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The M. A. C. Record.

VOL. 5. LANSING, MICHIGAN, TUESDAY, MARCH 6, 1900. No. 24.

Notes from Women's Course.

Miss Hadsell of Pontiac visited Miss Grace Elliott Monday and Tuesday of last week.

Miss Deborah Garfield spent a portion of last week at her home in Grand Rapids.

Miss Emma Barrett accompanied Bessie Kinyon to her home in Grand Ledge.

Miss Keller was most pleasantly surprised on entering the dining room on Monday evening. As it was the anniversary of her birthday, the young women had decorated the tables beautifully and profusely in honor of the event.

Miss Bessie Lee Gaylord was in Detroit from Tuesday until Thursday. B. A. K.

Military Hop.

The second military hop of the winter term was given at the armory on Friday evening; about one hundred were present. The armory was prettily decorated and all details were carefully arranged. Bristol's orchestra furnished the music.

Among those from a distance were Mr. H. W. Hart '97, of Lake Odessa, and Miss Jones of the same place.

Woman's Section at Ann Arbor.

The women's section of the State Round-up Farmers' Institute opened Tuesday afternoon, February 27th, with short appropriate remarks by Mrs. Mary A. Mayo, of Battle Creek.

Miss Keller then presented a paper on "Habit and Manners;" and Mrs. J. L. K. Haner read a paper on "Plain Sewing in the Home," exhibiting also many specimens of the work in this line by the girls at the College which attracted much attention and favorable comment.

Dr. Eliza Mosher, who was to have followed with an address on "School Hygiene," was unable to be present on account of an accident by slipping on the ice and falling. This was much regretted by all, but by no one more than by the Doctor herself. Her paper, however, was presented by Mrs. Scott.

The program of Wednesday afternoon included a paper by Mrs. Mary A. Mayo on "Well-bred Children," which was much enjoyed, and an able and interesting paper by Miss Crowe on "The Relation of Good Cooking to the Health of the Family."

Miss Julia A. King of the Normal college was unable to be present.

Thursday afternoon the ladies of the Institute were taken in a body, as the guests of Dr. Mosher, to visit the museum, art gallery and gymnasium, the latter being in the magnificent new Woman's Building, where an exhibition was given by the young ladies of the U. of M., after which dainty refreshments were served to the guests.

It is needless to add that this afternoon was as pleasantly and enjoyably spent as any afternoon of the Institute. L. D. K.

The College at The Round Up.

A large delegation went to Ann Arbor last week. Among those who took part in the exercises were Pres. Snyder, Dr. Kedzie, Prof. Smith, Prof. Taft, Prof. Mumford, Dr. Waterman, Prof. Towar, Prof. Jeffrey, Prof. Marshall, S. H. Fulton, Mr. Dean, and Mr. Ferguson. Secretary Bird was on the program, but was prevented from speaking by an attack of tonsilitis.

Miss Keller, Mrs. Haner and Miss Crowe were in attendance at the Woman's Section, as were Mrs. E. M. Kedzie, Miss Kedzie, Mrs. Smith, Mrs. Mumford, Mrs. Towar and Miss Kellum.

Among the graduates and students present were A. N. Clark, F. E. West '99, C. J. Monroe with '61, E. O. Ladd '78, W. L. Snyder '82, C. E. Bassett with '84, H. B. Cannon '88, T. F. Marston with '90, E. A. Holden '89, K. L. Butterfield '91, B. W. Peet '92, A. B. Cook '93, V. J. Willey '93, A. G. Boehringer with '96, C. J. Foreman '94, L. R. Love '96, J. W. Rigterink '97, G. F. Richmond '98, C. A. Hawley with '01, W. Bos with '01, Lucy Monroe '00*w*, Miss Dunston '01*w*, G. E. Chatfield '99, Fruit Special; F. D. Wells '00, Fruit and Dairy Special.

A meeting of the Board of Agriculture was called for Thursday night, but owing to the lack of a quorum no session was held.

Sleighing Parties.

On Wednesday evening about fourteen young women and the same number of young men enjoyed a "leap year" (?) ride for a couple of hours.

The Columbians gave a sleighing party on Friday evening. About forty, in all, drove to Holt, where a chicken pie supper was in readiness for them.

A week ago Saturday, six of the young men gave a small sleighing party to an equal number of young women.

Prof. Bemies gave an enjoyable sleigh ride on Saturday night to the first and second basket ball teams, both boys and girls, and on returning they were treated to an oyster supper at his residence.

Last Saturday evening about thirty members of the senior class went on a sleigh ride to Mason.

Athletes, Take Notice!

The weekly athletic contest next Saturday at 2:30 will consist of the pole vault, high kick, shot, running high jump, running broad jump, standing broad jump, wrestling in middle, welter and light weights.

All the men entered in any of the track events, including running, should bear in mind that the contest for picking out the track team occurs on March 16. Only two weeks, brace up boys! The runners will not be chosen this term, but we want good practice in this line from now on to the end of this term, to be in good condition for the spring. A number of the athletes have been having the grippe.

Basket Ball.

Did you get your fifteen cents worth? The last intercollegiate basket ball game on the regular schedule has been played, and the boys put up a star game, winning from Ypsilanti by the score of 25 to 8.

We could not pick out the star, it was a constellation of five of the first magnitude. It was the first game of the season in which the boys played fast from the first whistle of the referee. In the previous games they did not get warmed up to work soon enough.

In the first half Ranney threw two goals from field, and Agnew one, and Palmer, for Ypsilanti, made two.

In the second half both teams put on extra energy, determined to win, and it was a pretty contest. But M. A. C. popped the ball into the goal, with inspiration to the following credits: Leavitt two, Balbach three, Agnew three, Ranney one, and Leavitt threw a basket from the foul line.

In this half Ypsilanti made two from field, by Palmer.

It was the cleanest and most scientific game seen at M. A. C.

But this is only half of it. The girls had a game immediately after, with the Lansing High School girls, and took them in by the score of 16 to 4.

The practice game, a couple of weeks ago, which M. A. C. won, only served to make the High School girls more determined to win in this first regular game. It was a contest royal, for when Amazon meets Amazon then comes the tug of war.

The down town girls played with such energy that they lacked in making it effective. Miss Deyarmond, captain of the M. A. C. team landed three baskets in the first half, while Miss Kinyon threw two goals from fouls. Lansing finished the half scoreless, but in the second, Miss Kennedy, captain, dropped in two baskets; while Miss Deyarmond caged four.

The Lansing girls certainly got around the field in a more lively manner than M. A. C. but our team work counted.

Attendance and Conferences at Ann Arbor.

The Round-up brought together at Ann Arbor one hundred and three delegates, representing the various county institute societies. There were also in attendance about forty institute workers, besides 250 visitors from outside the county.

The local attendance was comparatively small, owing to the severe snow storm which prevailed on Wednesday, but Newberry Hall was well filled each afternoon.

As a result of the conferences which were held each morning, it was determined to group the counties so that each crew of two workers can hold three two-day institutes in contiguous counties each week. This will lessen the expense of the institutes and make it possible to also hold one-day institutes in each county.

At the close of the session on Friday afternoon, resolutions were adopted favoring the passage of the national oleomargarine bill, and against the admission of Argentine wool duty free.

Thanks were extended to the Ann Arbor Business Men's Association; to Pres. Campbell and Secretary Mills and other members of the local executive committee; to the University Glee, Banjo and Mandolin Clubs and to Prof. Stanley; to Dr. Angell and members of the faculty, and to Prof. Smith, Supt. of Institutes, for their work in promoting the success of the "Round Up."

EXCURSION TO YPSILANTI.

A pleasant feature of the Institute was the excursion to Ypsilanti and the Normal College. This was planned for Thursday forenoon, but owing to the storm it was necessary to postpone it until Friday. Cars were generously provided by the Detroit & Ann Arbor Electric Railway, and the party of about sixty reached Ypsilanti about nine o'clock. An hour was spent in visiting different classrooms and witnessing calisthenic exercises in the gymnasium.

At ten o'clock the chapel was reached, where the students were found assembled. The chapel exercises included a short musical program, and at the close short talks were made by Capt. E. P. Allen, Col H. S. Dean, A. E. Palmer, Prof. Lyman, Prof. Julia King and others.

Botanical Club.

