fly. Dr. Kedzie, Prof. Frank Kedzie, Dr. Grange, and doubtless others, are booked for similar work. These are timely talks, each in its season, not the work of a more exhaustive nature carried on in the various laboratories.

The Professor of Agriculture, instead of attempting to constitute in himself a complete encyclopedia, believes that his students should get the best they can from each specialist. We commend his course as wise and liberal, and not only for the best interest of the students, but for the Department of Agriculture under his charge.

* * *

FORMING a part of the equipment for obtaining an education of the most practical kind in either of the three courses at M. A. C., there are numerous things worthy of especial attention, even though they are not generally mentioned in catalogues or prospectuses.

There is the finest College campus in this country, with plenty of elbow room, where thrive many kinds of trees and shrubs, specimens of most of which are plainly labeled. Birds and squirrels seem to feel a freedom from molestation and find homes among the branches, delighting the young naturalist.

The closely mown grass on a well-graded surface is not only beautiful to the eye, but just the thing for various games of tennis, base ball, foot ball, military drill, and pleasant rambles. Long stretches of artificial stone walks extend to the principal buildings and are convenient in all sorts of weather. There are miles of nice gravel roads, including those extending through the lane between the farm fields.

Here is a large farm in fine condition, producing crops in variety, seven or eight kinds of cattle, twelve kinds of sheep, six or eight of swine, thirteen of poultry, and several kinds of bees. Here are orchards of apples, pears, quinces, peaches, plums, and cherries, besides berries, mulberries, vineyards, small fruits, vegetables, flower beds, borders and groups of shrubs and flowers.

Here is an arboretum, twenty-one years old, with trees labeled, and farther back "improved" wood lots; a botanic garden containing 1,300 to 1,400 species of hardy plants, some of which are grasses, others forage plants, and plats of weeds.

M. A. C. is the headquarters of the State Experiment Station, where thousands of kinds of plants are tested in one way or another, and in connection with other activities and objects of interest, making this place throughout the growing season, something like a perpetual fair for visitors and students.

For those whose bent is toward mechanics or engineering there are also many attractive features and examples of practical engineering art, not confined within the narrow limits of class-rooms or laboratories. At night the walks and roads are made bright by electric lights twinkling among the trees, the power for whose supplying current is furnished by College engines. Many of the College buildings are also so lighted. Pure water from an artesian well some 300 feet deep is supplied at all points of the campus by a complete water works system, including pumps, an elevated tank and some miles of water mains. Fire protection is provided by hydrants on these pipe lines and an equipment of fire-fighting apparatus. Several buildings are heated in cold weather by steam, generated at a central point, and a complete irrigation plant with standpipe and distributing pipes is also in evidence, ensuring in the dryest of seasons the productiveness of its protected area.

In winter the live stock is to be seen at its best, as well as the several green houses. Then the laboratories teem with busy men and women working at all sorts of problems, which tend to better the condition of young farmers and mechanics.

Pure recreation can claim but little time, and this in connection with the numerous duties in class room, military drill, the exercises of numerous societies and the like, wherein appear a brass band and a mandolin club.

There are about twenty societies (mostly enumerated on another page) for the improvement of their members, and every student belongs to one or more of them.

There is a spacious Assembly hall, used also as a gymnasium; one or more public lectures nearly every week entertain and instruct.

There is a Museum noted for the excellence of its type specimens rather than its great size, and an exceptionally fine Library for the use of its students, in the courses here pursued, containing also a reading room, abounding in journals of agriculture, of mechanical engineering, English literature, pictorials, local papers of the state, and college publications.

The street cars make the neighboring city and railway stations easy of access.

That this enumeration applies today to a spot which fifty years ago was a swampy wilderness, seems hardly credible. Its truth indicates that the desire for education overcomes all obstacles, and demonstrates the wisdom of the founders of this institution.

SANITATION ON THE FARM.

