

# The M. A. C. Record.

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## Farmers' Club.

On Wednesday evening, February 20, the Farmers' Club listened to an interesting talk by Prof. U. P. Hedrick on "Irrigation in the West." Prof. Hedrick first gave a brief history of the practice. Irrigation has long been known in Egypt where the Nile overflows its banks, and in this country Southern California and Arizona furnish remains of ditches used by the Indians for irrigation purposes many years ago. Modern irrigation began in 1849 when the Mormons were forced west. July 4th, 1849, the Mormons came to Great Salt Lake with few provisions and scarcely any seed, but under the direction of their leader Brigham Young planted the few seeds and watered their crops by carrying the water in buckets. It was soon discovered to be much easier to dam the river and run the water to the crops in ditches, so this method was resorted to and the soil being very rich, good results were obtained.

Horace Greeley did much in the way of advancing the work, and it was through his influence that Greeley City, one of the greatest potato centers of the west, sprang up. The Greeley method for raising the money to build irrigation systems was by taxation, and this method is still used in Idaho. In Utah a stock system controls the water supply. In Colorado the state regulates the system, while in California it is conducted by private corporations who rent the canals.

The ways of getting water for irrigation are five in number: First, by diverting the water from streams and rivers; second, by pumping water from these by means of steam, electricity, turbine wheels, hydraulic rams, and syphons; third, by artesian wells, suitable for small areas; fourth, by reservoirs made by damming up ravines, etc.; and fifth by canals. These last are expensive, costing millions of dollars, but are very efficient, often extending a distance of fifty or sixty miles.

The actual irrigation takes place in one of three ways:—by means of ditches, which are undesirable because they waste water; by flooding the land, which results in some parts of the field getting more water than other parts; and by check basins. This last method is the most desirable. Among orchards still another method is used, the water being conducted along the sides of the trees by means of small furrows. Sub-irrigation has been tried but has not found favor. The amount of water used varies with the crop and season, but usually six inches will grow a good crop, or at most twelve inches. The time of irrigating depends almost entirely upon the crop. Orchards are generally irrigated in winter, summer crops about the middle of June. Cultivation should immediately follow irrigation, so the moisture will be retained and the ground prevented from baking.

There are many advantages offered by the irrigation in the west over the irregular rainfall of the east. By means of it frost can be avoided, and thus later vegetables made possible. It enables nursery

men to do more with trees because by regulating their water supply they can keep trees in shape to bud at any time. It also enables fruit growers to control fruiting periods. Care must be taken not to over-irrigate because it spoils the quality, and if stone fruits are irrigated when the fruit is setting it causes the pits to crack. Irrigation increases the size of crops, and with small fruits often two crops can be obtained. The cost of irrigation is ten to fifteen dollars per acre, and nearly every state has stringent laws regulating seepage, etc. While so important and successful in the west, irrigation could not be profitable carried on in the east, except in a small way, because of the unevenness of the ground and shallowness of the soil.

DON B. JEWELL.

## Those Quotations from President Eliot.

In the RECORD for Feb. 26 there were some quotations from President Eliot's last report which I had selected, because of the prominence and long experience of the author. I did not think it necessary to make comments, as the items were taken from his annual report and were expected to refer to Harvard University. So far as M. A. C. is concerned the quotations would only be applicable to students of about the middle of the junior year, because students below that rank here could scarcely expect to pass the entrance requirements at Harvard.\* With that understanding, it didn't seem to me that President Eliot was much out of the way. If a teacher with the known ability of Dr. Edwards misunderstood the quotations, how much more important was it for me to have shown the connections of the quotations for the reading by our students.

President Eliot was speaking of some statistical tables which had been kept at Harvard for years past. Pres. Eliot says, "It proves conclusively that many of the strongest students of the College abandon the classics and mathematics for studies which seem to them more likely to be serviceable in the actual activities of modern society. These tables, as the Dean points out, do not furnish material for an exhaustive study of the elective system in Harvard College; but they support the belief that as a body the students use the system with reasonable intelligence. They confirm the results of previous inquiries in several important respects:—thus, they prove that under a wide elective system there will be no extreme specialization, and there will be a fair amount of judicious choice of correlated subjects. The general conclusion is that a boy of eighteen who has had a good training up to that age will ordinarily use the elective system wisely, and that the boy who has had an imperfect or poor training up to eighteen years [and some such do occasionally get into Harvard. B.] is more likely to accomplish something worth while under the elective system than under any other."

\*This statement we by no means admit to be true.—Ed.

Even where most or all of the subjects in a course are elective, a student's choice is more or less hedged about by the counsel of a Dean, his teacher, his parents and his most intimate associates at the college.

W. J. BEAL.

## Bal Poudre.

The "Bal Poudre" minuet given by the members of the Feronian Society last Friday evening was a complete success, both from a social and financial standpoint. At eight o'clock the dancers, who were tastefully attired in colonial costumes, came forth and gracefully executed a colonial dance to music furnished by Miss Hannah Bach, who presided at the piano. The young ladies representing gentlemen were dressed in black jackets, white ruffled vests, short back skirts, high-heeled shoes adorned with large silver buckles. Their hair was dressed and powdered after the fashion of one hundred years ago; they wore the colonial cocked hat which we always associate with the days of Washington and they conducted themselves in a manner that would have made many a gallant of the eighteenth century envious.

The ladies all wore different colored gowns of the colonial style with hair dressed high and liberally powdered.

Those representing the gentlemen were Misses Beebe, Goodrich, Buskerk, Bowerman, Langford, Robson, Farrand and Lundy, while the colonial maidens were Misses Bristol, Katherine Gunn, Smith, McCormick, Woodbury, Alice Gunn and Light.

That the audience was pleased was plainly demonstrated by the manner in which the dancers were encored. Some of the ushers wore gowns that would have been a delight to the collector of antiquities.

After the minuet was concluded all who desired danced until eleven o'clock. The grand march was led by Prof. and Mrs. J. D. Tower, both being attired in colonial costume as were many of the faculty ladies.

By no means the least of the attractions was the gipsy fortune teller in the person of Miss Mary Knaggs who presided in a tent in one corner of the armory and forecast the future of all who crossed her palm with silver.

The members of the Feronian Society greatly appreciate the valuable assistance rendered by the faculty ladies and others, and especially that of Miss Bessie Lee Gaylord who trained the girls for the minuet.

The net proceeds of the entertainment were over \$50 which will be used to help furnish the new society rooms.

M. A. C.

## Death of Dr. F. J. Hodges.

Dr. A. E. Bulson, '88, editor *Fort Wayne Medical Journal-Magazine*, Fort Wayne, Ind. sends Prof. Kedzie the sad intelligence of the death of Dr. F. J. Hodges, '84, of Ashland, Wis. Dr. Hodges died in Chicago of blood-poison, the poison being introduced into his system through a needle-prick in the middle finger incurred during an operation

he was performing. Dr. Hodges leaves a wife and three small children. Two of the children are seriously ill with typhoid fever. We take the following from Dr. Bulson's letter:—

"While a resident of Indiana Dr. Hodges was a very popular and influential physician, as evidenced by his election to many positions of honor and trust by his confreres and friends. He was for several years secretary of the Mitchell District Medical Society, an organization having a membership of over 300, and had been honored with the presidency of his local county medical society. In 1895 he was a candidate for election to the position of secretary of the Indiana State Medical Society with 1600 members, and was only defeated through a combination of circumstances largely brought about by the election of a president from an unexpected section. Dr. Hodges for many years was a professor in the Ft. Wayne College of Medicine, holding the chair of genito-urinary surgery and assistant to the chair of general surgery. He was also, until his removal to Ashland, an associate editor of the *Ft. Wayne Medical Journal-Magazine*.

"Fred, as we all called him, numbered his friends by the hundred through various portions of Indiana, and they all regretted his departure from the State, and have recently received a severe shock in the news of his sudden death.

"The first news which reached me was that contained in the *Ashland Daily Press*, and having been intimately acquainted with Fred for a number of years, and been thrown into close personal contact with him while he made my residence his home during those days that he lectured here at the College, I felt the blow most keenly.