A very interesting paper on "Chicory and its Uses" was read before the Botanical Club by T. G. Phillips. Chicory, a common roadside weed in many places, has a variety of uses concerning which very little is known. It is used both as an adulterant and as a substitute for coffee. Today it is such an important article of commerce that it has been necessary to make laws to prevent its own adulteration. It grows best in the territory adapted to growing sugar beets, hence although the industry is only in its infancy, a large part of Michigan is well adapted to raising this crop. From his observations in the Saginaw Valley, Mr. Phillips said that as a whole, chicory was one of the best paying crops a farmer could raise, as it sometimes pays a net profit of $15 to $20 an acre and many raise this crop in preference to sugar beets. It makes a good feed for stock and the farmer is enabled to thus dispose of the culls in his crop with profit. The soil should be a reasonably level and deep sandy or clayey loam, with a somewhat open and friable subsoil. If the soil is not naturally well drained, tile should be laid before chicory culture is attempted. The same care in getting good seed should be used as in sugar beets. The speaker concluded by giving a description of the factories at Bay City, and exhibited samples of the root in the different stages of roasting. G. M. B.

Travel to learn and learn to travel. —*Saturday Evening Post.*

THE M. A. C. RECORD.

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Official Directory.

Y. M. C. A.—Regular meetings Sunday evenings at 7:00 and Thursday evenings at 6:30. C. H. Parker, President. D. S. Bullock, Cor. Secretary.

Y. W. C. A.—Weekly meetings for all ladies on the campus, Thursday evenings at 6:20, in Abbot Hall. Sunday meetings with the Y. M. C. A. Mabel Brigham, President; Elizabeth Johns, Cor. Secretary.

KING'S DAUGHTERS—Meet alternate Wednesdays. Mrs. J. L. Snyder, Leader. Mrs. W. B. Barrows, Secretary.

NATURAL HISTORY SOCIETY — Meets alternate Wednesday evenings at 6:30 P. M., in the Zoological Lecture Room. B. Barlow, President. W. K. Wonders, Secretary.

BOTANICAL CLUB—Meets Tuesday evenings at 6:30 in the Botanical Laboratory. G. M. Bradford, President. Emma Miller, Secretary.

ADELPHIC SOCIETY—Meetings every Saturday evening at 7:00, Class room A., College Hall. Wm. Krieger, President. R. Southwick, Secretary.

COLUMBIAN LITERARY SOCIETY—Meetings every Saturday evening at 7:00. Fourth floor, Williams Hall. Bronson Barlow, President. Burt Wermuth, Secretary.

ECLECTIC SOCIETY—Meetings every Saturday evening at 7:00, Fourth Floor, Williams Hall. D. B. Finch, President. T. G. Phillips, Secretary.

FERONIAN SOCIETY—Meetings every Thursday afternoon at 4:00. U. L. S. Rooms. Allie Cimmer, President. Mabel Brigham, Secretary.

HESPERIAN SOCIETY—Meetings every Saturday evening at 7:00, West Ward, Wells Hall. L. S. Christensen, President. H. G. Driskel, Secretary.

OLYMPIC SOCIETY—Meetings every Saturday evening at 7:00, Fourth Floor, Williams Hall. T. J. Leavitt, President. D. C. Pierson, Secretary.

PHI DELTA SOCIETY—Meetings every Saturday evening at 7:30, East Ward, Wells Hall. H. L. Kimball, President. R. L. Himebaugh, Secretary.

THEMIAN SOCIETY.—Meetings every Friday afternoon from 5 to 6, Agricultural Laboratory, second floor. Maud Parmelee, President. Marguerite Nolan, Secretary.

UNION LITERARY SOCIETY — Meetings every Saturday evening at 7:00, U. L. S. Hall. E. W. Ranney, President. A. Kocher, Secretary.

TAU BETA PI FRATERNITY—Meetings on alternate Thursday evenings, Tower Room, Mechanical Laboratory. William Ball, President. C. W. Bale, Secretary.

CLUB BOARDING ASSOCIATION—H. L. Chamberlain, President. Geo. Severance, Secretary.

M. A. C. ATHLETIC ASSOCIATION—W. T. Parks, President. H. P. Weydemeyer, Secretary.

FARMERS' CLUB—Meets alternate Wednesday evenings at 6:30 in the Agricultural Laboratory. J. H. Skinner, President. G. M. Odlum, Cor. Secretary.

M. A. C. CHORUS meets in the Chapel every Monday evening at 6:30. C. H. Parker, President. Gertrude Van Loo, Secretary. Mrs. C. E. Marshall, Director.

Electrical Distribution of Power in a University Shop.

J. R. McColl '90*m*, professor of mechanical engineering at the University of Tennessee, has recently had some interesting work in hand which he describes in the October *Record* of the above institution.

"The new shops and laboratories for mechanical engineering in the University of Tennessee have several new features which the old did not have. Among these is the electrical transmission of power in place of the old line-shaft system. There were many reasons why the change was thought advisable." He gives the following:—The very small portion of the power of the prime mover used at the machines—15 to 20 per cent. in the machine shop and about thirty per cent. in the wood-working department,—"The fact that the machines could be put in any position or in the remotest laboratory of the University due to the convenience of applying power at any point"——,——"the possibility of putting all machines on solid concrete floors with no overhead belting or shafting to shake the laboratory floors above,—and lastly, but not insignificant, the opportunity afforded engineering students to test a series of standard-make motors——."

As the equipment of the old shops was made up of high grade machines it was desired to retain all of these in the new shops, and the greater part of the paper is given to a description of the changes necessary to adapt the machines to the new conditions. He gives in some detail the methods adopted in several lathes, a shaper, a universal tool grinder and a planer. In the machine shop each tool is driven by a separate motor, excepting in a few cases where one motor is connected to two machines. In the wood-working shop, the machines were so grouped that they could be driven from two motors.

In his discussion of the new system, he states that, using the efficiency for the generator given by the makers, the efficiency of the system is slightly more than 50 per cent. "It may be noted that these results are not quite a fair comparison with those given for the old shops—for the reason that the counter-shafts in the new shops have in most cases become parts of the individual machines and the efficiency of the motor is figured outside of the attachments; while in the old shops the tests for efficiency were for "utilized power" beyond the countershafts. Tests have not been made yet to determine what percentage of the power required for any machine is absorbed in driving the countershaft gearing——."

Prof. McColl concludes as follows: "Aside from the question of utility, of the new system over the old, there is one which appeals to the aesthetic. A glance at the cuts showing the appearance of the old and the new shops, will make apparent a marked change for the better in this particular. No one who has tried electrical distribution of power, with its convenience, flexibility and neatness, as well as its economy, would ever consider the question of replacing the line-shaft and belting. That it is more and more to displace the older system in all manufacturing establishments is beyond question."

The article is well illustrated by reproductions of photographs and drawings. Professor McColl acknowledges his indebtedness to C. E. Ferris, '90*m*, professor of machine design, for important assistance in carrying out the details of the undertaking.

Hogan—"Do ye belave in dreams, Mike?"

Dugan—"Faith an' I do! Lasht night I dremt that I was awake, an' in the mornin' me dream kem thrue."—*Princeton Tiger.*

A dictionary of college slang is being prepared by Dr. Babbitt, of Columbia University. All colleges are requested to contribute their words "peculiar to themselves" with comprehensive definitions.—*Ex.*

The Round Up at Ann Arbor.

The Institute "Round Up" opened in Newberry Hall, Ann Arbor, Tuesday afternoon, Feb. 27, for a four days' session.

Hon. William Campbell, President of the Washtenaw Farmer's Institute Society, presided.

The topic for the first session was "The Soil," and it was discussed by various speakers from different standpoints. Dr. Kedzie was first called upon for

"THE CHEMIST'S VIEW."

The soil is not an inert mass, nor is it merely a stage on which plants perform the drama of growth. Various chemical and physical changes are going on at all times, and the substance of the soil is gradually rendered available for plant food. Of the seventy-eight elements, only thirteen are found in plants, and of these four come from the air, while nine are obtained from the soil and form the ash of plants. Of these, silica makes up one-fourth of the earth, while lime is found in vast amounts. Most of the others are in small amounts, but are of the utmost importance. Phosphoric acid and potash are often present in such small quantities that plants cannot secure the amount needed for their growth. Clay soils contain large amounts of potash, and as this element becomes available slowly, a clay soil is not readily exhausted.

