

The M. A. C. Record.

VOLUME I.

LANSING, MICHIGAN, TUESDAY, APRIL 7, 1896.

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THE FARMERS' MARKET.

Editor Record:

I noticed in the M. A. C. RECORD of February 4 a paper read by James Y. Clark before the Farmers' Institute held at Pontiac, entitled "Prospects of the Young Farmer."

He strikes the key-note when he says that "The great question is, not how to produce more cheaply, not how to increase production, but how to market better that which we already produce. The only remedy for the present ills of agriculture lies in the direction of education and organization." Farther on he says "We have arrived at a juncture in our history where the very instinct of self preservation calls for organization for the daily support and protection of the farmer in his social and business life."

To meet the demands of the hour allow me to suggest the following plan for marketing the products of the farm and garden, hoping that this or some better one may speedily find favor.

First, of course, there must be organization; the Grange or Farmer's Club would do. It would not be necessary for all farmers and gardeners to be members of the club, but they should be controlled by it.

A suitable market place with store-room, refrigerator and elevator would in time need to be provided, charging a fee, say, of 10 cents per load. All products could then be brought to the market and put on sale, while the owner returns home to attend to his business.

The way to get started is to begin. Organize if you have not already done so. Then for the first year take some one article and see what can be done. Take tomatoes for instance—in Bay City last year we sold them as low as 8 cents. Hold them at 25 cents (the consumer would feel perfectly satisfied with that price), get all the growers to bring them to the market place. Instead of getting up at 3 a. m. and standing around the market all the forenoon, take them up the night before getting your pay the next night when you deliver another load. If only three-quarters of the whole amount brought in is sold, you only get pay for three-quarters of what you brought in, and in case of glut in the market take home your share of what does not sell and feed them out.

Let us see if this would pay. Say for the season that 12,000 bushels were marketed, but only 10,000 bushels sold at 25 cents, bringing \$2,500 instead of selling 12,000 bushels for \$960 (8 cents per bushel), making a gain of \$1,540. Would it not be worth a trial? But some one says, "You might not sell over half the 12,000 bushels." Well, let us see, 6,000 bushels at 25 cents would give \$1,500 and the other 6,000 bushels taken home and fed is certainly worth 5 cents per bushel, which, added to the \$1,500 would make \$1,800, still a gain of \$840.

At the end of the year we would know the amount we have been able to sell. During the winter each grower should send in to the office an estimate of the acreage he intends to plant, and footings made and the amount, with the amount sold the previous year, sent to each grower, or, better still, look about for increased sales. When well started have canning and evaporating establishments for all overproduction.

With some such organized effort we would not be tumbling over each other trying to market tomatoes at 8 cents, sweet corn at 2 cents, cabbages at 4.50 per ton, and other things in like proportion, or less.

Prices of farm products at present are a matter of sentiment. Reports come in that we have raised a very large crop of potatoes, and the sentiment obtains that potatoes will be very cheap and so they are. If a man raised 1,000 bushels last year he would have to grow 4,000 this year to get the same amount of money; but that is not the worst of it, some cannot sell at all at any price. Last year we raised about half as many as this year and had about enough, so that if a farmer had 1,000 bushels last year he would get \$750, this year he has 2,000 bushels but can only sell 1,000 at 15 cents or less and gets \$150.

I could make some strong exclamation but will only ask: Are our heads made of wood? Where are we at anyway?

J. B. STEVENS.

Essexville, March 17, 1896.

AN ACCURATE THERMOMETER.

C. F. SCHNEIDER ('85) DIRECTOR WEATHER SERVICE.

Some time ago our office was visited by a gentleman who brought with him a thermometer and asked that it

be compared with the standard instruments with which every Weather Bureau office is equipped. The instrument was of a kind which is familiar to many a household—about eight inches long, mounted on white metal and this mounting supported in a japanned back. The visitor explained that he was curious to know if it was reliable because he used it in determining the temperature of his incubators. Comparison with our thermometers developed the fact that it had an almost constant correction of about +10 degrees; that is, it constantly read about 10 degrees too low; yet he said that it had hatched chickens very successfully.

Using this instance as a sort of a text, a few words about thermometers and their exposure has been suggested. In the first place a good and reliable thermometer cannot be obtained for less than about \$3.00. The thermometer should be filled two years before being used, so that the molecular changes in the glass which are so productive of errors, shall take place before graduation of the stem. In other words glass undergoes a "seasoning" process much the same as wood, although the change is much less and slower. After the thermometer has been laid away for about two years it goes through the process of calibration, which is the process of determining the proper location of the various degree marks on the stem. The boiling point (212°F) and the freezing point (32°F) are first ascertained by subjecting the instrument to the temperature of the boiling point (at normal atmospheric pressure at mean tide level) and to the temperature at which ice from distilled water melts under standard atmospheric pressure. Due reference to standard atmospheric pressure is necessary because the boiling point, particularly, varies greatly at different altitudes, as for instance the boiling point at Pikes Peak—elevations of 14,147 above mean tide—is about 186°F instead of 212°F which obtains at New York City. Stanley, the great African explorer, verified and obtained many of his altitudes by the boiling point.