"I had learned to look upon Fred as one of the most genial, companionable, and withal studious and progressive medical men that it has been my pleasure to count as a friend and associate. It hardly seems possible that one so young and in the enjoyment of perfect health should be carried off so suddenly, but the instance only recalls to mind the fact that in the midst of life we are in death."

Among the participants on the program of the Round-up the following were former students here:

Alumni, Dr. G. A. Waterman, '91a; J. D. Towar, '85a; Hon. L. Whitney Watkins, '93a; Hon. C. J. Monroe, m. s., '85; C. F. Wheeler, '91a; K. L. Butterfield, '91a; C. C. Lillie, '84; H. W. Mumford, '91a; and Hon. C. W. Garfield, 70a; m. s., '73.

Non-Graduates, Hon. S. L. Kilbourne, (a) '57-'58; G. A. True, (sp.) '95-'96; and Hon. G. C. Creelman, (a) '92-'93.

In the *Review of Reviews* for the current month is an article by Ray Stannard Baker, '89, on "How the Beet Sugar Industry is Growing." It treats especially of Michigan and of the work done by Dr. Kedzie and Professor Smith.



# THE M. A. C. RECORD.

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## The "Round-up" Farmers' Institute.

At the end of each institute season there is held at some centrally located city a general institute, to which all institute workers, two delegates from each county institute society, and farmers generally—indeed, all persons interested—are invited. Such was the institute just closed at M. A. C. It was undoubtedly the most successful meeting of the kind ever held in the state, both in interest, in enthusiasm, and in attendance. The total attendance was between 800 and 1,000 people. Several different meetings reached the 800 mark by actual count. Between 300 and 400 visitors were fed at the various clubs, showing the steady interest in all the meetings. Fifty-one counties were represented, not reckoning Ingham. The Women's Section gathered each day an audience of from 150 to 200. Best of all was the entire good feeling and enthusiasm shown. Not a discordant note was heard. The management was such that everything went off smoothly. Everything was foreseen and attended to at the right time and place. Even the street cars ran steadily on something like a half-hour schedule.\* As far as could be learned, there was only one circumstance to be regretted, and that was that Supt. of Public Instruction Fall, who had left a national educators' convention in Chicago to come home and speak on "The Rural High School," was almost entirely shut out by the lateness of the hour when he came on the program, and this, too, through no fault of his own. His topic is one of vast importance to Michigan, and one which should have been carefully discussed before this, we might say, uniquely representative gathering of farmers.

The holding of this institute at the college is peculiarly fitting and fortunate. There are here larger means for illustration, a deeper general interest in the subjects in hand, and a larger fund of accumulated knowledge to draw upon than can be found anywhere else in the state. Then the college itself is a subject that the farmers of the state should keep closely and intimately informed about. And finally the influence upon our students cannot be other than highly stimulating and directive. As a matter of fact the students took constant and deep interest in the proceedings; especially is this true of the upper class men,

\*The cars went entirely out of commission the following morning. The effort had been too much for them.

who were found intently listening whenever their duties would permit; and the classes that could be adjourned without serious detriment to the term's work, sent their members over to the meetings. The unanimous vote adopting a resolution expressive of the opinion that for an indefinite number of years the place for holding the "Round-up" Institute should be the Agricultural College, seemed to indicate a degree of general satisfaction very gratifying to the college population.

There were many interesting things said and done which the writer of this report did not hear or see. He wishes that he could have been omnipresent, and that he had had nothing else to do than to follow and note the proceedings. If nothing is said about important and interesting meetings, it is simply because no adequate report could be obtained and not because the matters were intentionally neglected.

### CIVIL GOVERNMENT SESSION.

One of the most interesting sessions held was that of Tuesday evening, devoted entirely to State affairs. The speakers were President Snyder, Auditor General Powers, Representative Dingley, Judge Montgomery and State Superintendent Delos Fall. The exercises of the meeting were much delayed by the non-arrival of the speakers for the evening. The audience-room was crowded, but the delay was good-naturedly borne.

The exercises were finally started with a speech of welcome from President Snyder. He expressed the general feeling of gratification that so many representative farmers were here to spend the time at the College, gave some facts about the College and its administration as reasons why the farmers should feel interested in the College, and expressed the wish that all would feel free to come and go in any building at will, to ask questions of everyone and to take every opportunity to form unbiased opinions about how things are managed. The effort is to keep the College close to the people, to make science serve the social and industrial needs of the people. Founded before the nation gave aid to industrial education, the acceptance of the aid provided by the land-grant act of 1862 made it one of that group of schools which may be called the great National College of applied science, which now holds property to the amount of \$58,000,000 and has 35,000 students. President Snyder ended by inviting all to a reception in the Women's Building at 9 p. m. the following evening.

The speakers having now arrived, the chairman, Col. Ives, of Mason, introduced Mr. Powers by stating that these speakers were all still engaged in a certain phase of farming, viz., keeping up their fences.

### EXECUTIVE GOVERNMENT.

Mr. Powers happily introduced his talk by a story illustrative of the material that usually goes to make a politician. A father wishing to find out the proclivities of his son shut him up in a room with a dollar coin, a bible, and an apple, thinking that if he were interested in being a merchant he would show that in handling and brooding over the dollar; if in being a preacher he would closely examine the bible; if in being a farmer, he would study the apple. When the father re-

turned to the room the son was sitting on the bible, eating the apple, and had the dollar in his pocket. The father made him a politician.

Mr. Powers spoke of the especial trials and difficulties surrounding the path of the executive department of the government. It is the men of this department who come directly in contact with the people in the execution of law. Men will enthusiastically endorse sentiments which when applied to themselves in the form of law they will energetically resist or evade. Every time an executive officer keeps a dollar from a man's pocket he makes of that man an enemy. Mr. Powers, in the short time over which his experience extends, has had men come into his office and tell him that he was violating precedent and becoming quixotically impractical in the administration of state affairs, and they have sneeringly remarked, "Oh, you will be a one-termer. You will never be renominated for this or any other office." There is something worse than to be a one-termer, and that is to demonstrate before one's children and one's friends that one is a coward.

Although there is a separation of executive and judicial departments, there is always a certain amount of discretion left with the executive. He can do or leave undone. All laws are not mandatory in form or spirit. Men who are affected by such action or non-action become hostile and consider themselves aggrieved. Even men of no standing have power to sting and injure by criticism. The man in office seeks to make friends and avoid criticism. The rule of practical politics is not to do as much good work as possible, but to avoid doing those things that arouse criticism even from a minority.

Mr. Powers thought that in the main executive officers are honest, and that in no state of the union is this more generally true than in Michigan. The question is suggested whether when something worthy is done, officers receive the encouragement that is helpful. Men will say that since it is only a matter of duty, such work does not require especial notice; but after all, these positions are full of difficulties and a good strong word of approbation strengthens greatly. One is tempted sometimes to believe that only the bad thing becomes known; that the good work all remains hidden, and so it comes about that the novice in politics receives only the advice to avoid doing the things that are harmful and that draw down criticism.

The man that is dangerous in public affairs, in office and out, is the man who is full of wild schemes and theories, who is not sane and sound, who is dissatisfied to accomplish the possible and attainable, because he is reaching out for the impossible and unattainable. This man and the man of two faces are almost equally to be dreaded.

As proof of the general sanity and soundness of our public men, Mr. Powers pointed to the great work the state is doing for the defective classes in our asylums and the blind school. He alluded in an especially complimentary way to the work of the State Industrial School for boys, who had furnished excellent music for the occasion.

In conclusion Mr. Powers stated that he believes in institutes, because in these the people discuss the

problems of everyday life, on the solution of which the home, the school, and the state depend. Give encouragement to the great army of executive officers in your state. Recollect that it is the executive officer who lays the actual hand of the law on the dishonest man, and thereby makes of him a strong enemy. Let the officer find in you for the same action an equally strong and courageous friend. Recognize effort for good with as much zealous approbation, as you exercise in punishing dereliction in office.

### THE JUDICIARY.

Judge Montgomery spoke next on the judiciary department of the government. The judge alluded to his size as a strong corroborative proof of his statement that he was brought up on the farm. He told an anecdote of a convention in which Colonel McCreary was candidate for State treasurer against a granger for whom the sentiment in the convention seemed quite strong. In nominating the colonel, the speaker wound up by saying: "I appeal to you as farmers to support our farmer candidate, Colonel McCreary." The appeal was successful, and McCreary was nominated. After the convention, some one asked McCreary what branch of farming he was engaged in. "Well, today I am engaged in threshing," was the reply.