The farmer by plowing, cultivating, draining and other operations, opens up the soil to the action of air, water, gases and frost, and renders these reserve materials available for plant use. Cultivation also promotes nitrification. The soil is a factory and not a mine, as a mine is gradually worked out and exhausted, while the soil is the workshop of God, where is woven the fabric of the vegetable, and the foundation of animal life.

The best soils contain large amounts of humus, or decaying vegetable matter, which renders it 1½ to 2½ degrees warmer; it retains water and nitrogen, and is the source of carbon dioxide which is taken into solution in water and breaks up the limestone and feldspar and sets free potash and other elements of plant food. Sulphur also is of much benefit in disintegrating the soil.

Nitrogen is obtained in vast quantities from the South American deposits in the form of Chili saltpetre, but the nitre plant is also at work in the soil.

When a solution of nitrate of potash passes through soil the potash is retained, while the nitrogen leaches out as nitrate of calcium or magnesium. If the land is kept covered with growing crops this valuable element will be saved, as it will be taken up by them.

"THE SOIL AS THE BACTERIOLOGIST SEES IT."

was considered by Prof. Marshall, who gave the following summary of the work of the bacteria in the soil: "1. The fermentation of organic matter, resulting in the setting free of ammonia compounds along with others. 2. The action of nitrifying bacteria upon the fermentation products. 3. The liberation of free ammonia in the fermentation abstraction. 4. The liberation of free nitrogen by means of denitrifying bacteria in their action upon nitrates. 5. The abstraction of free nitrogen from the air by bacteria, and its conversion into a form assimilable by plants. 6. The abstraction of free nitrogen from the air by bacteria and its conversion into a form in which it may act upon rocks and reduce them to arable soil.

GREEN MANURING.

Prof. J. D. Towar in his talk on "Green Manuring," defined a fertile soil as one rich in the elements of plant food and full of organic matter. Virgin humus is more and more valued now that it is gone, as, when humus is present, nitrogen is retained, water is held in the soil and the work of the bacteria is aided. It lightens clays and binds the sands. While summer fallows have lifted mortgages from Michigan farms, they have placed a mortgage on the soil as they have tended to exhaust its fertility. Much can be done to restore it by plowing under the roots and stubble of the crops, manure and straw, but the benefits of green manuring should not be overlooked, as it will aid in supplementing the other sources. It is especially valuable to the mixed farmer and fruit grower.

Crops may be grown either for consumption or for soil improvement. The soil should be kept covered all of the time if we wish to get all of the mineral food possible, as it will be taken up and its loss prevented. The shading of the soil aids the bacteria in developing more food. Many crops also send their roots into the lower soil and bring up plant food. When leguminous crops are grown on a soil deficient in nitrogen, they will take it from the air and leave it in the soil for other crops, but they do not add mineral matter as they only leave what they have taken from the soil.

Green manuring should be secured from catch crops. With grain crops these may be used as a part of the rotation. Peas, oats and vetches may be sown in the spring; cow peas and soy beans in the early summer; winter vetch, crimson clover, and oats in the late summer; and wheat and winter rye in the fall. Good results can be obtained from crimson clover, or oats and peas after wheat and corn.

The turning under of large amounts of green material in warm weather will leave acids in the soil that may injure the growth of the following crop unless it is turned under several weeks before the crop is sown. The use of lime is also beneficial.

SOIL PHYSICS.

In the absence of Colon C. Lillie, Prof. Jeffrey gave a short but very interesting talk upon "Soil Physics." This subject has for its object the study of the soil and the mastery of those conditions that will produce chemical, bacterial and other changes, by controlling the heat, moisture and air in the soil. The successful growth of crops depends upon the favorable condition of the soil. Thus, if water is lacking, crops cannot be grown, and the analysis of the worn-out soils of Virginia shows more of plant food than in the best lands of Maryland. The moisture and air contents and the temperature conditions depend upon the physical conditions. Soil physics shows that the openings between the soil particles occupy from one-third to one-half more space than the particles themselves. The water in the soil at the opening of spring, if saved, is generally sufficient to grow a good crop without further rainfall, but it is seldom saved.

The Campbell system, now in use in the western states, has produced a marked increase in the yield of wheat and other crops in that semi-arid section. The soil is first dragged to pulverize the surface; it is next plowed and a subsurface packer is used once a week during the fall and in the spring before the wheat is sown. The drills are far enough apart to permit of the cultivation of the wheat until nearly ready for harvesting. The packing of the soil aids in the upward movement of the soil water, while the cultivation lessens the evaporation from the surface.

TILLAGE.

"Tillage in Theory and Practice," was discussed by Roland Morrill of Benton Harbor. Before the actual tillage is commenced the soil should be in correct mechanical condition, and contain the needed amount of plant food. Only use as much land as you can till well. Tillage is manure, as it unlocks Nature's storehouse of plant food in the soil. While different crops require various kinds of treatment, tillage is for the purpose of conserving moisture, and incidentally to kill weeds. In preparing land for corn, plow early and cultivate it at once to hold the moisture. After planting use the harrow frequently to kill the weeds and prevent the baking of the soil. If the soil is heavy and wet the early cultivations may be to the depth of three or four inches, but later in the season two inches will be ample.

TUESDAY EVENING.

The session of Tuesday evening was opened by a song from the University Glee Club, which was encored.

The addresses arranged for the evening related to higher education, and the presidents of the University, and the Agricultural and Normal Colleges, and a member of the Board of Control of each institution, were to give their ideas of what they could do for the people of the state.

DR. ANGELL ON THE UNIVERSITY.

In introducing his remarks, Dr. Angell of the University welcomed the delegates to Ann Arbor. The principal criticisms against the University come from people who have never visited it and, as he could not transport it for exhibition to all parts of the state, he was much pleased that so representative a body had come to Ann Arbor to visit it. The University and the other state institutions belong to the people of the state, and the officers in charge are their servants to administer them.

The early settlers of Michigan were from New York and New England, and as many of them were well educated, they at once took steps to secure the blessings of higher education to their children. Money was scarce, but congress had made grants of land for endowing institutions of learning, and, by disposing of the land grant, means for establishing the University were secured.

Since that time more than 30,000 students have been in attendance, and this year more than 3,300 are enrolled. Of these one-half have come from farm homes. The total state appropriations for the support of the University have been less than the cost of a single battleship.

The object of the University is to give a high, general education, but it has also furnished many teachers for agricultural colleges, and investigators along agricultural lines. The work done in the laboratories has also been of much value to the farming interests of the country.

The aim has been, first of all, to make men, as, if you cannot make a man of a student, you cannot make anything of him.

The graduates are scattered from ocean to ocean, and for a number of years the University of Michigan has had a larger number in congress than any other college in the country. Two of the five commissoners who negotiated the treaty of peace with Spain had been U. of M. students, and it is likely that there will be the same proportion on the Philippine commission.

THE NORMAL COLLEGE.

In the absence of Dr. Leonard, Prof. Lyman spoke for the Normal College. He considers that one strong feature which to a large extent accounts for the success attained by our educational institutions is that they have the people back of them. The Normal College has had a regular increase in the number of its students, which has grown from 330 in 1882 to 1,100 in 1900. The State now has three normal schools, that at Ypsilanti having been established in 1850; the second was opened at Mt. Pleasant less than five years ago, but it now has 500 students, while the new school at Marquette already has more than seventy. Most of the students are Michigan boys and girls, and on graduating 98 per cent. of those who teach go into Michigan schools.

As yet no attention has been given to manual training, but as with all of the better professional schools, it is thought necessary for all students to take sufficient academic work to form a basis for their technical training. They must be scholars themselves in order that they may know what to teach. Many normal schools turn out machine teachers, who do not have an academic training and their teaching deteriorates after the first year, but in this respect the Michigan State Normal Schools are exceptions.

THE AGRICULTURAL COLLEGE.

President Snyder claimed that the agricultural and mechanical colleges have a field peculiarly their own. The ordinance of 1787 asserts that religion, morality and intelligence are necessary to good citizenship, but no one can be a good citizen who does not have the ability to earn a living for himself and family.

In the early days the educational institutions were intended to prepare men to follow the so-called learned professions, but a feeling finally arose that education should also be available to those who were to follow industrial callings, as the changed conditions emphasized the importance of broadening the higher education.

In 1862 the Morrill Act was passed. It provided for the establishment of colleges that should teach such branches of learning as will fit the children of the industrial classes for the various pursuits and callings of life. This has led to the opening of agricultural colleges in each of the states, and has brought the educational system to meet the needs of the present time.