After the freezing and boiling points are fixed on the stem of the thermometer the successive degree markings are made. Here again errors have to be guarded against which arise from the bore changing its diameter from point to point unless suitable allowance is made for this graduation by putting the marks closer together in some places and farther apart in others. A small part of the contents of the tube is made, while at a constant temperature, to occupy different parts of the bore; its varying lengths in different places in the bore indicate how the graduations should vary.

Thermometer exposure is another very important factor. All Weather Bureau thermometers are exposed for the sole purpose of obtaining the *real temperature of free air*, therefore they should be placed in some open space, and where the circulation of the air is entirely unobstructed. They should not be placed simply in the open air but should also be protected from free exposure to the sky and direct rays of the sun. By the Weather Bureau this is accomplished by the covered instrument shelter, which protects the thermometers from the direct and reflected rays of the sun and the radiation to and from the sky.

With this brief explanation of the time and care necessary to construct an accurate thermometer and a short allusion to its proper exposure it is easy to see why little dependence can be placed on the ordinary thermometer (often with a "storm glass" attachment) which is frequently found hanging on the "side porch." It is also interesting to note the cause of the many criticisms of official temperatures which are often made in the summer time when it is imagined by some that the air is much hotter than the official thermometer would show. This is caused by the humidity or amount of moisture in the air. In warm weather the greater the amount of moisture in the air the more oppressive is the effect on the human organization because it loses its animal electricity quicker and easier. For instance on a May afternoon with the temperature ranging from 80° to 85° and the relative humidity ranging from 80% to 90% the weather is close and oppressive, the least exertion causes the sweat to issue from every pore; the poor mortal in want of sympathy calls up the Weather Bureau, asks what the temperature is and has his faith greatly shaken in official methods and equipment when informed that the temperature is but 85°, when according to his feelings it should be nearly 100°. On the other hand a temperature of 95° with a low humidity is much less depressing.

ABOUT SPENDING A VACATION.

J. M. BARNAY, '98 m.

Returning after the long winter vacation, spent in practically applying the knowledge which it is the province of the mechanical course of this college to impart to its students, I always resume my work of the course with renewed energy. This will be readily understood by those who have spent their vacation under similar circumstances.

The progress in the mechanical world during the past year has been very marked. As a result of the increasing competition among bicycle manufacturers, machine tool makers are vying with each other to produce machines that will do the largest amount of work in the shortest time. They have already attained a degree of perfection that is simply marvelous.

Let us consider, for instance, the "automatic hub machine," as it is called. The Warner & Swasey Co. of Cleveland, O., in whose shops I have spent my vacation, is building one of the best machines of this type. Extreme rigidity in construction is necessary, for upon this depends the life of the forming tools. So we find the machine of very heavy build, with the cone mounted on a hollow spindle which will permit round steel up to two and five-eighths inches in diameter to pass through it. On the head end of this hollow spindle is the powerful split chuck designed to withstand the enormous pressure exerted by the wide forming tools. This chuck is operated by a turnstile, engaging with rack and pinion, fastened on rear part of the bedframe just under the spindle, and imparts its motion to a hollow plunger free to slide within the spindle. By this arrangement the power of the operator is many times multiplied. The forming tools are carried by a very substantial tool carriage forming an arch over the machine bed and attacking the stock from three sides, while permitting six other tools fixed in the revolving turret head of the machine to operate upon the end of the stock. The machine has automatic feed, with automatic stop, and an oil pump to keep cutting edges well oiled. The machine will turn out finished bicycle hubs made from a solid bar of steel two inches in diameter at the rate of six minutes per piece, or about one hundred pieces per day of ten hours. The fact is not to be lost sight of that at this rate the tools do not require grinding until after about 3,000 pieces have been turned out by the machine. Truly wonderful, if we consider that a very few years ago the same article represented more than a half day's work, and required four or five separate operations. What young student wouldn't grow enthusiastic in the face of such exhibitions of the designer's ingenuity?

It is in working amidst such surroundings that we are best able to judge the direction in which improvement is necessary, and to judge what part of our college education requires our particular attention or to discover any deficiencies in our knowledge of mechanical matters such as may be supplied during the months of study following. These are some of the reasons that lend me the renewed energy on my return.