"A correspondent writing from a New England farm house thinks the *Outlook* does not realize the need of sanitary knowledge in the farming districts. She is writing from a house where the windows are kept closed and darkened in summer; where the cellar is never ventilated, though vegetables are kept in it. She says that mold is found on the carpet-linings over the cellar, that the house is damp and unhealthy, and the whole condition is due to the ignorance of the householders. This writer has described thousands of homes in the farming regions of this country. It is the knowledge of this dangerous ignorance, with its disastrous results on the cumulative wealth of this country, that moved the Michigan University to establish a department of domestic science relating particularly to the home needs as well as the needs of what might be termed the women's department in agriculture—the dairy, the hennery, the care of fruits, etc. We long ago discovered that the finest types, physically, of men and women, were not to be found on farms; that physical development is not a mere question of exercise and a full stomach. The science of food is a new science. Professor Atwater and Mr. Atkinson, Mrs. Richards and Dean Talbot, the pioneers are living on the sunny side of fifty, yet they can point to results in the period of their working years that, measured with the progress in other sciences, are phenomenal. Sanitation is a part of the new science, and the increase of knowledge in this department is marked. The lack of money prevents the spread of knowledge in some farming districts, but the schools of agriculture, and the attempt to introduce into the schools in the rural districts studies that have a special bearing on the life in the farming districts, argue well for the future."—The *Outlook*.

[If we substitute the words "Agricultural College" for the word "University" in the foregoing, the text will then apply exactly to M. A. C. In fact, there can be no doubt the writer intended the notice to apply to the recent action of our Board of Agriculture, and not to the Regents of the University, who have taken no action.—Ed.]

HOW SURVEYING IS TAUGHT AT M. A. C.

PROF. H. K. VEDDER.

A week or two ago a letter of inquiry came to me asking a brief statement concerning the courses in surveying, their extent, and the methods of instruction. The applicant has since become one of our students. Similar requests are frequent, and warrant repeating here a part of the reply forwarded in the case mentioned, with some additions.

The earlier course in surveying, given in both the summer and fall terms (after this year in the spring and fall terms), is a short one, in which is presented as much of the simpler operations of line and angle measurement as can be crowded into two hours per week of meeting in the class room, and two hours per week in the field. A text-book is used, but the larger part of class instruction is by lectures or talks, in which the practical points of theory are made prominent.

In the field work, a series of problems (practical ones, not useless geometric curiosities) are solved, and the student "learns to do by doing." The ground covered is indicated by the final test required of each member of the class, i. e., field notes and a map of an irregular tract, from personal survey, which must "close" within specified limits. For this work the class is divided into squads of five, each in charge of a captain, whose principal duties are to direct the division of labor and to make a report on each day's work.

An instructor accompanies each squad for a good part of the time in the field, illustrating by example the correct methods of procedure as well as correcting faults and wrong habits of work when he observes them. He does not, however, become responsible for the successful solution of any problem, but the young men are thrown quite completely on their own resources. To indicate to both student and teacher the accuracy of any piece of work, means of checking are arranged; as for instance, the solution of problems is required by several independent methods, or a measurement is asked whose correct value is known to the instructor but not to the student.

The principles of leveling receive some attention in this course, but there is not time for much practice. Those completing the course generally know how to make, with accuracy, ordinary farm surveys for area, drainage, etc.

A later course, required for mechanical seniors and elective for agricultural seniors, is entitled "Civil Engineering" in the catalogue. Though placed under the same title, the work is somewhat different for the two classes; the agricultural students giving more attention to methods employed in government land subdivision, grading, drainage, and computation of simpler problems in earthwork; while the mechanical students deal particularly with the adjustment, construction and manipulation of the instruments of precision that are used. For both classes the course is essentially a study of surveying methods, sometimes denominated higher surveying, in which all necessary refinements and cautions for avoiding error are taken into account. Considerable notice is taken of the applications of the methods studied to land, city, topographical, geodetic, and railroad surveys. The instruction is given in about the same way as for the earlier course.

For the field practice in both courses the instrumental equipment of the College is remarkably complete. Besides a number of astronomical instruments which are available when required, as they sometimes are in surveying, there are a large number of the surveying instruments more generally used, among which are four compasses, four Y-levels, three transits, one solar transit, barometers, hand-levels, rods, chains, tapes, pedometers, etc.

Department of Mathematics and Civil Engineering.