The judge began his formal address by a comparison of the powers of the legislative, executive and judicial departments. While the first two are powerful, the power of the judiciary is under our system greater. It is not wholly inaccurate to say that the parliament of Great Britain is, as to its power to prescribe rules of human conduct, omnipotent. With us, however, the power of the legislature is limited by a written constitution. It cannot exercise power contrary to the tenor of the commission under which it is acting. The final judge of the validity of the power exercised by the legislative department is the judiciary. John Marshall established this principle when he said that inasmuch as the duty rested upon the court of administering the law, this duty involves a preliminary inquiry into what the law is. Rufus Choate said of this decision of Justice Marshall: "I do not know that I can point to one achievement of American Statesmanship which can take rank for its consequences of good above that single decision of the supreme court which adjudged that an act of the legislature contrary to the constitution is void, and that the judicial department is clothed with power to ascertain the repugnancy and to pronounce the legal decision."

This added function of passing on the validity of legislative enactments, became one of the most important possessed by the federal supreme court, and the same function exercised by the State supreme court is relatively as important.

The rules for the guidance of the court in the exercise of this function are (1) that the acts of the legislature are presumed to be constitutional until shown to be in conflict with some provision of the supreme law, (2) that when such conflict exists the duty of the court to enforce the supreme law is clear.

Judge Montgomery raised the question, why laws which the court has been compelled to set aside have



multiplied in recent years, and answered it by stating that in these days, legislators, far from jealously guarding their own power, yield support to legislation which the individual members do not even believe to be constitutional, declaring that the courts will take care of the rights of the people under the constitution. He condemned this procedure as casting a burden upon the court not contemplated by the constitution, and as an evasion of duty by a coördinate branch of government, whose obligation to support the constitution is as great as that upon members of the court. A second cause of this increase he thought to be the idea that constitutional questions are determined by the predilections or temperament of the judges. Against this idea that the decision is a mere matter of choice, he protested warmly, asserting that in a written constitution there is no such thing as elasticity or growth. "What the legislature was prohibited from doing when the constitution was written," said he, "it is prohibited from doing today. It is unquestionably true that changed conditions may forcibly present the question as to whether attempted legislation was within the meaning of the framers of the constitution, but this question once determined, the question of the validity of an enactment ought likewise to be solved." Conservatism of the people should be exerted in stemming the tide of criticism of an instrument which has stood the test of fifty years, and under which the state has written a history that reads almost like a fairy-tale.

The judge said that he protested, not against honest criticism of judicial opinions, but against vituperation, abuse, and assassination of character. He recalled the fact that no judge in Michigan has been impeached for misconduct in office, and declared his opinion that every judge in the state could say with Justice Brewer that in all his judicial experience no attempt had ever been made to swerve him from the path of duty. The past of the supreme court is secure, the future will be what the people decree it shall be.

#### THE LEGISLATURE.

The next speaker, Mr. Dingley, defended the legislature, while admitting that much unsound legislation went through. He quoted the remark that the supreme court has the advantage of the legislature in that it has the last guess.

Mr. Dingley read a lengthy paper in which he explained minutely the duties and work of the legislature. He emphatically stated that members of the legislature should consider themselves as agents for the whole State and not merely for one small part. The duty to the State comes first; the duty to his county is second. He thought the fifty-day limit productive of evil in that it tended to enlarge the number of bills introduced and made it impossible to pass any general legislation before the expiry of the limit. To abolish limit would shorten the session from 20 to 30 days. He commended speaker Carton's plan of having definite dates arranged for visiting committees, instead of a general legislative junket.

Mr. Dingley put forward a lengthy argument for his bill for a constitutional amendment to pay

legislators a fixed salary, instead of a per diem as now.

#### THE RURAL HIGH SCHOOL.

It is much to be regretted that Mr. Fall, the next speaker, could not have had more time, or have come earlier in the session; for his topic is deserving of close and careful study, by the farmers, and he speaks upon it with convincing force.

Mr. Fall told of the improvements in the educational system of Michigan since he had known it, and asserted that he was proud of this improvement. There has been some improvement in the wages of teachers, but still the average of wages is much too low. The great bar to the progress of the schools is the small wages of teachers. You get poor teachers for poor salaries, and poor teachers make poor students.

The homes of the people have improved faster than the schools. This fact Mr. Fall dwelt upon and illustrated at considerable length. He showed how the farmer was no longer satisfied with his home school. He sends to the neighboring city high school. The few can do this, but the many cannot. It is no longer true that the district school meets the needs of the ordinary young man and woman in the country. And yet, by our present law it is a crime to go from one district into another, a crime punishable by a fine—you must pay for it. The cost of high school tuition to non-residents in Michigan last year was \$87,540, add to that transportation and board for these 7,000 non-residents at the very low rate of \$1.50 per week and you have a sum total of \$500,000 for the crime of going from one district into another. Suppose this fund were divided among the 80 counties of the lower peninsula. It would give a sum sufficient to give a large impetus to the rural high school at the home of the student.

Professor Fall was proceeding to demonstrate how the establishment of a high school approximately in each township could be brought within present expenditure, and had just gotten so far as to show that the cost per student in some districts runs as high as fifty dollars while in Albion high school the cost ran only from ten to fifteen dollars per capita, when the departure of the last street-cars for Lansing was announced and the meeting had to be adjourned.

The music of the industrial school band was of a high quality and was frequently encored during the session.

HOWARD EDWARDS.

#### WOMEN'S SECTION.

The morning session of the Women's Section for Wednesday was called to order by Miss Keller. Miss Lyford introduced her subject, Principles of Cooking, by discussing the use of dry and moist heat in cooking, and the care of and principles governing the working of the stove. Miss Lyford then demonstrated the making of white sauce and explained its use as the foundation of a variety of dishes. With this sauce, both creamed and scalloped potatoes were prepared. The use of the thin sauce as a foundation for soup was demonstrated, also the use of the thick sauce in making meat croquettes.

The subject of eggs was considered next. The temperature at which eggs should be cooked was discussed and the making of foamy omelet demonstrated. Miss Lyford then prepared Welsh rarebit on toast. A sample of each article pre-

pared was served to the guests who seemed well pleased with the results obtained.

Mrs. Haner followed Miss Lyford with a paper on linen. The aim of the first part of the paper was to illustrate the character of the essay required of the women in the domestic art department. It treated of the origin and use of linen in ancient times and its manufacture.

The second part of the paper treated of the methods of bleaching linen, history and origin of damask, general rules to be considered in purchasing damask, the making and marking of tablecloths and napkins, and the laundering of the same.

A. E. C.

#### MOISTURE IN THE SOIL.

This subject was treated by Prof. J. A. Jefferey in one of the sectional meetings. His main points were as follows:

Soils have their individualities, which the farmer should study no less than those of his horse. Nowhere, perhaps, do these differences in soils manifest themselves more than in their relations to moisture.

Water in the soil takes the plant foods found there into solution, conveys them to the roots, into the roots, thence through the stems to the leaves, where the food is transformed, and finally conveys the transformed foods to the different parts of the plant for the building up of its tissue.

The rate at which plant foods in the soil dissolve depends very much upon the temperature of the soil.

The presence of oxygen of the air is necessary in soils, that much of the food may be made soluble and available for the use of the plant.

Both temperature and air conditions in the soil depend largely upon the moisture conditions.

When a soil contains about one-half the capillary moisture it is capable of holding, the conditions are at a maximum for plant growth. When the moisture content falls to 4 per cent. or 5 per cent. of the dry weight of soil in sands and to about 14 per cent. in the fine clays, plants are unable to grow in them. So that when the water content of a soil rises above that giving maximum conditions for plant growth we seek to get rid of the excess. When it falls below we seek means to conserve the moisture.

Cultivation is the most common method employed to conserve moisture, and of its effectiveness most farmers are aware in a general way. The hired experimenter has sought to determine just how effective it is.