The benefits, then, that a student may derive from a vacation spent in practically applying the principles he has learned during the nine months of the college year I consider almost incalculable. Let every mechanical student who intends to follow mechanical engineering through life try it, and he will never again find himself undecided as to the best way of spending the vacation. Let him remember that in order to become successful mechanical engineers a little more is necessary than a passing interest in his studies while at college.

I wish to refer, before closing this article, to Mr. Nicola Tesla, the young electrician who established his fame by the great work of designing the electrical equipment for the power station at Niagara Falls, and who gave to the world the high voltage electric generator. Coming from parents of limited means, passing through college and working his way independently up to fame and the enviable position he now holds, his life affords a good example to all young men striving toward the same goal.

The example of Nicola Tesla has particular force with our Mr. Barnay, for they are fellow countrymen, both being natives of Buda-Pesth.—ED.

The writer of "The Farmers' Market" is a son-in-law of M. A. C. Miss Sarah E. Wood of the class of 1883 is Mrs. J. B. Stevens.

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SHOP VISITS.—Familiarity with machinery can only be acquired by direct examination of machines. Not only is it difficult to comprehend fully the details of machines from a study of text-book illustrations, but, also, in this progressive age text-book illustrations soon become antiquated. In order that students may become acquainted with the details of various classes of machinery, the best shop arrangements and the more recent engineering practice, it is customary in the many engineering schools to supplement the regular work by visits of inspection to prominent engineering establishments in various parts of the country.

While we at M. A. C. are particularly fortunate in regard to machine equipments, also in the privileges accorded us with respect to inspection and testing by a number of the industrial concerns in this vicinity, still, in the opinion of the writer, it is particularly desirable that the students in the mechanical course should undertake, in connection with their regular work, to visit more distant points for purpose of inspection. We believe, for instance, all mechanical students will appreciate the value, in connection with the college work, of a trip that would include the inspection of blast furnaces and accessories, rolling-mills, rolling mill engines, and so on.

We recommend that our students consider the undertaking of such visits of inspection during the coming summer vacation.

ENGINEERING EXPERIMENT STATIONS.—A bill was recently introduced in the senate of the United States providing for the establishment of engineering experiment stations in the "land grant colleges" of the various States. The object is to promote scientific investigation, engineering research, and experimental testing for the best interests of the government and the industrial development of the States wherein such stations shall be located. The bill provides for the publication of bulletins, and, to some extent, for the supervision of engineering inspection and the granting of engineers' licenses.

AT THE COLLEGE.

Student labor began yesterday.

Miss Grace Fuller, '91, called at M. A. C. last Thursday.

Gerritt Masselink returned to Cass City last Thursday morning.

Dr. Grange went to Traverse City last Friday, returning Saturday.

Baseball game last Saturday with U. of M. at Ann Arbor resulted 20 to 6 in favor of the University.

Chace Newman, clerk for the Mechanical Department, has been visiting for several days in Grand Rapids.

The Western Union Telegraph Co. is constructing a line to the college from the Grand Trunk line along the west side of the college farm.

The next meeting of the "Try and Trust" circle of King's Daughters will be held at the residence of Mr. Thos. Gunson on Tuesday, April 14.

The meeting of the M. A. C. Grange, which was postponed last Friday evening on account of Mr. Orth's lecture, will be held on Friday evening of this week.

The Browne and Sharp Mfg. Co., of Providence R. I., have donated to the mechanical department twenty-five copies of their new catalog and a twelve inch steel scale.

Mr. Eli Minch, Bridgeton, N. J., writes to the Experiment Station: "Thanks for your most able strawberry report—concise, full and practical. Michigan reports are certainly the most valuable I receive."

On Wednesday evening, April 1, Prof. Babcock was called to the Howard Terrace phone and asked if he could find the log cosine of a fricasseed chicken. He has not yet been able to find it in Jones' logarithmic tables.

Prof. Taft left last Thursday for Hartford, South Haven and Kibbies. At Hartford he will look up the

matter of irrigation, and at Kibbies he will start some experiments with fungicides and insecticides for diseases of the peach.

Through the kindness of several other departments of the college, the laboratory work in Bacteriology will be carried on with much greater facility than was at first anticipated, as a number of microscopes have been loaned to Dr. Grange by them.

Mr. E. C. Smith, business manager of the Pontiac Asylum, looked over our college last Friday. Quite extensive changes and repairs are contemplated in the asylum barns, and for that reason Mr. Smith gave especial attention to our barns and herds.

On Wednesday a meeting of the M. A. C. Republican Club was held and the following officers elected: S. B. Young, Pres.; J. D. McLouth, Vice-Pres.; S. H. Fulton, Sec'y; C. H. Briggs, Treas.; C. C. Pashby, B. A. Bowditch, C. A. Jewell, Executive Com. Mr. Bowditch was elected as representative to attend the meeting in Chicago, April 3, 1896, of the National Republican College League and left for Chicago Thursday night. The membership now numbers over 100. Arrangements are being made to have several lectures on the political questions of the day by prominent men throughout the state.