"Each season teaches anew the imperative necessity for a more and more scientific knowledge for those who are to plow and plant profitably."—J. Sterling Morton, Secretary of Agriculture.

"The markets of the world will finally be invaded, captured, and held by those who produce cereals and meats, vegetables and fruits at the least cost, and can therefore most cheaply sell."—J. Sterling Morton, Secretary of Agriculture.

THE AMERICAN COW.

The American cow has a champion in the halls of Congress. It is Representative Dolliver of Iowa, one of the brightest men in public life in this country. When the filled cheese bill was before the House the other day Mr. Dolliver spoke as follows: "I say, give the American cow a fair chance. She has been the faithful servant of man. She landed with our ancestors at Plymouth Rock, and, tied behind the old, weather-beaten emigrant wagon, she has marched with the household goods of pioneers who have taken possession of this continent, from ocean to ocean. (Applause.) She has increased, multiplied and replenished the earth until today the industries which she has made possible contribute annually to the wealth of the world more money than the great combinations of modern capital—more than iron and steel; more than lumber and coal; more than cotton and wheat; more than all the mysterious riches of gold and silver. Yet there are men in the House whom I have heard today sneering at this bill who spend most of their time trying to get protection for some insignificant local enterprise or "talking through their hats" in the silver debate. I say, give the American cow a fair chance! For myself, I am in favor of the monopoly that God gave her—in the production of butter and cheese. And if every man in this House who in the days of his boyhoods got up at daylight to feed the cows and stayed up after dark in order to milk them; if every man who has churned actual cream with a reliable upright churn and has watched with a boy's enthusiasm the old-fashioned process of making cheese in the days of its honor and repute, will stand by this bill we will drive from the American barn yard the horde of counterfeiters and cheats at common law and keep them out "till the cows come home."—*Exchange.*

THE BOTANIC GARDEN.

DR. W. J. BEAL.

The succession of plants in flower is very rapid at this time of year. Some pass out of flower as others come in. As a considerable portion of the garden is in the ravine containing the brook, it is easily overlooked from the bank on either side.

The following plants, in many cases represented by generous patches six feet in diameter, are especially brilliant at this time: Oswego Tea, a mint with bright red flowers; Pleurisy-root (Butterfly-weed), a kind of milkweed with flowers ranging from light yellow to dark orange; Turk's-cap lily, six feet high with large clusters of flowers spotted and bright orange; blue larkspur, seven or eight feet high; spiderwort, six kinds, the flowers blue, white, and pink; the common purple-berried Elder, with its large corymbs of sweet flowers is especially fine near the brook; great willow-herb with showy pink flowers; holly-hocks in variety; Cononillia varia, a very pretty plant with flowers somewhat like those of a pea; New Jersey tea or Red-root, a low shrub bearing clusters of white flowers, near which is another species from the northern counties now past flower; a wild tansy from the shores of Lake Superior; the wild swamp rose; Pentstemon Torreyi from Texas, a tall plant bearing red flowers somewhat the shape of a trumpet; several kinds of bellflowers, some white, some blue in different shades, among them the harebell, very common on rocky banks and in the clefts of rocks; a bed of mixed poppies, flaunting gay flowers in variety; prickly poppies, with yellow flowers, nearly related to the bloodroot now going into a period of rest; the pink variety of the white water lily; the large white-flowered water lily from Europe; the lizard's tail, bearing spikes of white naked flowers, very pretty, in the edge of the river and pond; ox-eye daisy, and another much like it; yellow-flowered camomile; a patch of yarrow with pink flowers, another with yellow flowers; a coreopsis with showy yellow flowers. The ferns, although never appearing in flower are noticeable, the largest of which is the native ostrich fern. The ferns are on the north side of a bank secluded from the wind, as they should be, partially covered by hemlock trees, blue beeches, and other trees. There are large numbers of other plants in flower, but none are so showy or so large as those above named. A great many kinds are promising flowers, all along in July and September till the arrival of severe frost. For two months now this garden will be in its prime. Almost everyone visits the botanic garden and it is rare to find one who does not appreciate the place.

Botanical Department.

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Clerk to President.
CHACE NEWMAN,
Clerk of Mechanical Department.