The Michigan Agricultural College furnishes instruction in all of the sciences that relate to the operation of farm, shop and home. There are three distinct four-year courses, agricultural, mechanical and women's, and in addition to the technical instruction the students are given a thorough general training.

FROM THE BOARDS OF CONTROL.

Col. H. S. Dean of the Board of Regents of the University said that proud as the people of Michigan had reason to be of her farms, manufacturing establishments and mines, they should be prouder still of the school system, crowned by the University which stands second to none.

Prof. Johnson of Ann Arbor spoke for the Normal schools, stating that Michigan was the fourth state in the Union to establish a normal school, and that the Normal College at Ypsilanti was the fifth school to be opened. Of all the schools in the country it ranks first in the character of its instruction.

Business men employ specialists to take charge of their work, but too often allow their children to be trained by amateurs.

Capt. E. P. Allen of the State Board of Agriculture referred to the good work done by the Agricultural College in turning out well-trained men and women, who are able to grapple with the problems that confront them on the farm, in the shop, or the home; while the general education that they receive is a good foundation for technical training along other lines.

8 A. M. Feb. 28: The conference of county delegates occurred with Prof. C. D. Smith in the chair.

The matter of the number of regular workers that should be sent to each institute, and the matter of holding institutes upon Mondays and Saturdays called forth some very spirited discussions on the part of the delegates.

It was finally decided by a very marked majority that institutes should be held upon these days. The other question had to be laid over until later.

So interesting was the work of the conference, that instead of closing at 9 o'clock as it should have, according to program, it was 9:30 when the morning session of the institute opened.

LESSONS OF THE YEAR IN GROWING FARM CROPS.

"Lessons of the Year in Wheat Growing," was presented by Mr. A. M. Brown, of Schoolcraft. Following are some of the thoughts gleaned from his paper: In these later years new elements have entered into wheat growing. It costs something to grow wheat. It costs something to go through the motions of growing wheat.

That when a man grew 13 bu. of wheat per acre and sold it in Chicago at 62c. per bu., he must get $6.50 per acre for his straw to come out even. The only way to make wheat growing pay is to increase the yield; to do this the most necessary thing is to increase the fertility of the soil.

The general wheat failure of last year was due, 1st, to lack of moisture, 2d, to the Hessian fly. The occasional good yields of the year he attributed, 1st, to the mechanical condition of the soil, and 2d, to the humus present.

He condemns the too careful pulverizing and smoothing of the soil in the preparation of the seed bed for wheat, but favors the leaving of the surface rough and lumpy that the snow of winter may be held to protect the crop from frost and furnish moisture upon melting for the future use of the crop. The frosts would pulverize and level the lumps and inequalities of the surface before spring, and cover the exposed roots.

Humus in the soil offers resistance to frost and regulates its action, and helps to conserve moisture. Fertility is the Alpha and Omega of wheat growing. It assists even in combatting the Hessian fly.

Seed makes less difference than is usually supposed. Few wheats will do well on a poor soil, and few will not do well on good soil.

There is no time at which wheat may be sown that it may escape the ravages of the Hessian fly. Sow early, that the plant may, if possible, make good growth, and be in best condition to withstand the attack if the fly does come.

In the discussion that followed this paper, many good and interesting things were said, but space will not permit their repetition here.

"Lessons of the Year in Corn Growing," was presented by Mr. E. A. Croman of Grass Lake. He said in part:—

"So large crops of corn cannot be grown now as were grown formerly. The ideal cornfield is made from clover sod well manured in summer or early fall, and plowed in the fall if the soil will permit; if not, in early spring. Drag or cultivate or both till it is transformed into a deep mellow seed bed.

Save your own seed rather than purchase from neighbors or seedmen. Select from field while still on the stalk, selecting ears which mature early, have good form, are well filled, are of medium size, and are growing upon stalks typical for fodder.

It may be desirable to cross-breed to secure a corn that possesses all the qualities, as the speaker himself had done.

Test seed before planting, using for germinator a box of soil well moistened; upon the top of the moist soil, place a hundred or more of the seeds to be tested, cover with a moist cloth, and place in warm place. After a few days remove the cloth, and count the unsprouted seeds.

Plant with planter, and harrow after every rain till ready to cultivate. Cultivate once a week.

Such soil is ready for fall wheat or rye without plowing. A very spirited discussion followed this paper.

The paper by Prof. J. D. Towar, on "Results of Experiments with Legumes" was listened to with exceptional interest and called forth a great many questions throughout the reading.

After speaking of the early work of Hellriegel, in which he demonstrated that Legumes had the power to grow without being supplied with nitrogen, while under similar conditions cereals died, and of the work of Lawes and Gilbert in which they demonstrated that the nitrate content of soil after yielding a crop of clover was greater than after yielding a cereal crop, and that the effect was noticable in the following crops, he spoke of the hardiness, yields, and value, of members of the legume family experimented with at the College Experiment Station. These included red, alsike, and crimson clovers, peas, cow peas, alfalfa, and sand lucern.

In his paper on "Rotation of Crops" Mr. A. E. Palmer of Kalkaska, made some very practical observations.

Due to our methods of handling our farms, nature is failing to respond to our labor, in a way commensurate with the labor bestowed. A cereal crop may not do well when following a cereal crop. A hoed crop may not do well after a hoed crop. Some crops are shallow rooted, and feed near the surface, others are deep rooted and feed deep down. Some crops require long periods to mature, as the corn and potato, others but a short period. The root systems of the different crops affect the mechanical condition of the soil differently. Different crops are accompanied each with its own peculiar pest of weed or parasite. The above facts seemed to demand a rotation of crops. He considered a short rotation better than a long one, and offered as an ideal one corn, wheat, clover.

Mr. Palmer believes that we plow too much, and that once in three years is often enough.

"New Helps in Potato Growing" was the title of a talk by Mr. M. L. Dean of the M. A. C. This talk was short and very much to the point.

Select good seed. The best time is at potato digging. Select tubers typical in size, form, etc. Care for the seed carefully, to prevent heating, sprouting, etc., all of which affect the vitality of the tuber. Before planting, treat with corrosive sublimate, and quarter each good-sized potato lengthwise. It makes little difference whether plants in trenches or hills. Rows should be 3½ feet apart. Hills should be 12 to 15 inches apart for early potatoes and 24 to 30 inches for late, one piece to the hill. Cultivate often, following flat cultivation. Spray early — don't wait for the potato enemies to appear. Certain machines are helpful, —but don't buy a machine you don't need,— use judgment in the matter. No end of enthusiasm was aroused among the members as was shown by the questions that were sprung.

The session of Wednesday afternoon was devoted to fruit growing, the first speaker being Roland Morrill of Benton Harbor who spoke on

LESSONS OF THE YEAR IN PEACH GROWING.

The strip along the west side of the state, or the "Peach Belt," has always been most reliable for growing this crop, but, even there, some sections are better than others, and the experience of the past season has shown the folly of using anything but the most favorable, elevated locations for this crop. A difference of four feet in elevation has made the difference of a full and a half crop, while four feet lower has given no crop. The higher locations may give a good crop in a poor year and this will bring high prices. Hundreds of acres of good corn land have been planted to peaches even though utterly unsuited for it and failures have resulted. Many growers have failed to give proper attention to tillage. The peach is at its northern limit in Michigan, and care should be taken to grow the trees as large and strong as possible, and have them ripen properly. They can be made to reach in three or four years, a size as large as they commonly attain in eight years.

Plow the orchard shallow, early in the spring, then follow with spring-tooth and smoothing harrows, or a weeder, if the soil is not too heavy. Sow oats at the last cultivation in August. Mound the trees for borers in the fall, and spray for leaf-curl and yellows, early in the spring. Cut back the branches from one-half to two-thirds early in the spring and thin the fruit.

APPLE GROWING.

S. H. Fulton of the South Haven Sub-Experiment Station spoke of the apple crop of last year as comparatively small, except where the orchards were cultivated, pruned and sprayed. Fruit from these orchards brought a good price, while the inferior fruit from neglected orchards brought much lower prices. Three-fourths of the apple trees in Michigan are in the four southern tiers of counties, Oakland county leading in acreage. Statistics show that there has been a falling off in the southern and central portions.

Old orchards are receiving better care in many sections, but the plantings are small except, in Oceana, Newaygo, Saginaw and Oakland counties.