The Bachelors have inaugurated after-dinner entertainments, which are held in their club rooms on Saturday evenings. On the evening of March 28 the following program was rendered: Piano solo, Miss Brush; "The College Now and Twenty Years Ago," A. A. Crozier; Debate, "A course of lectures would be more beneficial to the students of this College than a course of Concerts." Affirmative, Messrs. Newell and Hoyt, Negative, Messrs. Howe and True; The Last Word on Athletics, D. J. Crosby. After the literary program warm sugar was served. The next entertainment will occur on the evening of April 18.

NEWS FROM GRADUATES AND STUDENTS.

John Whitten, with '97, is studying law in Lansing.

E. A. Hayden, with '94, is now teaching at Helena, Mont.

Will G. Merritt, with '93, is doing chemical work at Lewis Run, Pa.

East Helena, Montana, is now the abiding place of Peter V. Ross, '95.

Will Bristol, with '83, visited the college March 29, on his way to Shreveport, La.

John Nies, '95, m., is doing construction work for the Holland Electric light plant.

Bert Cook, '93, who has been very ill for over two months, is again able to be out.

The Republicans of Grand Haven have nominated R. M. Kedzie, with '93 m., for city clerk.

Adam F. Foster, with '92, is with the Grand Rapids Engraving Co. as bookkeeper and stenographer.

Zachary Veldhuis, sp. '93, graduated from the veterinary department of the Detroit Medical College April 2.

C. H. Hoyt, '85, is now working for the Detroit Graphite Co. with headquarters at 162 Chestnut St., Cleveland, O.

E. A. Holden, '89, and the Perry brothers, one of whom will enter M. A. C. next term, were visitors at the College last Thursday.

L. H. Baker, '93, teacher in the Galesburg schools, spent his vacation with his parents in Lansing. He called on college friends one day last week.

H. B. Fuller, '92, principal of Lewiston schools and commissioners of Montmorency county schools, spent last week's vacation in Lansing and vicinity, and made the College several visits.

A. T. Cartland, with '96, who is at present in Allegheny College, Meadville, Pa., writes to know what credits he can get from Allegheny at M. A. C. He wants to return and graduate with '97.

Roy C. Bristol, '93, is now with W. L. Holmes & Co., musical instrument dealers, Lansing. Frequently the city papers making mention of social gatherings close with some such expression as this: "Excellent music was furnished by Prof. Bristol."

Bulletin 111 by Prof. Bailey, of Cornell Experiment Station, contains an account of experiments by Waldo E. Rohnert, '89, who undertook to produce new varieties of sweet peas by crossing. Mr. Rohnert is with C. C. Morse & Co., seedsmen, Santa Clara, Cal.

E. Noyes Thayer, '93, m., and Warren Maxfield, '93, board at 716 W. Polk St., Chicago. Maxfield graduates in 1897 from Rush Medical College. Thayer works for

a large engraving company—the largest in this country. They will be glad to see all M. A. C. men.

G. D. G. Thurston, who attended M. A. C. in 1858, when the college first opened, is a Jersey cattle breeder, agricultural implement dealer and farmer at Sturgis, Mich. Sheridan Osborn, now a farmer at Sturgis, was also in the same class with Mr. Thurston.

The Horticultural Department has received from Prof. U. P. Hedrick quite a number of Chinese and Japanese flower and vegetable seeds. The flower seeds have been planted in the forcing house, and as soon as warm weather comes the young plants will be transplanted to beds in the open air. The vegetable seeds will also be planted soon.

I. B. Sweeney, with '89, is located at Burrows, Mich. He says: "There are 90 acres in the old homestead and 166 acres in the farm which brother Ed. and myself own. We have been following mixed farming. Fed 75 lambs the past winter. We are going into dairying and breeding registered Jersey cattle. We have five registered Jerseys on hand, having sold a St. Lambert bull to Flint parties lately."

"I am almost isolated from my old associates and friends at M. A. C., having met but one of the alumni in St. Louis in the past five years. If any of the alumni, students or faculty, or any of my friends should ever pass this way they will receive a hearty welcome, and find that the latchstring always hangs on the outside."

PERRY G. TOWAR, '85,

Central Cycle Co., Y. M. C. A. Building.

St. Louis, Mo.

A most delightful party was given on Monday evening by Mrs. J. H. Wyckoff in honor of Miss Daisy Champion, of Lansing. Mr. and Mrs. Wyckoff had prepared a large number of very interesting games—many of them new to Trentonites—and for the time being all present imagined they were young again. "Roman scandal" was so like every day scandal that every gentleman who participated registered a vow never to gossip again. Might tell some very amusing things that happened but won't. At eleven o'clock ice cream and cake were served, after which a pig drawing contest resulted in Mr. Harrison's capturing the first prize, while Capt. Sterns accepted the booby prize.—*Trenton Visitor*, April 3.