The saving of moisture in the soil increases when the depth of cultivation is increased, as is shown by laboratory and field experiments. At M. A. C. no cultivation, 1 inch, 2 inches, 3 inches and 4 inches of cultivation gave losses respectively of 10.4 tons, 5.19 tons, 3.36 tons, 3.16 tons, and 2.86 tons per acre daily.

In an experiment conducted in Wisconsin in '98 to determine the effect of both depth and frequency of cultivation it was found that with a virgin clay loam: (a) Increasing the depth of cultivation decreased the moisture losses. (b) Cultivating once in two weeks, once per week, and twice per week decreased the losses 23.88 per cent., 24.73 per cent. and 27.10 per cent. respectively.

With black marsh soils: (a) Increasing the depth of cultivation beyond one inch increased the losses.

(b) Increasing the frequencies of cultivation beyond once in two weeks increased the losses.

The rate of rise of water by capillarity is not the same in all soils. In a laboratory experiment water was found to rise through black marsh soil at the rates of 6.21 tons per acre daily; through sandy loam at the rate 7.24 tons and through virgin clay loam at the rate of 17.8 tons per acre daily.

J. A. J.

#### PRACTICAL WORK WITH FINE WOOL SHEEP AND WITH SWINE.

This was ably handled by Hon. Peter Voorheis, of Pontiac. Mr. Voorheis entered very fully into a history of the progress of fine wools in this country. The merits of this class of sheep were strongly urged. In the first place they gave a large clip which usually commands four to five cents more than the middle wools in the open market. They will live on coarse feed and less of it than is required by the middle or coarse-wool breeds; probably one of the strongest points in their favor lies in their ability to withstand the usual evil effects of over-crowding in close quarters or herding in large flocks.

By actual handling of two fine wool ewes, a Delaine and American Merino, Mr. Voorheis gave his audience a very clear conception as to the size and type of animal required and the kind of covering wanted. While excessive wrinkling of the skin is not as eagerly sought after as was formerly the case, Mr. Voorheis thinks it is impossible to get the finest staple from sheep entirely free from them. In his own flock he would not use sires which were not more or less wrinkly on neck and thighs. With regard to the amount of yolk in the fleece, he explained that its presence in large amount was absolutely necessary to the growth of a fine fiber. The amount present will vary from fifty to as much as seventy per cent.

With regard to the value of Merinos for crossing purposes, Mr. Voorheis said that in his opinion rapid improvement towards refinement of wool can only come from a more general use of Merino sires upon the common ewes of the country.

Mr. Conrad of Wacousta, Mich. conducted the exercise in judging swine. Mr. Conrad has been a successful breeder of Poland Chinas and his judgment of swine is good. It was unfortunate in the judging of both sheep and swine that the time was so limited as the matter could not be properly presented in the time allowed. Mr. Conrad had two very useful specimens of Poland China sows to work upon and he brought out in a very practical manner the strong points of the breed and the points which should be most carefully scrutinized before purchases of breeding stock are made. It is Mr. Conrad's belief that the average farmer should look for form, constitution, good length and depth in a pig rather than for the fancy points and markings of the Poland China intended for the show ring.

He also emphasized the necessity of getting breeding stock with good legs and feet.

Professor H. W. Mumford conducted the work in judging of mutton breeds. Very creditable rams of the Dorset Horned Hampshire, Shropshire and Oxford breeds were used as specimens.



In introducing the subject the speaker emphasized the necessity of selecting breeding stock possessing strong constitutions, and in the selection of rams care should be taken to select individuals showing strong masculinity. The statement was made that the future of sheep husbandry in Michigan would eventually be largely confined to the use of smooth bodied and grade Merino ewes of good size and strong constitution as a foundation of the ewe flocks of the country and rams of some one of the English mutton breeds. Experience and experiments have shown that in this way has been produced the most satisfactory fattening lambs for Michigan conditions.

Professor Mumford used as an argument substantiating the statement that he believed that the merino grade ewe was the best foundation for our ewe flocks, that the merino was the only breed of sheep we have been able to improve in the United States; that we never have and probably never will improve upon the English mutton breeds as found in Great Britain.

Good constitution in a sheep is generally shown by a broad rather than a long head, a short thick neck and broad deep chest, well sprung ribs and good strong bone, a deep rather than a long body set on short well placed legs, a bright lustrous fleece containing an abundant yolk in a liquid state and a bright pink skin.

Masculinity is indicated by breadth and prominence of the nose above the muzzle, by breadth between the eyes and short thick neck, well developed fore-quarters and a fleece of medium fineness and strong staple.

If a ram is to be selected for use on a pure breed flock great care should be taken that such ram possess the true breed type.

If the ram is to be used on a grade flock for the production of lambs for fattening purposes especial attention should be given to the development of the so called mutton points of the sheep, namely, a good leg of mutton or well developed thigh, low full twist, a long level rump and broad thick, well covered loins, and a broad back with handling qualities that indicate that the back is thickly covered with flesh. Rams possessing these all important characteristics to the breeders of fattening lambs can be purchased for a reasonable price.

J. J. F.

#### THE FRUIT SECTION.

Each morning at 9:30 the delegates and others interested in horticultural matters held a meeting in the College chapel to listen to papers by members of the faculty and institute workers upon topics relating to fruit culture.

The Production of a Two-Year-Old Tree was explained by Chas. E. Greening of Monroe. He dwelt at length upon the procuring of tree seeds and the method of growing the seedlings. The use of French crab apple seedlings was recommended and the speaker was well pleased with Kieffer and Japan pear seedlings, Mahaleb cherry and Myrobalan plum stocks. Apple trees are generally grown from root-grafts, while budding is used for pears, plums, cherries and peaches. The land for growing the trees should be highly manured, and supplied with an abundance of humus by plowing under field peas. The methods of budding, grafting, planting and pruning were explained

and samples of seedlings, grafts, and trees of different ages were shown.

R. M. Kellogg, of Three Rivers, spoke on Small Fruits. He urged the importance of propagating the plants from selected parents that have not exhausted themselves by long-continued and excessive fruiting. For strawberries he prefers the hill system, or the narrow hedge row, rather than the wide matted row. In growing black raspberries, the new canes should be pinched back in June and the side branches should be cut back to spurs early in the following spring. Summer pruning of red varieties is not advisable.

The lecture of Prof. R. H. Pettit was illustrated with lantern views of many of the more injurious insects. His topic was Insect Enemies of Fruit Trees, and he explained their habits and transformation and gave remedies for them.

Prof. W. B. Barrows spoke on Birds and their Relation to Agriculture. Very few of our common birds do much harm, and most of them are useful to the farmer as they destroy thousands of insects. Woodpeckers instead of injuring the trees are of benefit to them, as when they make holes in the bark they are after insects. The sap-sucker, however, which makes holes in rows running around the trunks of trees, does much harm. Song-birds should be protected and, if necessary, it is better to do without cats, which are their greatest enemies. This lecture, also, was illustrated with a stereopticon.

New Points in Pruning were treated by A. P. Gray, of Traverse City, who prefers the spring for this work, although in southern Michigan the more hardy fruits may be pruned during the fall and winter. For pear trees the pyramidal form is desirable, but for northern Michigan where an open head is best in order to secure all the sunlight possible, the vase form, although less strong, has many advantages, especially for the peach.

J. N. Stearns, of Kalamazoo, told of the Lessons of the Year in Peach Growing. He had found an excess of moisture more injurious than a severe drought, as the effects of the latter could be largely prevented by frequent cultivation. Spraying in March had been found a perfect remedy for leaf-curl, and the use of Bordeaux mixture and Paris green after the fruit had set controls the curculio and lessens the injury from rot.

Much harm to the fruit interests has been done by dishonest packing, as both demand and price has been much reduced. The speaker has a standing offer to return double the cost price if any of his fruit is not found exactly as represented.

The Fungous Enemies of Fruit Trees was the topic of Prof. C. F. Wheeler, who illustrated his talk by means of charts showing enlarged views of many of the more troublesome forms. As most fungi that attack fruit trees winter upon the fallen leaves and fruit, it is best to collect and burn them whenever possible. When the branches are attacked, as in the case of black knot on plum trees, the injured portions should be removed, the cut being made a foot or so below the swelling. The fungi propagate by means of spores and most of them can be prevented from gaining access to the interior of plants if fungicides are used before the spores germinate.