Apple growing, under proper conditions, is profitable, and we should either take better care of our old orchards or plant new ones. Last year many old orchards that were plowed, cultivated, pruned and sprayed, gave large crops of smooth fruit. The trees should be headed moderately low, for convenience in pruning, spraying and gathering the fruit; the soil should be cultivated to conserve moisture and food for the trees, and plant food should be supplied.

The fruit should be carefully graded and at once placed in barrels or fruit houses and not left for weeks on the ground.

NEW TIME IDEAS IN FRUIT GROWING.

In his lecture upon this subject Prof. Bailey illustrated the changes that have taken place by comparing the first fruit book published in 1726 with those of the present day. One-fourth of the early book was devoted to cider, and nearly all of the varieties mentioned were recommended for cider. Now we grow apples for fruit, and the best books set down the underlying principles, which are to be worked over and if they apply put into actual practice.

The fundamental idea in fruit culture is tillage, and yet Downing's "Fruits and Fruit Trees of America" gives but one page to this subject, while several hundred are devoted to varieties.

The fruit growers of New York are beginning to appreciate the value of tillage, and it is estimated that the increased value of the orchards of that state through improved methods of tillage, equals the entire cost of both of the New York experiment stations.

Deep plowing is desirable in preparing orchards for planting if the land is hard, and heavy land should be plowed each spring for a number of years thereafter, but after that it is not necessary except to turn under a green crop. Ordinarily, plow in the spring, and cultivate frequently until the period of growth is over. Later, put on some cover crop. Canada peas and oats make a good cover crop.

In selecting varieties the soil, location and the market requirements should be considered. Fruit of fine quality will bring good prices in special markets. The markets of the Old World, especially England and Germany should be cultivated. Only the best fruit, honestly graded, and carefully packed in crates should be exported. Barrels increase the cost of ocean freight, and the fruit does not open up well after rolling down the long gangways.

"NEW THOUGHTS ON SMALL FRUITS,"

was the subject of an entertaining talk by J. N. Stearns of Kalamazoo. Small fruits have been both his financial and physical salvation. Few farmers grow enough for their own use, but require their wives to prepare 1,095 meals per year from the pork and flour barrels, and potato bin.

Plant in long rows in connection with the vegetable garden, and it will be but little trouble to care for them. In growing strawberries do not allow the rows to become more than twelve inches wide. It pays best to fruit the commercial plantation only once, but the farmer can get two or more crops. Even raspberries and blackberries should be renewed often, four crops of fruit being more profitable than eight. Never take plants from old beds. Pinch back blackberries and black-raspberries at two feet, and prune back in the spring. Mulch the strawberries in early winter, and, if you cannot readily obtain straw or marsh hay, sow oats in August or September—also desirable in bush fruits. When strawberries are grown for three years, the ground should not be used again for this crop under five years.

Several in the audience claimed that they could not afford to raise small fruits, as they could buy them from their neighbors, who were specialists, for less than it cost to raise them, but this was denied by others and the point was brought out that, when they were purchased, the quantity used was generally much smaller than when grown on the farm. The use of plenty of fruit is healthful and reduces doctor's bills.

Mr. Stearns recommended Jessie, Haverland and Brandywine as three strawberries for home use. He also spoke highly of wood ashes as a fertilizer for fruit of all kinds. They give yield, color and quality.

"FUNGICIDES, INSECTICIDES AND SPRAYING"

Was discussed by Prof. Taft. The increase in the number of insects and plant diseases makes it impossible to grow first-class fruit unless the trees are sprayed. In order to make a rational use of fungicides and insecticides, one should understand the nature of the various pests which infest our fruits. Most of the insects that are commonly troublesome obtain their food by biting off and consuming portions of the leaves, or fruit, and for these the use of some arsenite, such as Paris green, London purple or white arsenic, will be found effectual. Paris green at the rate of one pound in 150 to 200 gallons of water will be best for small growers, but, for large commercial plantations, white arsenic will be much cheaper. This can be prepared by boiling one pound of arsenic and two pounds of freshly slaked lime in two gallons of water for forty minutes, and then diluting to 300 to 400 gallons. The best results are obtained when the arsenites are used with Bordeaux mixture, but, in its place, lime may be added at the rate of one pound in twenty gallons. This will be found effectual, if applied thoroughly, for the canker worm, codling moth, curculio and other troublesome insects. For sucking insects, use tobacco water, kerosene and water, or kerosene emulsion.

As a fungicide, the best results are secured with copper sulphate, or "blue-stone," either as a solution at the rate of one pound in fifteen gallons of water, or in Bordeaux mixture, which is composed of one pound of copper sulphate and one pound of lime for each ten gallons of water.

The use of these materials is thought by some to have a good effect against such troublesome diseases as peach yellows and pear blight, while they will to a great degree prevent injury from nearly all fungous diseases, if the application is thorough and if it is made before the disease has appeared.

Leaf curl of the peach can be entirely prevented by a single application of copper sulphate solution before the first of April.

For the spraying of large orchards one should have a tank holding eight or ten barrels and a powerful pump equipped with two lines of hose, extension rods and at least four nozzles.

LIQUID AIR.

On Wednesday evening the delegates assembled in the lecture room of the old medical building to listen to a lecture by Dr. Paul C. Freer. The university has a three horse power liquid air machine, presented by Mr. Brush of Cleveland.

Dr. Freer was introduced by Pres. Snyder, and expressed his appreciation at the interest shown by the large attendance, about 250 having ventured out in the storm. He referred to the old theory that all substances were in three classes, gases, liquids and solids, while we now believe that all substances may be changed from one class to the other by merely varying the temperature and pressure. Thus, water is a liquid, but if heated to 212 degrees it boils and becomes steam, a gas, while if cooled to 32 degrees it takes on a solid form. In the same way air at a temperature of 300 degrees below zero becomes a liquid.

In 1822 it was found that chlorine gas could be liquified, and in 1877 the first machine to liquify air was constructed. Dr. Freer showed diagrams of these early machines, which subjected the air to a pressure of 300 to 400 atmospheres and to a low temperature.

The modern liquid air machine consists of an air compresser, which forces air into a reservoir from which it passes into the inner one of a triple coiled tube at a pressure of 200 atmospheres. At the end of the coil it passes through a valve into the middle one of these tubes, where the pressure is but sixteen atmospheres. From this it passes to the outer tube with a pressure of but one atmosphere. The air is passed through the tubes several times until it becomes a liquid and can be drawn from a faucet the same as water. The cooling is largely due to relieving the pressure as the gas passes from one tube to another, and as the gas thus cooled passes in each case into a tube which surrounds the one that contains air under a higher pressure it exerts a cooling effect upon it. To illustrate the cooling effect produced by reducing the pressure, Dr. Freer allowed liquid carbonic acid,

which was under a pressure of thirty-nine atmospheres, to escape, when it took on a solid form resembling snow, with a temperature of 105 degrees below zero.

The liquid air used in the experiments was in a double walled flask to prevent the warming and evaporating of the liquid air. The air is exhausted from the space between the walls of the flask, as a vacuum is one of the best insulators. The outer surface of the flask was silvered, as a smooth surface absorbs less heat than a rough one.

When the liquid air, which is a colorless fluid, was turned out upon the table, it ran off in drops and vaporized the same as water from a red hot stove. This was not strange, as the difference in the temperature of the liquid air at 300 degrees below zero and the surface of the desk at 70 degrees, is about the same as between that of water at the ordinary temperature and a red hot stove. In both cases it was, by contact with the warmer substance, raised above the boiling point, and passed into a gaseous state.

A small amount in a test tube, which was placed in a beaker of cold water was thus made to boil, while the liquid air was so much cooler than the water that a mass of ice was formed about the lower end of the test tube; and a test tube of liquid air was so much cooler than the air of the room that it condensed the moisture in the air and produced a miniature snow storm, while small icicles formed on the test tube. A rubber cork placed in liquid air for one minute was frozen so hard that, on pounding it with a hammer, it cracked like glass. When a lighted taper was placed in liquid air it burned even more freely, and a piece of burning charcoal burned freely in liquid air, and the carbonic acid resulting from the combustion was deposited as a solid, thus showing that the temperature was more than 105 degrees below zero after the combustion had been going on for some minutes.

To show the effect of liquid air upon the burning properties of illuminating gas, Dr. Freer passed it in a brass tube through liquid air, and was able to nearly extinguish the flame, a faint blue blaze only remaining. The liquid air was thus able to freeze all of the gas except the small amount of hydrogen which it contained. Hydrogen is one of the most difficult gases to liquefy as it requires a temperature of only 35 degrees above absolute zero, which is 456 degrees below zero Fahrenheit.