Many of our readers will remember Guy Van Alstyne, whose father a few years ago kept a restaurant in this place. We have lately heard a scrap of his history since he left here which illustrates the possibilities for other boys. Guy went to Grand Rapids, where he obtained a situation in a hardware store at small wages. But he was faithful and frugal. After a little time he went to Lansing with his small savings and worked his way through a term at the Agricultural College. Then he became a canvasser for the Grand Rapids *News*, and saved enough to take another term at the college. Now he is court reporter for the *News*, and is highly esteemed both by his employers and in society. That's the result of the motto—Business rather than fun.—*South Haven Messenger*.

CORRESPONDENCE.

MANKATO, MINN., March 28, 1896.

To the Editor:

DEAR SIR—I have been recently receiving copies of the M. A. C. record, and am pleased to learn of the great growth and magnitude of the College, where I once, in its infancy, was a student.

The recommendations of the Faculty to obtain the war records of its graduates is certainly most wise.

I was associated with Gilbert A. Dickey during his entire service in the army, first in Capt. Howland's company of engineers, which went out under Gen. Fremont. In that company eight students enlisted, Dickey, Prentiss, Clute, A. F. Allen, Beebe, Benham, my brother Thomas and myself; but we were soon discharged, as we were improperly organized, and when Gen. Fremont was relieved from the command of the Department of Missouri, we were retired. The system of signals by means of flags introduced in the army by this company was retained and became of great value to the service. As I remember this part of my service in the army it seems like a fine rollicking outing. Good company, little but pleasant duties, swinging of flags and riding over the beautiful prairies of southern Missouri. Dickey was the first sergeant of this company and here obtained that knowledge of the commissary department that was so useful to him as commissary sergeant of the 24th Michigan Infantry.

In August, 1862, we both enlisted in the 24th, he in the regimental non-commissioned staff and I, as first sergeant of a company, had ample opportunity to become familiar with the difficulties and perplexities of his position of supplying rations for a thousand men.

There was never a word of fault found with his work in this department, either by officers or hungry privates. His faithfulness in this work soon earned him promotion to second lieutenant of company G; this position gave him more leisure and I saw more of him than before. He became a most excellent drill master.

You are mistaken; he did not fall while storming a redoubt at Gettysburg, but was shot and instantly killed while we were maintaining a difficult line of battle without breastworks and were attacked by overwhelming numbers of the rebels. My position was near the right of the line; Dickey's on the left. During the lull before the attack I went down and had a talk with him and was probably the last person that engaged him in friendly conversation. I found him reading his Bible. We talked a few moments and looked at the lines of the enemy filing through the timber and preparing for the advance. We said "good-bye" and I returned to my post and soon came the shouting rebels and poor Dickey was no more, and I, wounded, was finding my way to the rear.

Two years ago I was at Gettysburg and visited his grave in the shadow of the government monument.

I am, respectfully,

GEO. W. HAIGH, with '62.

AGRICULTURAL COLLEGE, March 23, 1896.

To the Editor:

In the winter of 1889 was held, in Lansing, the first reunion of the Central Michigan Agricultural College Reunion Association. Whether this association died on account of its long name or from some other cause, has not been learned. No second meeting has been held.

By the advice and consent of John J. Bush, '84, the president elect for the second reunion, and Jessie I. (Beal) Baker, '90, the treasurer elected for the same meeting, I am authorized to turn over the small balance in the treasury to the Alumni Association of this college. The amount was \$8.31.

At the last reunion of alumni there was an unpaid bill due the treasurer of \$6.50. This would leave a balance of \$2.81; to this I put in interest (approximately correct), \$3.00, making a sum of \$5.81.

W. J. BEAL.

ASH OF WHEAT FLOUR.

R. C. KEDZIE.

A writer in a recent number of the *Journal of Hygiene* advocated the breeding of wheats to secure a variety which would be so rich in albuminoids as to be a complete food in itself, and require no addition of meats and other foods rich in nitrogenous material to completely nourish the human body. No such wheat is known, or to be expected in the immediate future. Indeed the improved methods of milling, where the whitest flour is sought, seems to be a movement away from highly nitrogenized bread, as the patent flours are poorer in gluten than the flour made by the old Buhr-stone mill. At the same time these high grade flours are deficient in the ash elements of food, which not only nourish the muscular and nervous tissues, but contribute to the formation of the bony structures, teeth, etc. The chief ash ingredients of flour are the phosphates, being about 96 per cent of the ash.