S. H. Fulton, who is in charge of the college fruit experiment station at South Haven, told about new varieties of fruits. The Triumph peach, Ontario apple and the large late plums such as Kingston and Black Diamond were favorably spoken of.

Growing plums and cherries was explained by L. J. Post, of Lowell. He plants about sixteen feet apart and practices heading-in the trees, but at the same time takes care that they do not become too thick. Montmorency cherry, and Guij, Pond, Kingston, Coe Golden and Shropshire Damson plums have been found most profitable. Mr. Post sprays his trees to keep off the attack of fungi, but finds it safest to jar the trees for curculio, which are caught upon an umbrella-shaped screen fastened to a cart.

Spraying mixtures and spraying were discussed by Prof. L. R. Taft. He urged the importance of early and thorough applications for both insects and fungi. Paris green and white arsenic were recommended for chewing insects, and kerosene, either with soap or as a mechanical emulsion, for scale insects and plant lice. Bordeaux mixture and copper sulphate are the remedies for fungi, but are only effective as preventives. All fruit trees should be sprayed with Bordeaux mixture and an arsenite just before the flowers open and again as soon as the fruit has set. One or two other applications will generally be desirable. Peach trees should also be sprayed before the middle of April with a solution of copper sulphate to prevent the attack of leaf-curl, and the expense of thus treating all fruit trees will generally be well repaid.

The attendance at all the sections was good, the number reaching 175 on Wednesday morning. L. R. T.

#### HISTORY OF FARMERS' INSTITUTES.

One of the most interesting topics discussed at the whole series of meetings was that of the origin and history of the farmers' institutes. The music for the evening was furnished by the Lyric Mandolin Orchestra and was excellent in quality.

Before proceeding to the main topic of the evening a few moments were given to Mr. F. A. Converse to talk on the Pan-American agricultural exhibit. Mr. Converse explained that this exposition, to open at Buffalo in a few months, is designed for the Americas alone, and will surpass all previous exhibits in extent and thoroughness of its educational features. All the architecture, as a compliment to the nations south of us is to be of a Central and South American type. There are to be no collective exhibits, but all exhibits in agriculture, for instance, will go into the Agricultural building, and so on for the seventeen divisions into which all exhibits are classified.

Mr. Converse then went into an explanation of the grounds and the location of buildings. Electricity is to be the main feature of the exhibition. The power for all machinery, lighting, transportation, etc., is to come from Niagara.

The farmers are, if possible, to be interested. Every domestic animal known to man is to be exhibited, and all varieties are to be placed on an equal footing. The live-stock show is to begin August 26. All judging is to be done by single

judges most carefully selected, not by committees. These judges are to be at hand where you can question them and have reasons given for their decisions. There is to be a model dairy and a model barn, the result of the most careful examination and comparison. A diploma will be awarded all goods coming up to a certain standard. Let all Michigan products be well represented. The South Americans will be there in large numbers, and for the purpose of learning where to buy their goods. There will be a \$5,000 building for strangers.

Mr. Converse stated in conclusion that he thought it far better for the peace of the world and for American prosperity to put \$10,000,000 into an exposition than into two battle-ships.

Dr. Kedzie, introduced as the pioneer institute worker, began his talk by sketching the early history of the College, laying emphasis on the hostility of farmers and the necessity of interesting them in its work. The first cause of hostility was its location, brought about by a compromise which pleased nobody. The second was that it was supposed to be the bantling of the then new Republican party. The third was the opposition of the College authorities to the centralizing efforts of the university authorities.

The Doctor told the story of the turnip-seed sower by a green boy at the rate of a bushel to the acre near the highway. Five years after, those turnip seed were still coming up, and the farmers continued to laugh at "those professors up there who think to teach us how to farm." Great efforts to make friends were made, and it was at this time that the idea of farmers' institutes was proposed and advocated in the faculty. But there were opponents in the faculty and outside. There came a time, however, when the legislative appropriation to keep the College running for the next two years seemed in danger, and Dr. Abbot was greatly discouraged. "It was at this time" said Dr. Kedzie, "that I interviewed a number of members of the faculty, and on May 7, 1875, introduced a resolution" creating a committee to draw up a scheme for a series of farmers' institutes to be held in different parts of the State during the next winter, and instructing such committee to confer with the State Board of Agriculture. The resolution was unanimously carried and the committee, Drs. Kedzie and Beal and Prof. R. C. Carpenter, drew up a carefully prepared memorial to the State Board. The memorial set forth the want of sympathy between the farmers and the College, the evils so brought about, and the remedy in farmers' institutes. The main feature of the proposed institutes was the union of local farmers and College professors on the programs of the meetings.

The board took action on the plan proposed, and at their request Dr. Kedzie prepared and had published an article setting forth the plan and the object of these meetings. The plan for farmers' institutes secured popular favor at once. The board was overwhelmed with applications from thirty or forty places. Halls large enough to accommodate the audiences were difficult to find. The plan "took root and grew and has grown with increased expansion for 25 years, till it has touched every county in our state and its branches have reached over into nearly every



state in the Union and even realms beyond the seas."

Mr. K. L. Butterfield followed Dr. Kedzie with a summary of work during the last 25 years. Mr. Butterfield stated that Michigan did not originate the institute idea. The secretary of the Massachusetts Board of Agriculture recommended farmers' meetings of this kind as early as 1853. Illinois held institutes in 1869. Ohio established a state-wide system in 1881. But we were the first to make a state appropriation for the work, and the first to make this work a regular part of the duties of college professors. The vital features of an institute were present in the beginning just as they are now. The college still manages the institutes as a part of its educational function; the professors still give much time to institute work; and local speakers, by law, have half the program time.

Under the original plan of 1875, six institutes were held each winter and the legislature, beginning in 1877, appropriated some \$300 a year for institutes. In 1888 an increased demand for institutes showed itself. In 1891 the appropriation was increased to \$750 per year, and in '92-'93, twenty-two institutes were held. In 1893, by the efforts of board members C. W. Garfield and I. H. Butterfield an appropriation of \$4,000 was obtained.

The Grange took hold of the matter, and asked for an appropriation of \$10,000. Active in this movement were R. V. Clark, J. Weston Hutchins, Thos. Marrs, and W. L. Kane. In 1895 the appropriation was made, and an institute in every agricultural county became a possibility. Previous to 1895 there was an average of nine institutes a year under state control, 171 in all. The total appropriation up to that year was about \$10,000, or a little more than \$500 a year. During the six years since 1895, 410 institutes two days long and 407 one-day institutes have been held. At least one institute has been held in every county of the lower peninsula and in ten of the fifteen counties of the upper peninsula. These institutes are estimated to have reached each year 40,000 people.

The features peculiar to our institute system are (1) the county institute societies, (2) women's sections, (3) conferences of state speakers and institute society workers, (4) one-day institutes, (5) the State Round-up.

The benefits that have come to the State from this work are, as in the case of all educational work, difficult to measure. Practical evidences of such benefit may be seen in the increased attention to spraying among fruit-growers, use of up-to-date dairy methods, and the more scientific cultivation of crops. But the greatest benefit lies in inspiration.

Mr. Butterfield ascribed the change of attitude towards the college largely to its institutes; also the recent prosperity of farmers' organizations, and the growing interest in the whole problem of rural education. He mentioned with especial gratitude among the originators of this great movement, Drs. Kedzie and Beal and Hon. C. W. Garfield.

Mr. Butterfield regards institutes as a permanent phase of college extension work. Every state but three has them. Two thousand meetings were held in 1898, over \$170,000 were expended, and over

half a million farmers were reached. Mr. Butterfield outlined a plan of college extension work, with institutes, reading circles, lectures, field-experimentation and traveling libraries, that offered an inspiring picture for the future, and he insisted that the college should recognize this extension work as just as necessary a function as the regular college classes and should elevate it to the dignity of a department.