The University machine is only able to supply one and one-half pints of liquid air in two hours, but the authorities hope to build a much larger machine the coming summer.

COOPERATION IN EDUCATION.

At the close of the lecture by Dr. Freer the audience proceeded to University Hall where they were treated to a short organ recital by Prof. Stanley, upon the great Columbian organ. This was followed by the address of Dr. R. M. Wenley, of the University, upon the "Importance of Co-operation in Education." In a practical way the farmer can co-operate with his neighbors and friends, in matters relating to the growth of their crops. Man is an imitative animal and, although unconscious of it, he is likely to follow his neighbors along lines that seem worthy of imitation.

There is a growing need for scientific knowledge on the farm, and every farmer has an ample laboratory in his farm, and apparatus in his implements. There are two forms of expression. That by means of the hand is used by the farmer, but he neglects too much expression by the mouth. He should meet with his neighbors in institutes, the farmer's clubs and the Grange, and give and receive information. In the work of the farm there is ample opportunity for consideration and thought. The farmer's institute is an altar raised to the development of the farmer, and the more attention that is paid to them, and to co-operation, the better for the community. The agricultural class is the backbone of the country because the farmer's leading characteristic, stability, is developed by his contact with Nature.

TREND OF AGRICULTURAL EDUCATION.

Prof. L. H. Bailey of Cornell University, was introduced as a son of Michigan and a graduate of M. A. C. in the class of 1882. In opening his address he expressed his pride in the State of his birth, and, as a Michigander, he felt particularly proud of her educational system, with the graded schools and co-ordinated higher institutions of learning. The University stands at the head of the system. Another, the Normal School, is for the propagation of education, while the Agricultural College is for the development of her industrial interests.

In the old days, education was for the few, but it has gradually become the property of the many. The idea of an institution for agricultural education is not a new one, as one was projected in 1651 by a friend of Milton. The first actually established was in 1763 in France; five were founded in Hungary from 1771 to 1797, and others were opened in Bohemia and Germany.

The teaching and example of Washington during the latter part of the last century attracted attention to the importance of agricultural education, and the idea of starting an agricultural college was considered between 1790 and 1800, but the plan was killed at a general meeting of farmers.

In 1829, a *bona fide* agricultural college was established at Derby, Conn., but soon passed out of existence. About 1833 a second was established at College Hill, near Cincinnati. It kept open until the opening of the war, and afterwards was again placed on its feet. Dr. John A. Warder, the well known pomologist, was professor of agriculture, and Mr. Carey, brother of the sweet singers, was connected with it.

In 1854 a school of agriculture was established at Oberlin, O., but after one year it was removed to Cleveland, and two years later became the agricultural department of the University of Ohio. The Michigan Agricultural College was opened in 1857, and is the oldest agricultural college.

In 1862 the Hon. J. S. Morrill secured the passage of the land grant act, the noblest effort for the education of the industrial classes. One of the fundamental principles was that they should teach practical agriculture, and the establishment of agricultural colleges was a protest against the old style of education.

Prof. Bailey traced the development of the agricultural colleges in the different states, and of two new movements, the establishment of intermediate training schools and agricultural high schools. Reference was made to the College extension work, and the nature study leaflets that are placed in the hands of the children. We hope to print the final portion of Prof. Bailey's address in full next week.

SUGAR BEET CONFERENCE.

One of the most interesting, instructive and enthusiastic meetings of the Institute was the conference of farmers, scientists and beet sugar manufacturers. There were present Dr. H. W. Wiley, chemist of the Department of Agriculture, Washington, D. C., Dr. Kedzie of M. A. C., Dr. Perry F. Trowbridge of the U. of M., a large number of farmers who have grown beets for sugar factories, and chemists, stockholders and managers representing several beet sugar factories.

Prof. Smith presided at the meeting, and presented some of the questions of difference and doubt that the past two years' experience has left unanswered. Dr. Kedzie read a paper on "The Relation of the Farmer to the Factory." Methods of the various factories in taking samples of beets for determining tare and sugar content were presented, criticised and otherwise discussed. The methods were generally approved. The faults of carrying out the methods were, as a rule, ascribed to men appointed to do this work. The determination of marc, the factor which is employed to convert sugar in the juice to sugar in the beet, was thoroughly explained. Dr. Wiley stated that normal beets ran very uniform in this respect and that the per cent. of marc should be about five, making a factor of .95, though he admitted that certain conditions might increase the marc to 7 per cent., permitting a factor of .93. Dr. Trowbridge gave results of his investigations the past season in several factories. He concluded that .92 or .93 was not an unfair factor under such conditions as prevailed in the fall of 1899.

Utilization of pulp and other by-products received a share of the attention. Dr. Wiley recommended drying the pulp, and with ground cornstalks and the residual molasses the formation of a press cake which could be used to advantage as a feed for fattening animals. Where fuel is scarce the pulp may be dried and burned. The lime ought to be valuable as a fertilizer as most of our American soils seem to be lacking in this material. Several other questions such as methods of cutting samples from beets for analysis, storing beets, adaptation of low-lands for beet growing, etc., received attention.

It was a grand and harmonious meeting. Everybody talked freely and the questions were usually answered to the general satisfaction of all, while the promise was manifested that existing differences between farmer and factorymen would soon be things of the past.

SUGAR BEET PRODUCTION.

Dr. H. W. Wiley spoke of the results secured by beet growers in different parts of the country. In California, although they have little or no rain after the beets are planted, they grow good crops. Very thorough cultivation and subterranean moisture make this possible. The seed is sown at intervals from January to June, so that the operations of planting, thinning and harvesting are distributed over nearly the entire year. They never have to protect the beets from cold.

In Utah beets are grown under irrigation, and the crop is very profitable, as large crops can be depended upon.

In Michigan, New York and Northern Indiana the conditions are very favorable, as there is a reasonable amount of rainfall, sunshine and heat, which is required for growing beets and producing sugar.

Farther south the results are not so satisfactory as there are extremes of heat and moisture, with a lack of sunshine, and to the north and west we find temperature and moisture quite variable, and early frosts are troublesome. Factories are being built in unfavorable localities, but the industry is likely to centralize in sections suited to growing the beets.

Sugar beet culture has had a wonderful effect upon the agriculture of other countries. It has taught the farmers the art of agriculture and has led them to improve their soil. Beets need large amounts of potash, phosphoric acid and nitrogen and should not be grown oftener than once in four or five years. Dr. Wiley also spoke of the need of national pure food legislation as state laws have no control in other states, and innocent parties often suffer.

On Thursday evening Dr. Wiley spoke upon "Beet Sugar Manufacture," and explained the different processes and showed views of factories and the different machines used in making sugar from both beets and cane.

The exercises of Thursday evening were held in University Hall, and were varied by music by the Banjo and Mandolin clubs, and by Prof. Stanley on the organ.

Two of the speakers, Geo. B. Horton, master of the State Grange, and Secretary Bird were not able to be present.

THE FARMERS' CLUBS.

A. N. Kimmis, of Midland, spoke of the "Work of Farmers' Clubs," which have for their object the advancement of the social, moral, intellectual and financial interests of their members. The results show a marked benefit along all of these lines, although the financial benefits have been such as naturally accrue from development along the other lines. The clubs have had much weight in state political matters, and the measures they have advocated have resulted in the saving of thousands of dollars to the people of the state.

He especially commended the work of Secretary Bird who has had charge of the Farmers' Club page in the *Michigan Farmer* for several years.

THE FARMER AS A CITIZEN.

The address of Ex-Gov. Luce on this subject, shows that he has lost none of his old fire and enthusiasm. He considered that no office is higher, and that none imposes more important duties than American citizenship. Our forefathers declared that all men are created free and equal, and placed the crown of sovereignty on the heads of her citizens.

Aside from morality and ability, a third virtue, industry, is equally important. Farmers are more honest than the average of other men, as the temptations that confront them are less numerous. This is especially true while the children

are young, as on the farm the fathers and mothers can give more attention to them.

The farm is not represented in two of the State institutions, the Industrial Schools for boys and girls. Much attention is given to the government of the people of the city, but, although a lusty half of the people live in the country, no one worries about managing them, as they can not only govern themselves, but are also able to defend the honor and life of the nation.