Nineteen years ago the most of the milling done in this State was with the Buhr-stone mills. The Hungarian steel roller process was just beginning to be introduced in the State. At that time (1877) sixteen specimens of flour, from thirteen different kinds of winter wheat, ground in the Buhr-stone mills, were analyzed in this laboratory. The percentage of ash in these flours averaged .64 per cent. The average of numerous analyses of American flour, made by the Department of Agriculture, quoted in Battershall's Food Adulteration (1887), gives .54 per cent of ash. The ten years between these two sets of analyses witnessed the general introduction of the steel roller process, and we may assume that the latter set of flours were made by the new process of grinding. The significant fact stands out that there is a falling off of .10 per cent of ash in the flour. Jago, in his chemistry of wheat, flour and bread, states that the average ash in European flour is .40 per cent. The ash in the highest grade of Minnesota patent I find to be .39 per cent, and in the patent flour from Buda-Pesth wheat, .50 per cent. The ash in thirty samples of winter wheat raised in Michigan averages 1.77 per cent, while the average of 260 samples, analyzed by Department of Agriculture, is 1.84. The bran contains the largest proportion of ash, and most of the ash is separated in making the whitest flour. Some of these rejected portions of wheat (aside from bran) would seem to be well adapted to nourishing the human body, instead of being used for cattle feed. Thus in the analysis of wheat grits recently I found 1.20 per cent of

ash, or nearly double the amount found in fine flour, and three times the amount in choicest patent flour. It is possible that the process of refinement in making wheat flour has been carried to an excess, and not enough of the ash-containing materials retained for making the strongest food.

Chemical Department.

THE COLLEGE HERD AND THE TUBERCULIN TEST.

PROF. C. D. SMITH.

In former ages one of the most dreaded diseases was small-pox. Gibbons tells us that this disease decimated the population of whole provinces and covered nations with a thick cloud of dread. The discovery of vaccination has dispelled the gloom and almost entirely eliminated the fear of this disease.

In modern times consumption has taken the place of small-pox. It is more sinister, more covert in its approach, more stealthy and unrecognized in its work, yet equally fatal in its results. No sudden inflammation or other outward manifestation marks its attack. Its approach, because unknown, is the more dreaded.

Because of these facts public attention has been of late largely drawn to this disease. Scientists tell us that it is due to the presence of a specific germ, an organism so minute as to require the aid of the most powerful combination of lenses in the microscope to demonstrate its presence. Expert bacteriologists have also shown that the disease may be conveyed from one animal to another through the milk, or the meat, or even through the dust left by the dessication of the sputa falling upon the floor. It became, therefore, a prime importance to the consumer to know whether the animals which furnished him with milk or meat were victims of this disease. Veterinarians had learned years ago that the outward appearance of the animal was not a safe criterion as to its health. Tuberculosis might be present in a dangerous form, and yet the animal afflicted give no outward manifestation of the disease. The discovery of the tuberculin test has placed in the hands of the veterinarian a diagnostic agent which can be relied upon in a very large per cent of cases to tell whether the animals to which it is applied have or have not the dreaded disease. It is not my purpose here to discuss the efficacy of the test. As soon as its usefulness had been demonstrated, public institutions all over the land began to test their herds. Private individuals were not slow to follow, and, indeed, in many cases they led in the work. The results were surprising. Wealthy gentlemen with pampered herds, kept in close confinement, in warm and often illy ventilated stables, found, to their intense surprise, that their sleek, fat, and apparently healthy and vigorous animals, were badly afflicted with tuberculosis. The herds of colleges and experiment stations, of asylums and of other public institutions were not exempt. Reports are current of the destruction of whole herds of highly bred and valuable thoroughbred cattle, and the institutions are few whose large herds well fed and well housed stock have entirely escaped.

The college herd at M. A. C. has been carefully selected with the single purpose of gathering together, for illustration to students, the best specimens obtainable of the most important breeds. In the care of these animals great pains have been taken never to pamper, but to allow plenty of daily exercise and an abundance of sunlight. Our Holsteins have been fed as near the upper limit of their capabilities as the combined judgment of the superintendent of the farm and the herdsman would permit. During the past winter the Jerseys have been accorded the same treatment. The beef breeds, the Shorthorns, Hereford and Polled Angus have been kept in good healthy condition, have not been overfed, and have been compelled to take daily vigorous outdoor exercise. The presence of tuberculosis in the herd has therefore not been suspected. It was deemed wise, however, since the return of Dr. Grange from his winter's work at Ann Arbor, to thoroughly test the whole herd, that any shadow of doubt might be removed. Fifty-seven animals have therefore been tested.