#### THE APPLE.

Mr. Robert Sherwood discussed the apple on Thursday afternoon and his talk aroused much interest. He showed why the Michigan apple must become more and more important, through larger export of the eastern crop. The area for successful cultivation of the apple is not extensive, and the growing of apples means work for twelve or fifteen years. Yet a return of \$100 per year per acre makes it a paying crop. Mr. Sherwood gave the following recommendations: Fertilize well. Trim before leaves come out in the spring. Spray with blue vitriol solution, five gallons to forty of water, solution made by adding one pound of vitriol to gallon of water. Spray very thoroughly (1) before buds are out, (2) when petals are dropping, (3) when apples are the size of hazelnuts. You need one spraying outfit (a good one in good order) to every twelve acres. Get the best man you can find to prune for you. Cultivate well with shallow gang-plow or cultivator. Barn-yard manure is the best fertilizer. One hundred barrels to the acre is a fair yield. Keep informed on prices. Apples should be barreled as soon as picked, and should be sold as soon as barreled unless you have cold storage.

Mr. Sherwood fertilizes with barnyard manure and ashes. He puts a bushel of ashes to each tree, and a load of manure to every four or five trees. He uses the disc harrow in the orchard. The most popular varieties with him are the Ben Davis, Greening, Baldwin, and Canada Red.

#### RESOLUTIONS.

The committee on resolutions reported recommending (1) that each county society, in order to encourage community of interest and a proper division of benefits, should send to the Round-up a wife and daughter of a farmer; (2) that the institute hereby endorse the rural high school, and recommend the passage of a law to permit the union of adjacent districts; (3) that the legislature should provide for the analysis of cattle food, just as it does for the analysis of fertilizers; (4) that in view of the entire success and high grade of the institutes a vote of thanks be extended to Prof. Smith; (5) that the institute request the passage of bill appropriating \$7,500 per year for institutes; (6) that it endorse the work of the forestry commission and request the passage of bills withdrawing barren lands from sale, establishing the state's title to these lands advertised year after year for taxes, and providing a fire warden with not more than ten deputies.

All these recommendations were adopted. Two other resolutions were proposed and voted down.

HOWARD EDWARDS.

#### MANURES.

Thursday morning at 8:30 o'clock C. C. Lillie, one of the editors of the *Michigan Farmer*, lectured on

"Handling Barnyard Manure and Commercial Fertilizers." Mr. Lillie gave a good, practical talk, full of suggestions to the farmer. He opened his topic by saying "that the practical farmer can control the manure," and "that the times have changed, and we no more have virgin soil in Michigan, so we must rely upon some other source for fertilizers."

He then enumerated two ways to preserve barnyard manure, and discussed them: 1st, by having a covered yard into which to draw out manure and straw from the barn, to keep it tramped down by allowing animals to walk on it, and then draw it to the fields at leisure; 2d, by having a manure cellar pit in which to preserve the manure placed there from day to day, and then to draw it out in the spring and summer.

Mr. Lillie says "We don't want any manure cellars, for the reason that the most improved method is to draw out the manure from day to day as it is made, thus eliminating the extra labor of handling it twice." If the farmer can, in any way, save time it means money. In the winter the average farmer is not pushed for work and this is the proper time to draw out the manure and spread it on the fields. The loss by spreading it on the snow, if any, is very slight and the extra labor of handling will not be paid for by the amount of nitrogen, phosphorus, and potassium saved. Mr. Lillie substantiated his statements by stating the experiments on his farm, both on level and moderately hilly ground, and asserted that the loss even on the hilly soil could hardly be noted. He however acknowledged that the colored water which flows away on the surface, contains some important fertilizing elements but not very much.

He seemed very enthusiastic over the commercial fertilizer and his experience with them for fifteen years on his farm had proven the opposite to what many farmers think of commercial fertilizers. "The commercial fertilizers are the complement of barnyard manure and clover."

To enable a young plant to start is to have some available food near the plant as soon as it germinates; by thus giving it a vigorous start, it will get the potential plant food from the soil.

In 1885 Dr. R. C. Kedzie drafted a bill providing for the analysis of all commercial fertilizers and for licensing the dealers for the sale of the same. This bill passed the legislature and since that time we have not been bothered by poor fertilizers on the market. A bulletin is published each year by the experimental station, which gives the estimated amount of available nitrogen, phosphorus and potassium claimed by the manufacturer and by actual analysis. This enables any farmer to know just what he is buying. The fillers used for commercial fertilizers are of no benefit to the soil, only the nitrogen, phosphorus and potassium are available. In soil where vegetable matter is needed, the stable manure furnishes it.

It is often held by many farmers that if commercial fertilizers are used the land will get hard and run down. This idea is wrong and misleading. If the soil needs the constituents that a certain fertilizer contains, then we can afford to use that fertilizer. "The plants need a balanced

ration, the same as an animal," says, Mr. Lillie.

Barnyard manure is rich in nitrogen, and to have a balanced ration, we should add a fertilizer that is rich in phosphoric acid.

There are two kinds of commercial fertilizers: chemical and animal. A chemical fertilizer is a fertilizer that is made from the ground rock and contains all the elements needed for the growth of the plant. Animal fertilizers are made from the tankage and refuse from slaughter houses. Both are equally good but should be used with consideration as to what elements are needed for the plant you intend to grow. Mr. Lillie gets the most benefit by using commercial fertilizers in connection with barnyard manure.

The clover plant is a complete fertilizer in itself, and you can improve the mechanical condition of the soil at the same time by using it as a manure.

The commercial fertilizers are not stimulants, and you can use them year after year or alternate them with manure. This is opposite to what some claim, viz., that if you use commercial fertilizers once you have to use them forever after to obtain any crops. Mr. Lillie gave as an illustration, a farm that he bought which was completely run down, and he used nothing but commercial fertilizers for five years; he now has a good farm and last year raised a splendid crop by using barnyard manure.

In conclusion, Mr. Lillie says: "I know some condemn commercial fertilizers, but I am not prejudiced against them. I would advise any farmer friend to use them in connection with barnyard manure, or if the soil is lacking in any of the essentials to plant growth, apply such commercial fertilizers as will supply the lacking element."

Mr. Lillie is in no way connected with any commercial fertilizing establishment, and does not offer any particular kind to buy.

#### PLANT ROOTS.

On Wednesday a. m. promptly at eight-thirty o'clock, Dr. Beal opened the institute by lecturing on "The Functions of Plant Roots." His lecture was plain, so that any person could carry away some good ideas concerning the roots of plants. The Dr. opened his lecture by saying "that roots are mysterious, because out of sight, and presented no gay colors. "In my lecture, I shall only have in mind, those that apply to the agricultural plants."

The functions of plant roots may be named under five headings: 1st, roots absorb water and take up mineral matter; 2d, they convey the water to stem and leaves; 3d, they hold plants in place; 4th, they act as a storehouse for the plant; 5th, galls on the roots serve to help manufacture plant food.

The stomata or mouths on the leaves allow the gases to pass in and out while the roots take in the liquid food. Water is the chief carrier of plants. It is absorbed by the roots and passes along through the plant, and such nourishing elements as are needed for the plant are taken out as it passes along, then it passes out of the plant through the leaves in the form of vapor. Water is induced to enter the plant by diffusion, suction, caused by rapid transpiration, capillary attraction, and osmosis. The plant takes in about 325 tons of water for



every pound of dry matter it retains. It is unable to get all the water from the soil leaving 5-12 per cent.

Water exists in the soil in three different forms; free water, or the water that will separate from the soil and go in the direction of gravity (this is found in different depths in the soil); Capillary water, the water that is held by capillary attraction or surface adhesion (this form of water is of the greatest importance to the agriculturist, for it is the water that is most used by the plant); and the hygroscopic water, the water in the soil that cannot be seen and is only appreciated by loss of weight on heating the soil. This form of water is sufficient to sustain life in the plant, but no growth. The Dr. says, "The roots are hygroscopic themselves." The roots of plants abound in the upper sixteen inches of soil but many plants send down roots much deeper in dry seasons, as the clover and corn plants have been known to descend to the depth of from four to six feet.

The root hairs of plants are of the utmost importance. Here Dr. Beal showed on some drawings on canvass, where the root hairs are formed. These little minute hairs form on the young plants just beneath the surface of the ground. They resemble a snake as they do not go through the small particles of soil but they grow between them, absorbing such matter as is needed by coming in contact with the soil. The little root tips break down or decay and form an acid that helps to dissolve mineral salts, insoluble in water, making them available for the plant. Anything that encourages the formation of root tips aids the plant growth. This may be done by root branching, which depends upon, 1st, amount of free oxygen, for protoplasm is active only in presence of oxygen; 2d, the amount of available oxygen; 3d, proper amount of moisture, and 4th, transplanting, which removes the terminal growing points and stimulates the growth of lateral ones, making a compact root system. The Doctor stated that there are about 1,700 root hairs to the inch on a root, and that these hairs are most abundant where the soil is the richest.