The morning session of Thursday and all of Friday were given up to the consideration of live stock topics.

CARE OF THE DAIRY COW.

According to J. W. Hutchins of Hanover, an up to date dairy cow is one which gives paying results for feed and care.

Always keep the cow comfortable, and protected from inclement weather. A shed 30 by 30 feet is of sufficient size for ten cows to run in.

The stables should be so constructed that they have thorough ventilation and yet not freeze except in the severest weather. Plenty of light must be admitted by windows, and fresh water should always be of easy access and kept at a normal temperature.

Clover hay is rich in protein and is the nearest to a balanced ration. Oat and pea hay is a good substitute, if sown in the proportion of one bushel of oats to two of peas per acre. This is also a rich feed for soiling when pastures are dry, and can be followed with corn.

For a grain ration use corn, oats and bran in equal parts. Always have a system and regularity in feeding. In the morning a cow should be milked and after milking give a feed of clover hay and four quarts of grain per cow; at noon a feed of shredded corn fodder; at night use the same order reversed, and water twice per day.

As a summary the cow is the stepmother of the human family and should be treated with the utmost kindness and cleanliness.

BACON HOGS.

J. J. Ferguson dealt with this topic referring more to the conditions demanded by foreign markets than those goverinng the trade in this country. At the present time, the modern type of bacon hog is not in demand by Chicago packers, hence it would not be well for Michigan farmers to make any radical changes in their methods of breeding or feeding, but just so soon as the market demands, and the packers are prepared to pay an extra price for them, it will be wise and profitable for our farmers to produce the bacon hog. As a matter of fact the *choice bacon hog* costs slightly more to produce than does the average well-bred general-purpose animal. In Canada there is a bonus of 50-75 cents per hundred, live weight, on animals suited for the best export trade, and this bonusing system would have to be introduced in this state before the farmers should be encouraged to go into this line of work.

A very few years ago, nearly all the animals marketed were of heavy weights, running from 300 to 450 pounds live weight. At present, the animal in demand for export and for the best home trade, is marketed at a weight of 160 to 250 pounds. The best trade now calls for lean, muscular bacon, differing entirely from the over-fat products obtained from the heavier weights. In raising bacon hogs, therefore, the object should be to produce the maximum amount of lean flesh.

In producing such animals, breed and feed are equally important factors. Tamworths, Yorkshires, and large English Berkshires with their crosses, are suitable in the order named. The distinctively American breeds are not now well suited, but selection and breeding towards the type wanted would do much in a few years. As to feed, Mr. Ferguson outlined a cheap system. This included the use of roots as the basis of the winter ration for store animals; and clover pasture and soiling crops for summer use. Exercise is a highly important factor in producing muscular flesh. During the first five months of the hog's life only muscle-forming nitrogenous foods should be fed; corn cannot be safely fed in the first period, since it results in the production of fat rather than flesh. The animals are marketed at six or seven months, and during the last two they have to be firmed up with mixed grains. Clover or roots alone cause *soft* bacon.

THE PACKER'S CHOICE.

E. A. Croman, of Grass Lake, discussed the production of pork, for sale and for home use. At present, there is but a limited demand for bacon hogs and they are not profitable.

The best returns are from hogs seven or eight months old that weigh 200 to 250 pounds. For the first few months feed on oats and peas, rape and clover, or rye in the fall, without much corn, but, during the last two months, confine the hogs and feed what corn and roots they will eat. Breeding hogs do well on shredded corn fodder, clover hay and roots.

Where one has a dairy farm, milk forms a cheap food for hogs. Corn is the leading crop with many farmers and can be used to better advantage for pork than for bacon hogs.

IMPORTANCE OF TYPE IN PROFITABLE STEER FEEDING.

The talk of Prof. H. W. Mumford was listened to with much interest. While the beef industry has been under a cloud the future seems bright. A steer is profitable when it will repay all expense for feed and leave a cash margin. The profit is from the increased value per pound. The home market, as a rule, is not the best, and the high grade products must reach the large centers of population to secure the highest prices. The difference between the best and the poorest grades of beef, is often $1.50 to $2 per 100 pounds, and this is largely due to the difference in type.

The type in animals is that which fits them for certain purposes. The best type for feeding is an animal that has the proper form, is able to transform the largest proportion of food into flesh, and that lays on flesh where it is most valuable. The most profitable are the pure or cross-bred, and high grades of any of the beef breeds — Shorthorn, Angus, Galloway and Hereford.

Profitable feeding for beef depends on, (1) Type and cost of steer selected; (2) Judicious feeding; (3) Form and quality of the finished product; (4) Relation between the cost and selling price.

The remainder of report next week.

Items Concerning the Botanical Department.

For many years past the department has been especially desirous of obtaining herbarium specimens from numerous regions of the State, even from every county, if possible. We believe these to be of more importance to the college and the State than foreign specimens. Seed plants and ferns are not only desired, but all the lower kinds as well. Here is a vast field for work that cannot be entrusted to inexperienced local collectors. We ought to be able to keep two men in the field all summer for some years to come; then we should have reliable data concerning Michigan flora that would be valuable for all future time. Numbers of plants of the State have gone and others have come, in a remarkable manner, and the end is not yet. M. A. C. already has much the start, and properly so, of all other institutions in the State in this line of work.

Three young ladies of the woman's course are at work in the herbarium mounting specimens, repairing sheets of plants and helping to straighten things up in general.

In the study of grasses and other forage crops this term, each agricultural junior is supplied with a small quantity of 25 to 35 kinds of seeds. Each member of the class purchased homeopathic vials in which the seeds are placed and correctly labeled. In like manner, they are furnished 125 or more kinds of accurately named seeds and seed-like fruits of weeds. In future these should be of much use to the members of the class, or their friends, in helping to identify grasses, clovers and weeds. At an expense of about ninety cents for bottles and a little time for labeling, each student becomes the owner of a collection of seeds that could not be duplicated in the market for less than fifteen to eighteen dollars. The study they put on the objects should make the students very reliable in naming anything of the sort they may find.

This is an age of weeds, and their rapid arrival as immigrants is alarming. They are grown on the home farms and in many cases allowed the greatest liberty; they are bought with seeds of grasses, clover and grains, carefully sown and given a good chance with these cultivated crops. No weed is ever driven from a farm, at least such instances are very rarely heard of. Professor Wheeler, as consulting botanist of the Experiment Station is beginning to receive samples of clover seeds from various portions of the State sent in by up-to-date farmers, who realize that it is high time they know definitely just what they are buying and sowing. So far the samples examined are better than formerly.

His Ambition Realized.

A SKETCH FROM THE LIFE OF THE NORTHERN MICHIGAN FARM BOY, BY HOWARD SEVERANCE '03.

When a country boy of northern Michigan arrives at the age of seventeen or eighteen, he becomes tired of farm work, and, in fact, of most any kind of work. Thus it happened that John Treadwell, as he sat down for a moment under a pleasant shade tree to rest his horses, was suddenly struck with the desire to become a lumberman.

"Now there's Bill Jones — he's worked in the woods ever sinst he was fifteen year old, and he says it's more fun than workin' on the farm, and there's money in it, too.

"Yes, I b'lieve him, for he's got plenty o' good clothes and wears them there high-topped waterproofed shoes, while I wear nothin' but common blue jeens and plow shoes.

"I think next fall I'll go up the river to Barker's camp and ask for a job, and maybe I kin git an ox team to drive. Then—O, what a snap I'll have a follerin' 'em around all day! Nothin' to do but holler! That would be a hull rod ahead of this wallerin' around after this horrid drag."

John carries out this plan and when fall comes he packs his "turkey," as he calls his very limited supply of clothing, without any serious objection from his father, and at last is started for his goal—the lumber woods. After trudging along for what he thinks is fifty miles, through the forest, he comes to an open space where there are, as near as he can make out, about half a dozen dark huts, which as he draws nearer prove to be a barn, granary, pig pens, cook shanty, and a shanty in which the men sleep. These buildings are covered all over with tarred paper held to place with strips of boards nailed on here and there.

You may imagine that John felt quite strange as he arrived at such a place as this, especially so as it happened that the men had just finished dinner and were at that moment sitting or standing around here and there outside of the camp, picking their teeth with broom-straws. They immediately began to size him up and talk of how easy he'd go up in a blanket. Tired and trembling, our ambitious farm boy walk straight to the foreman's office and asks for a job. The foreman, a rough yet good natured old fellow, asks him what he can do, at which John is in such a state of mind that he scarcely knows what he can do, and therefore answers, "I don't know." The foreman sees his trouble and brings out his point more clearly by naming a few lines of work in which there are vacancies.