The temperatures were taken during the day and early evening of March 31st, and the hypodermic injection of the tuberculin made on the late evening of the same day. During the following day, the first of April, the temperatures were carefully noted at hourly intervals. The results of these observations formed the basis of the verdict of Dr. Grange as to the health or disease of the animals tested.

Beginning now with the Jerseys, of which the college owns ten, and which had been subjected to the highest feeding of any of the herd during the winter, we were rejoiced to find that the relentless veterinarian condemned but one calf. Of the Holsteins, of which the college owns 13, among whom must be mentioned our

matchless trio, Belle Sarcastic, Houwtje D. and Rosa Bonheur 5th, but one was condemned, and that, to our intense sorrow, was Rosa Bonheur 5th. Belle Sarcastic, Houwtje D., Oatka, College Houwtje, and all the rest of our noteworthy milk givers of the Holstein family, escaped without a shadow of suspicion. At this we were greatly rejoiced, but our joy is tempered by the misfortune to our motherly and phenomenal, Rosa Bonheur 5th. Of the Shorthorns, which number 17 in the college herd, Mysie 44, her two months old calf, and college Victoria B. were condemned.

The Guernseys and our sole representative of the Polled Angus breed, end the list of thoroughbred cattle found diseased. Eight out of 52 thoroughbreds were found to be affected. Of the four native cows purchased for experimental purposes, one was found diseased.

It is needless, in conclusion, to discuss the results of the test, but two facts are so important that they cannot be neglected.

1. None of the dairy stock, which have been highly fed and carefully watched to make record, are diseased, with the single exception of Rosa Bonheur 5th.

2. The condemned Shorthorn, Mysie 44, is 14 years old, and is a relic of a former epidemic of tuberculosis on the farm.

To insure a perfectly clean bill of health, every animal which gave the slightest indication of the presence of the test by a rise of temperature ever so slight, will be tested again in the course of two months.

The condemned animals have been separated from the herd at once, and will, if the Board consents, be reserved in an isolated barn for such experiments as Dr. Grange may see fit to perform.

Experiment Station.

THE COOK ARCTIC EXPEDITION.

B. O. LONGYEAR.

Mr. S. P. Orth, of Oberlin College and formerly a student at M. A. C., gave a most interesting lecture in the chapel, Friday, evening, on the Cook Arctic Expedition. Mr. Orth went as botanist to this expedition and related his experiences in a very entertaining manner. The lecture was well illustrated by stereopticon views taken on the trip and saved from the wreck.

This expedition was organized to do as much work as possible in one season in making surveys and scientific collections in botany, zoology, geology, etc. The company was composed of thirty men, the largest expedition of its kind, and their ship used, the *Miranda*, was the first iron vessel ever used in Arctic exploration. The expedition started north in the spring of 1894, and it met first iceberg near St. Johns, Newfoundland. Near here came the first delay caused by the ships compass getting out of order.

Leaving St. Johns again, dense fogs and many icebergs were encountered and during one of these fogs the ship collided with an iceberg early one morning but no serious damage was done and the vessel continued on its way toward the north. A short stop was made on the coast of Labrador and after again returning to St. Johns the vessel started for Greenland. Reaching the coast of Greenland at Sukketoppen the party made a short inland expedition, finding game, and especially mosquitoes plentiful.

Starting north again the vessel struck a sunken reef and was forced to return to harbor, being able to float only by working the pumps. The ship was compelled to wait here for help while the members of the company made inland expeditions. A fishing schooner finally came to their aid and they endeavored to cross the straits but lost the *Miranda* during a heavy sea. The crew escaped on the schooner. Packed in among a cargo of salt fish they had to endure seasickness and were finally reduced nearly to starvation. After sailing six hundred miles down the coast of Labrador the vessel reached Sydney, Cape Breton Isl. At this place Mr. Orth with part of the company took passage on the *Portia* for New York. But one more event was to be added to this eventful trip. In a fog off Martha's Vineyard the *Portia* collided with a three masted schooner cutting it in two, and all but one of the crew going down. New York was reached without further accidents in the fall of '94.

Mr. Orth told many interesting things concerning the habits and customs to the Eskimo and related some amusing experiences with them. It is safe to say that all who heard him spent a profitable and very enjoyable evening.

Botanical Department.

Prof C. B. Smith and Miss Inez Beam, of Lawton, were the guests of Mrs. S. S. Wood the first of the week.—*Marcellus News*, April 3.

SOME NOTES ON LEVEE PROTECTION IN MISSISSIPPI.

W. L. CUMINGS, '93.

The bottom lands of Mississippi comprise nearly 7,000 square miles, or about four and a half million acres. This area is between the Mississippi on the west and a range of foot-hills that lies from 30 to 60 miles to the east. These hills approach the river at Memphis, and again approach it at Vicksburg, some 400 miles below. The area thus enclosed is termed the "Bottoms," the "Delta," or locally, the "Swamps," and is all alluvial land, much of it of recent formation.