Aside from the State Board of Agriculture given above, the following are the officers of the Experiment Station:

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Jonathan L. Snyder, Ph. D., Pres.....Ex-officio.
L. R. Taft, M. S.....Horticulturist.
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Herbert W. Mumford, B. S..Assistant in Agriculture.
H. P. Gladden, B. S.....Assistant in Horticulture.
M. L. Dean.....Assistant in Horticulture.
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Chas. F. Wheeler, B. S.....Botanist.
Mrs. L. E. Landon.....Librarian.
T. T. Lyon, So. Haven.....In charge of Sub-Station.
R. L. Taylor, Lapeer.....In charge of Apiary.

SUB-STATIONS.

Grayling, Crawford county, 80 acres deeded.
South Haven, Van Buren county, 10 acres rented; 5 acres deeded.

OFFICIAL DIRECTORY.

Sunday Chapel Service—Preaching at 2:30 P. M.

Y. M. C. A.—Holds regular meetings every Thursday evening at 6:30 and Sunday evenings at 7:30. S. H. Fulton, President. C. W. Loomis, Cor. Secretary.

Natural History Society—Regular meeting second Friday evening of each month in the chapel at 7:30. L. R. Love, President. J. W. Rigterink, Secretary.

Botanical Club—Meets first and third Friday of each month in Botanical Laboratory at 7:30. C. F. Wheeler President. B. Barlow, Secretary.

Dante Club—Meets every Wednesday evening at 7:30 in Prof. W. O. Hedrick's office, College Hall. Prof. A. B. Noble, President.

Students' Organization—S. H. Fulton, Vice-President. H. L. Becker, Secretary.

Columbian Literary Society—Regular meeting every Saturday evening in their rooms in the middle ward of Wells Hall, at 7:30. F. N. Jaques, President. T. A. Chittenden, Secretary.

Delta Tau Delta Fraternity—Meets Friday evenings in the chapter rooms on fourth floor of Williams Hall, at 7:30. A. C. Krentel, President. J. M. Barnay, Secretary.

Eclectic Society—Meets on fourth floor of Williams Hall every Saturday at 7:30 P. M. W. R. Vanderhoof, President. W. Newman, Secretary.

Feronian Society—Meets every Friday afternoon at 2:30 in U. L. S. Hall. Miss Bertha Baker, President. Miss Ellen Vaughn, Secretary.

Hesperian Society—Meetings held every Saturday evening in the society rooms in the west ward of Wells Hall at 7:30. W. T. Barnum, President. D. J. Hale, Secretary.

Olympic Society—Meets on fourth floor of Williams Hall every Saturday evening at 7:30. C. A. Jewell, President. F. J. Kling, Secretary.

Phi Delta Theta Fraternity—Meets on Friday evening in chapter rooms in Wells Hall, at 7:30. C. K. Chapin, President. J. W. Michen, Secretary.

Union Literary Society—Meetings held in their Hall every Saturday evening at 7:30. J. T. Berry, President. F. V. Warren, Secretary.

Tau Beta Pi Fraternity—Meets every two weeks on Thursday evening in the tower room of Mechanical Laboratory. E. D. Partridge, President. J. H. Steele, Secretary.

Club Boarding Association—I. L. Simmons, President. H. A. Dibble, Secretary.

M. A. C. Grange—Meets every two weeks in the Columbian Society rooms. G. H. True, Master. H. W. Hart, Secretary.

Try and Trust Circle of King's Daughters—Meets every alternate Wednesday. Mrs. W. B. Barrows, President. Miss Lilian Wheeler, Secretary.

NEWS FROM GRADUATES AND STUDENTS.

A. G. Wilson, '89, has been elected superintendent of the Webberville schools.

The Self-Registering Scale Co. moves from Tecumseh, Mich., to Elkhart, Ind., and W. E. Finch, with '96 *m*, will remain in the company's employ.

W. F. Wight, '94, Chicora, Mich., is alive and well, and working his farm. He wants all the bulletins of the Experiment Station, finding them very valuable.

President George T. Fairchild, of the Kansas Agricultural College, formerly Professor of English at M. A. C., will visit us the last of this week. We hope to have him conduct services in Chapel next Sunday afternoon.