Roots hold plants in place by shortening themselves and this is often done to the extent of 25 per cent. of their original length. They also grow out in every direction from the main stem and thus prevent the plant from being tipped over by the wind. Examples are corn, wheat, etc.

The roots act as a storehouse for food for the plant, in its production of further growth, the following season,—as for example, the sugar beet. This storehouse often contains a considerable amount of water, as the case of the radish which is 95 per cent. water.

The little galls that form on the roots of all legumes are important for nitrification. Two thousand years ago, the Romans knew that these legumes were good for the soil but they did not know the reason. By the repeated experiments of Laws and Gilbert, of England, many mysterious facts have been explained regarding these galls. These galls on clover plants are parasitic and enable the plant to get free nitrogen from the air by symbiosis. These roots forming such galls leave in the soil available nitrogen for the succeeding crop.

The Dr. concluded by saying

that "every farmer should keep his eyes open and see what is going on about him, thus answering many perplexing questions concerning plant growth."

T. G. PHILLIPS.

#### BEET SUGAR PRODUCTION.

On Tuesday afternoon the question of beet sugar production was quite thoroughly discussed by Prof. Towar.

The professor stated that here at the College he had never succeeded in growing on muck lands beets that will net 12 per cent. sugar. He does not advise attempting to grow beets in any large scale on muck lands.

Subsoiling must be done in advance. Raw manure must not be plowed under in the spring. Manure should be applied in the fall and winter, and allowed to rot, then it may be plowed under in the spring without disastrous results. This treatment improves the mechanical condition of the soil.

In regard to commercial fertilizers, he advised not giving a large dose of nitrogen to the soil, although a little is useful in the early life of the beet. The best treatment is hard wood ashes before sowing seed, then after sowing, 100 pounds of nitrate of soda to the acre. The best results one always obtained on sandy loam.

As to the time to sow, he advised as early sowing as safety would permit, possibly the average would be from the 1st to the 20th of May. He advised sowing seed at intervals throughout the season and not all at one time.

Prof. Towar thought it better to have rows 24 inches apart rather than 18 inches. The latter means  $5\frac{1}{2}$  miles of row to the acre, while the former means only  $4\frac{1}{8}$  miles. He thought the yield about the same under average conditions.

He found the loss to the soil in producing twelve tons of sugar beets to be twice as much in nitrogen and phosphate as twenty bushels of wheat to the acre. To recompense the soil, take advantage of thorough cultivation and rotate once in four years. Beets following beans and potatoes, he found to yield as follows: Beets following beans yielded 22 per cent. more, and beets following potatoes yielded 9 per cent. more than beets following beets. It is not the sugar that exhausts the soil, for if all except the sugar of the beets could be returned to the soil—tops, pulp, etc.—there would be little or no loss of fertility.

In the discussion Mr. Cochran said that France and Germany originated the beet sugar industry. Napoleon offered a bounty on beet sugar manufacture. So did Michigan but both failed to pay. There are now many factories in Europe, but few in the United States.

You cannot get something for nothing. The soil must be carefully prepared and the work at cultivation and handling beets conscientiously and promptly done. Since the soil must all be prepared just as you prepare the smallest and most fertile plot in your garden, it is well not to undertake more ground than you are sure you can properly handle. You may get seed sown by the 5th of May. Go over ground with the Hallock weeder three times. If this delays sowing to the 20th or 25th of the month it is time saved, for the weeds will be all killed. The rows should not be more than 20 inches apart. Thin out to six to eight

inches apart. Don't delay the weeding. Do it at the time it is needed. Don't pull beets too early. The profits are large, Mr. Cochran mentioned one man, who made 180 dollars on two acres.

#### NEW CROPS FOR THE SILO.

Mr. Welch, the next speaker, introduced by Mr. Ives, the presiding officer, as the prince of institute workers, advocated quite strongly the stave silo at some length.

Mr. Welch has experimented with amber cane and cow peas, both planted about the first of June. Peas planted the 20th of June ripened and filled out well.

He tried also cañier corn and peas, producing sixteen tons to the acre. In feeding from his silo, every time the peas were struck there was an increase in the milk of each cow by one to one and a half pounds. The peas keep the cows' bowels in good condition. He planted the Whip-poorwill variety, four beans to the hill. He cut the corn and peas about the 18th of September. To determine when to cut the corn, chew some of the stalk; if sweet, cut it before all the saccharine matter has passed out of the stalk.

#### LIVE STOCK ON THE FARM.

The next speaker was Mr. L. W. Watkins, of Manchester. In opening, Mr. Watkins compared ensilage to sauerkraut, and said it would very well suit the Washenaw Germans.

He thought his position similar to that of the clergyman who would reform the wicked yet had addressed only the confirmed few of his faithful congregation, since the farmers here gathered could be told nothing new about the importance of stock on the farm. "It is the class of farmers who never attend institutes," said he, "to whom I would carry, if I might, the important mission of live stock on the farm."

From the domestic animals on the farm come much of the comfort and luxury enjoyed by mankind. The huge stockyards with their accompanying packing-houses and rendering establishments demonstrate the vast importance of the live stock industry. Our woolen clothing, Galloway coats and robes, valuable commercial fertilizers, our boots and shoes and everything in leather, the fresh and canned and salted meats, with soups and extracts and oleomargarine, choice cheese and butter and condensed milk find their way to all peoples and in all climes.

Notwithstanding all this many farmers have little or no stock upon their farms. These are the farmers who desire to make a living without trouble and year after year sell their grains and fodder off the farm. There is another class who broke up this virgin soil and made money easily by growing grain, before the competition of the vast plains of four continents had brought down the price. Fifty years ago the center of wheat production was in New York near the Genesee Valley. Now it is beyond the Mississippi, leaving behind vast areas from which the choicest elements of plant food have been removed and sent to foreign countries. Here profitable cultivation is impossible without the application of fertilizers. Many of this class of farmers, being no longer successful without live stock are leaving their farms—"retiring from business." The farmer

should retire to his own farm where he may find interest and enjoyment in seeing his children succeed after him.

Mr. Watkins spoke of the loss of 40,000 inhabitants in the southern four tiers of Michigan, to which President Warner alluded in a recent address before the State Dairymen's Association, and said that the loss did not alarm him, because "it is the retirement of the one-crop wheat growers to the already congested cities—driven from their homes in defeat by the pesky little Hessian fly." Some have, however, learned their mistake and are joining herds and flocks of cattle, sheep, and swine to the raising of grain, so as to recuperate the fertility of the soil before it is too late.

In the west the operation has been reversed. Here rough, poorly-kept stock have given way to almost exclusive grain growing, which in turn has been given up or has been carried on with the modern live stock industry. Mr. Watkins mentioned incidentally that his father, owning and operating a ranch in Nebraska, shipped the first load of Michigan sheep that went west. A wrinkly merino ram in the load created more excitement at Fort Kearney than an elephant would have done.

When competition came to this rough western stock in the shape of fine beef and mutton from the east, the ranch owners saw the necessity of improving their stock and of plowing and planting vast acres of land to grain. Great profit came from the grain of this virgin soil, and herds and flocks were excluded. The effect upon the Michigan farmer was to drive him to butter-making, sheep raising, swine raising, etc. Creameries and cheese factories were established, and our land became noted for its beef, pork, wool, mutton, and butter. Another result of the increased interest in live-stock was richer fields, better cultivation for better crops, and better educated, more enthusiastic farmers. The system has become a series of intensive operations on an extensive scale.

Mr. Watkins thought that the West had been of great benefit to Michigan through the necessity it had imposed for better and more scientific farming. This reaction has also struck the West. After driving Michigan to see the necessity for mixed agriculture with live stock as the most important part of the equipment, they too are beginning to find a necessity for a system nearly similar to that of Michigan. Thus it comes about that in the end we can hold our own in honest competition with them, if we do not allow them to do better and more systematic work than we do.