"Can you saw, chop, load, drive horses, or drive oxen?"

"I can't saw, nor chop, nor drive horses, nor load, but I kin drive oxen."

At this answer the foreman resolves to try him with the ox team, but not before asking him another question.

"Sir, did you ever use profane language of any sort?"

"N-no, ma allers licked me when I swore, so I kind of got out of the habit of it."

"Well, then, my boy, you can't drive oxen! I'll try you though if you are willing to work on the road."

This is agreed upon and after John has eaten his dinner he goes at his task like a man. From this time on he is called "road monkey," which is considered by all lumbermen the lowest possible form of work.

I might trace this character from this position through all his promotions, until at last he reaches the coveted goal of the lumberman—"ox-teamster," when he has nothing to do but walk around after an ox team and "holler." I might tell how he spends the long winter evenings in sitting by the camp stove telling the tales of his past adventures; but that would involve another story.

At the College.

Mrs. G. W. Osborne of Grand Rapids is visiting her sister Mrs. M. L. Dean.

Mr. Takvourian has presented the library with a volume of Armenian poetry.

Mrs. Young of Portland has visited her daughter, Mrs. Chase Newman.

"Insect Parasites of the Domesticated Animals," is the subject of A. J. Cook's thesis.

A. G. Bodourian '00, has been for several days at the hospital having a tussle with the "grippe."

H. B. Gunnison has been on the sick list. He received a visit from his father and mother last Friday.

The father of C. A. Wood died at Jackson last Thursday from gangrene, resulting from a broken hip.

The M. A. C. chorus is now planning to give "Columbus" the second Friday evening of next term.

The Experiment Station has just received and set up a new two hundred and twenty egg Cypher's hot air incubator.

President Snyder and Professor Frank S. Kedzie attended the annual dinner of the Chicago M. A. C. Alumni Association on Saturday evening.

D. W. Trine '92 State Inspector of Nurseries, has been secured to take charge of a part of the laboratory work in the Horticultural Department during the spring term.

The Horticultural Department has received the silver medal awarded, at the Philadelphia meeting of the American Pomological Society, to the South Haven Sub Station, for "Its interesting educational exhibit".

Two employees of the college were discussing horses recently. One remarked, "It *does* seem as if some horses know more than their drivers." "Very true," replied the other, then added innocently, "*I* owned a horse once."

L. B. Littell, '01m, left college for his home on Tuesday last on account of sickness. A letter just received from him states that he is suffering with an attack of jaundice, and that he does not expect to be back for several days.

Professor Weil has one of those new-fashioned two-foot rules, whose joints, with much use, have all become double-back-actioned. He declares it's a "pretty good rule." When asked "why" his answer is "It's a poor rule that won't work both ways."

Mr. Ira O. Johnson, the progressive milk-dealer and producer of Grand Rapids, is at the College taking laboratory work in dairy bacteriology and hygiene. Mr. Johnson has done much in the State towards advancing the question of pure milk supply to cities, and has successfully carried his ideas into practice.

The next regular meeting of the King's Daughters will be held March 7th at the home of Mrs. Vedder. Lesson, Luke II, 41–52. Text word "Search." Leader, Mrs. Weil. The annual election of officers will take place; a full attendance is desired. This is pound week. All friends of circle, or those interested in the work, will be welcome.

Graduates and Students.

Fred O. Shattuck, with '85, is in charge of the office work of C. L. Greeno, upholstery goods, etc., 325 Main St., Cincinnati, Ohio.

Arthur Lyon, with '01, is spending the winter at Montgomery, Ala., where he hopes to soon be rid of a throat trouble. He intends also to do some business for the Hugh Lyon Co.

Jos. A. Bulkeley '99 left M. A. C. for New South Wales, Australia, the 20th of last June, going by the way of Liverpool, Wales, London, Gibraltar, Naples, Suez Canal and thence to his home, where he arrived the last of September. After spending a little time in writing a report of his European trip for his department, he entered upon his duties as lecturer in agriculture in Hawkesbury Agricultural College.

The following from *The American*, Manila, P. I., of January 25th, will interest the friends of Robert S. Welsh, '94: "On January 18th Lieutenant Welsh with a detachment of Company M. of the 39th Infantry, cautiously approached an insurgent outpost about three miles from Santo Tomas, and cleverly surrounded the rebels before they knew that there was an American near. The *insurrectos* were so surprised that they surrendered without firing a shot."

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News from Graduates and Students.

Dr. Wilber I. Powers '85 is now located at Billings, Montana.

E. H. Bradner '69 is principal of schools at Elgin, California.

Carl Babington, with '01*m*, made the College a short visit recently.

Ray S. Baker '89, with McClure's, expects to sail for Paris March 16.

Charles W. McCurdy '81 is superintendent of schools at North Yakima, Washington.

A. B. Clark with '99, of Grand Rapids, called at the College last week.

Arthur D. Baker, '89, Lansing, reports the birth of a son, on the 2d inst.

D. E. Hoag '99*m* is now draughting for the Northern Engineering Works, Detroit, Mich.

Frank F. Stephenson with '96 is a student of medicine at Detroit Medical College, 225 Harrison ave.

Leander Burnett '92, who went west a few weeks ago to look up a position, not liking the prospects, has returned to Lansing.

J. L. Kendrick, with '01, will engage in assaying for the Rock Lake Copper Mining Company, located east of Sault Ste. Marie.

W. G. Armstrong with '02 is teaching near his home, Berrien Center. He regrets very much that he was not able to return to college this year.

J. T. Berry '96 is at Bemidji, Minnesota, in the postoffice. He was six months recovering from the slight lung trouble he had when he left Michigan.

Waldo E. Rohnert '89 a prominent seedsman of Gilroy, California, writes that his business has encreased 500 per cent. due to training received at M. A. C.

Prof. W. A. Taylor, '88, assistant pomologist of the U. S. Department of Agriculture, sails for Europe March 7. He will have charge of the American fruit exhibit at the Paris Exposition.

Prof. P. G. Holden, '89, for several years assistant professor of agriculture in the Illinois University, has resigned. He is now field superintendent for the Pekin, Ill., sugar factory.

V. H. Lowe, '91, who has been studying at the University of Chicago during the winter, expects to return to his work in connection with the N. Y. experiment station at Geneva in April.

Miss Mildred L. Newell with, '02*w*, who is living with her brother (724 W. Court St., Cincinnati, Ohio) writes that she enjoys her new home and is going on with her music in the conservatory there.

Miss Eva J. Gray with '02, has resigned her position with B. F. Goodrich & Co. of Akron, Ohio. She is now a student of art and clay moulding at Throop Institute, Pasadena, California. She thinks there is no place like M. A. C.

Fred J. Kling, with '98*m*, is an employe of the Bullach Electrical Manufacturing Company, of Norwood, Ohio. He states that he finds the M. A. C. training very valuable both in the shops and in enabling him to keep in touch with the mechanical and electrical publications.

Miss Dunston, a former student, accompanied Mrs. Haner to the Institute at Ann Arbor.

R. A. Clark, '76, 331 Fourth Ave., Pittsburgh, Pa., is general agent for the Phœnix Mutual Life Insurance Co., of Hartford, Conn. He has issued a leaflet "Did it ever Occur to You?" setting forth the benefits of life insurance.

M. H. Lapham '99 writes from Washington, that he enjoys his work in connection with the U. S. Dept. of Agriculture Division of Soils very much. He and L. J. Briggs '93 work in the same laboratory room. Like every true son of M. A. C. he is very grateful to his Alma Mater for all the opportunities he received at her hand.

Oscar B. Hall '93, is a physician at 209 N. Holden St., Warrensburg, Mo. He writes, "I rejoice in the progress M. A. C. has made during the past few years; she is abreast with the times as her wide reputation indicates; one to whom her sister colleges can look for advice and guidance; one does not need to remain in Michigan to learn of her."

William Edward Rydalch, who will represent the University of Michigan in the annual debate with Pennsylvania, was a special student at M. A. C. in the summer of '93. He hails from Utah, was a friend of Partridge and Horne '96, entered the U. of M. law school in '98, and will graduate next June. In 1899 he won a place as alternate on the team that defeated Pennsylvania at Ann Arbor.

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