In former years this whole area was subject to overflow, but now, owing to the completion of the levee system, it is fully protected. The present levees are the outgrowth of the protection levees built by the planters in early days. These were built by individual effort and their height and strength varied according to the resources of each planter. They were invariably built close to the river, for in the steamboat days, the river front was the most valuable part of the district. They followed the crooks and turns of this eccentric stream, in order to protect every acre possible that was tributary to the river trade.

The levees are now built and maintained jointly by the United States Government and the Levee Boards, which are associations of counties formed for that purpose. The latter raise the money by a certain percentage of all taxes on all lands protected, thus levying tribute to the base of the foot hills. The greatest system is used in the construction and maintenance, and where there occurred 20 years ago a low protection levee, perhaps 4 or 6 feet high, we now see a superb line from Memphis to Vicksburg, and averaging 12 feet in height. The standard levee now is one with 10 foot crown and 3 to 1 slope on each side, with top 3 to 4 feet above the highest known water, but even this is being improved on, and many engineers are adding a banquette, which is an artificial base on the land side for additional strength.

Necessarily the line follows the main course of the river, but all recently located lines are placed some distance back and no attempt is made to protect all the "bends" or necks as the outlay would be greater than the benefit. One can ride a hundred miles on one of the river boats and never see the levee in the whole time. Occasionally the banks of the river begin to cave, and in some cases the levee, that was once 2,000 feet from the bank, is undermined and destroyed. In such cases a new line or loop is built some distance back and connected with the old levee at safe points above or below the threatened place.

No wood or stone is used in the construction, in fact all wood is excluded as carefully as possible and the cost of masonry is prohibitive. The ground is first cleaned of all trees, logs, etc., all stumps are grubbed, and the base is well ploughed for this aids in forming a perfect union of the embankment and the base. All roots and limbs are removed from the dirt used for construction. The reason for this is obvious:—each root in decaying leaves a cavity that in time of high water may serve as a conduit and allow enough water to pass through to ultimately form a crevasse. In suspicious places muck ditches are dug before the levee is built and generally are near the center line. These are usually 12 feet wide on top and about 7 feet deep, and they are refilled with clean dirt, put in in shallow layers so as to ensure good tamping. They serve the double purpose of forming a more perfect union between levee and base, and also of exploration for hidden logs and stumps. I have seen a log forty feet long and five feet through, found six feet beneath the surface while the muck ditch was being excavated.

The land is uniformly higher near the river than in other part of the bottoms so the problem of drainage is not difficult. The main drainage outlet in Mississippi is the Yazoo river, which empties into the Mississippi near Vicksburg. Its tributaries ramify all parts of the bottoms and many rise within stone throw of the Father of Waters. It is thus easy to see how, without levees, this water during an overflow would extend to the foot-hills, perhaps sixty or seventy miles back. It is said that since the completion of the levee system, there has never been more than 3% of the whole area damaged by high water. It will be readily seen what an immense service the levees have rendered. Land has increased in value many fold, the health is better than before, railroads have entered the territory, new settlers are pushing in and new areas are constantly being opened up, all on account of the completion and maintenance of the levee system.

High waters are not of annual occurrence and several years may pass without the water touching the side of the levee. This is the third year that the river has not

been out of its banks. The next high water will be watched with intense interest by all residents of the delta and should be of interest to all residents of the Mississippi valley. Owing to the completion of levees on the western side, thus protecting immense areas in Arkansas and Missouri, the water will be confined as it never has been before. Instead of spreading back to the foot-hills on each side, it will be confined by the levees of each side, which will not average more than two miles from the river. Some argue that this confinement will raise the flood height so that much of the levee system will be destroyed, while others claim that the increased velocity due to the confinement will scour out the river bed and thus aid navigation interests as well as lessen future danger from overflows. Still others maintain that the river bed is gradually filling up and that the levees will have to be gradually raised until their maintenance will be so costly as to be prohibitive. Nearly all engineers, government and local, are not increasing the levee height, but are strengthening their lines and waiting for the verdict that will be rendered when the next high water occurs.

SMOKE RECORD.—The writer recently received a "marked copy" of the Electrical Engineer containing an account of tests made by B. R. T. Collins, a former classmate, of two types of smoke preventing furnaces located at the Harrison street station of the Chicago Edison Co. Undoubtedly the results of these tests will be of interest to all residents of the Campus, as the writer has heard many express a desire that the prevention of smoke should be undertaken at the college boiler house. We wish, however, to call particular attention to one feature of the tests, namely, the "smoke record," which was kept by means of instantaneous photographs taken at fifteen-minute intervals throughout each test by the official photographer of the Edison Company. C. L. W.

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