Dr. Joseph Foster, '90, will sail for Europe two weeks from tomorrow. Dr. Foster has already gained an enviable reputation as an oculist, having been Dr. Carrow's assistant at the U. of M. for two years; and he goes abroad to spend a year in Vienna and Berlin in more extensive preparation for his profession.

It is with deepest sorrow that we record the death of Mrs. Bertha Hinkson, wife of Dr. J. E. Hinkson, '92, news of which came to us last Tuesday. Mr. and Mrs. Hinkson had been married but a few months and were just getting settled in their new home in Wacousta, when the summons of the death messenger came.

We rejoice in the success of a graduate, which calls forth such words of praise as those which follow, from the *Saranac Local*. Mr. Campbell graduated here in '94, and after two years in Saranac goes to a better position in the Yale, Mich., schools: "During the two years that Prof. Campbell has had charge of the Saranac school he has won a first-class reputation in this county as an educator. He came fresh from school, a stranger; he goes with an established reputation as a teacher and leaving a host of friends. In his work here he was systematic and thorough and he succeeded as a disciplinarian and at the same time won the esteem and respect of his pupils. Never in the history of the Saranac school have the requirements been as great in the studies and never has the standard of the school been as high as at present. Both Mr. and Mrs. Campbell were valued members in society and regrets are almost universal at their departure from this village to another sphere of usefulness."

J. D. Towar, '85, Associate Professor of Agriculture in the Rhode Island Agricultural College, Kingston, was well trained on his father's farm, near Lansing, and after taking the course at M. A. C. became master of Capital Grange. He went to Rhode Island against the tide of emigration. From several sources we hear good reports of him. Note the following from A. A. Smith, lecturer of R. I. State Grange, in *Grange visitor*: "It seems wonderful to me, the results accomplished by the Grange in our little state of Rhode Island. The Agricultural College at Kingston is an offspring of Grange effort, and we have to thank your state for one of our professors, who gained something of his enthusiasm for agriculture in his Grange work in Michigan. I allude to Prof. J. D. Towar."

In the Department of Agriculture at Washington, M. A. C. has a larger representation than any other College in the United States. It requires $10,000 to pay their aggregate salaries. At the July promotions for the coming year, the salaries of F. H. Hall, '88, L. H. Dewey, '88, and G. H. Hicks, '92, were each increased $200.

It takes a great deal of grace to be able to bear praise. Censure seldom does us much hurt. A man struggles up against slander and the discouragement which comes of it may not be an unmixed evil; but praise soon suggests pride and is therefore not an unmixed good.—*Spurgeon.*

If to some extent this condition of things seems to be true, we must not forget the fact that the number of college men, when compared with those not so educated, is a mere drop in the bucket. As we used to hear it, white sheep shear more wool than black ones, because there are more of them.

Harvard has graduated more men than any other college in America, the number of her alumni being 19,984. Yale stands next with 16,775 graduates and the Universities of Pennsylvania, Michigan, City of New York, and Virginia each have over 10,000. Princeton has 7,230; Dartmouth, 5,300; Union, 4,859; Brown, 4,508; West Point, 3,668; Columbia, 3,551; Amherst, 3,,650; Cornell, 3,477; and Oberlin, 3,235.—*Ex.*

View from President's House of west half of the M. A. C. campus. Six fine laboratories, as well as many other handsome buildings, are not represented.

Pure air, wholesome food, pleasant surroundings, fine equipment, moral and religious environments, kind and competent teachers, courses of study suited to the age in which we live and designed to meet the requirements of active life—these are a few of the advantages offered by the

MICHIGAN AGRICULTURAL COLLEGE

THREE COURSES OF STUDY:

Agricultural, Mechanical, Women's Course. Each Four Years Long.

FOUR SPECIAL COURSES DURING WINTER TERM.

Opportunities offered for earning part of expenses. Young women should investigate this course of study before entering elsewhere. To those desiring to prepare for teaching, no field offers such inducements as that of domestic economy and household science. The demand for teachers cannot be supplied although very high salaries are offered.

WRITE FOR CATALOGUE TO THE PRESIDENT.