Necessity insists that the farmer shall be a stock man, and that he shall produce as nearly as possible his own grains for his stock, that he shall handle his stock carefully and return to his fields as much of the fertilizers which they have produced as his stock can spare from the food consumed. He must put his product on the market in its enhanced value, and should market only the perfectly finished goods whether they be meats or butter.

In producing his grain and fodder and holding them for feed the farmer gets a profit on their market value. In feeding his grains and his fodder he gets another profit in the gain in quality along with the gain in weight. He is a manufac-



turer in the broadest sense, retaining the middle-man's profit and saving the enhanced value which comes from perfect finish of his material for the consumer. The waste products from this process are among his most valuable assets.

#### THE LAWS OF BREEDING.

This subject was ably handled by Hon. Robt. Gibbons who spoke in part as follows:—

"The Laws of Breeding" is the subject allotted to me by our genial superintendent, and surely it is an important one to the general farmer as well as to the stock-breeder.

"Like everything else in nature it is governed by fixed laws upon which the breeder may rely with confidence, but at the same time must be governed by them in his work of improvement. The first of these laws is that 'like produces like, or the likeness of some ancestor.' The second one is that in a state of nature the fittest survive, and carry on the work of reproducing their kind. Nature, therefore, produces animals, birds, insects, plants and fruits which never change.

"When man undertakes to improve his animals, he must, to some extent, work in opposition to these natural laws. The improved animal is therefore to a large extent an artificial production, produced by artificial means, and therefore requiring artificial care. Nature would never have given us the Jersey cow, the Shorthorn, Hereford or Polled Angus steer, or the various breeds of improved sheep, hogs, horses and poultry. Each of these is much more valuable to mankind through the work of the improver, but the natural tendency of all of them, when neglected, and the artificial care necessary for them in their present condition, ceases, is to revert back to their natural conditions and habits.

"All the domestic breeds of animals have been improved from a state of nature to better fit them for the use and requirements of man. These improved animals have been changed and modified in form, characteristics and disposition.

"When man, forgetful of his own interests and of his obligations to his domestic animals, neglects them, and allows them to suffer from cold and hunger, nature has its revenge by cutting off the income he would secure from them if properly cared for, and turning all their powers into the single object of maintaining themselves. This is also true of plants, trees, grains, etc.

"This reversion to original types in animals is styled atavism, and is one of the natural laws which the breeder and farmer should understand.

"Other laws of breeding to which I shall refer are the following:

"Cross-breeding.—The mating together of animals not related in any way to each other.

"In-and-in breeding.—The mating together of animals more or less closely related to each other for a number of generations.

"Like produces like, or the likeness of some ancestor."—This means that animals will produce in their offspring the same characteristics as they possess themselves, or the likeness of some ancestor, whose blood may assert itself generations after it lived.

"Hereditv.—Those characters which the offspring derives from its parents, affecting form, constitution, vitality and disposition.

"Survival of the fittest.'—This term means that in a state of nature the animal best fitted to maintain itself under existing conditions, always drives out the other males, and becomes the progenitor of all the young brought forth in the herd, flock, drove or band, of which he becomes the acknowledged head. It insures the maintenance of vigor and vitality.

"All improved breeds have originated by cross-breeding and then inbreeding the ones showing the most valuable characteristics.

"The most inbred of the families of the horse are the English Thoroughbred, from which comes our American Thoroughbred, the French Percheron, the American Trotter and the Russian Trotter.

"Undoubtedly the first attempts to improve domestic animals was by selection.—The best and most vigorous specimens of the species were retained to reproduce themselves. Advancement by this method, while slow, is also certain, provided the person carrying it on is sufficiently versed in the physiology and anatomy of the animal to enable him to detect the slightest deterioration in constitution, vigor and form, and the ability, by further selection, to remedy the defects.

"Undoubtedly in attempting to remedy defects more rapidly than could be done by selection the experiment of cross-breeding was first tried, and to it we are indebted for much of the wonderful improvement that has been made in our domestic animals within the past two hundred years.

"But while selection and cross-breeding had resulted in great improvement, there was still a weakness in breeding methods that demanded strengthening. It was found that to maintain what had been gained continual importations of animals had to be resorted to, as cross-breeding required continuous infusion of new blood. The cross-bred animal, while vigorous and of

(Concluded on page 8.)

#### VISITING CARDS....

Latest Styles—Lowest Prices  
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LAWRENCE & VAN BUREN  
PRINTING CO'S.

#### FULL MEASURE AND GOOD GRADES.

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CALL AND SEE THEM.

The main item in Stoves is to get the best for the least money. We have the nicest assortment ever in the city. Steel Ranges \$18.00 to \$40.00; Cast Cook Stoves with Reservoir \$16.00 to \$25.00; Base Burner Coal Stoves \$25.00 to \$40.00; Soft Coal Air-Tight Stoves \$12.00 to \$18.00; Air-Tight Wood Stoves \$5.00 to \$9.00; Nice Oil Heaters \$3.25 to \$4.00. Everyone of them fully guaranteed. A nice line of Pocket Cutlery Razors. Shears, in fact anything needed in the Hardware Line you will find it and at prices to suit you, at

NORTON'S HARDWARE.

Mrs. Scott, librarian of the mining school at Houghton, called at our library on Saturday and seemed much interested in our collection of books. She said that our old stu-

dents now at the mining school always look for the RECORD and examine its contents closely, thus showing their continued interest in M. A. C.

## SIMONS DRY GOODS CO.

FIRST SHOWING of

1901 NEW SPRING

Wash Fabrics...

New Embroidered  
Colored Muslin, pr yd. **28c**

New Spring Dress Goods.

New Spring White Goods.

New Patterns for Spring in

VELVET CARPETS,  
INGRAIN CARPETS,

Rugs, Curtains, etc.

Students given Special Attention.

## Furniture Headquarters.

COMPLETE LINE OF FURNITURE FOR STUDENTS' ROOMS

Woven Wire Springs at	\$1.50, \$2.00 and \$2.50
Woven Wire Cots at	\$1.50, \$2.00 and \$2.50
Mattresses at	\$1.75, \$2.00, \$2.50 up
Chairs at	50c, 60c, 75c up
Arm Chairs at	\$1.50, \$1.75, \$2.00 up
Students Tables at	\$1.50, \$1.75, \$2.00

M. J. & B. M. Buck.



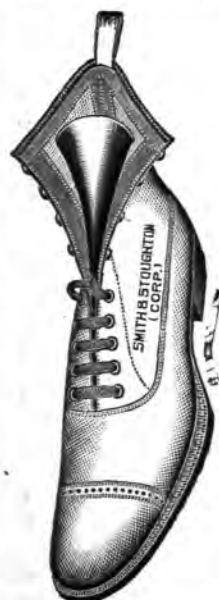
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And at the same time give you a garment unsurpassed for Fine Tailoring and Correct Styles.

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## Royal Shoes

We have the exclusive sale of this celebrated line of men's shoes for Lansing. Made in all styles and colors, light, medium and heavy weight at the one uniform price of

**\$3.50** a pair

They are without doubt the best fixed price line of shoes and have crowded out many of the FIVE DOLLAR shoes wherever introduced.

C. D. WOODBURY,

HOLLISTER BLOCK.



## The "Round-up" Farmers' Institute.

(Concluded from 8th page.)

approved form, seldom made a good sire. The blood was too mixed in character to prove a potent force in breeding, and new blood had to be brought in to remedy defects that were constantly obtruding themselves upon the breeder, and rendering him disgusted with his work. There was a lack of stability. The question then was, what must or can be done to engraft their best characteristics upon improved animals so strongly that they would be enabled to invariably reproduce them in their progeny, the same as was done in a state of nature? It would be seen by close observers that in a state of nature, under the natural laws of the survival of the fittest, and like producing like, that there was undoubtedly a great deal of close-breeding, and the question would naturally come up, Why not try this method with domestic animals? Probably the first man in Great Britain to put this method into actual practice was Bakewell, and the results of his experience was to completely change modern methods of breeding. He showed that in-breeding so concentrated the blood of an animal as to greatly increase its prepotency.

"From that time until the present in-breeding has been recognized as necessity in the formation of a new breed or the improvement of an old one.

"It is true in-breeding is a two-edged sword in the hands of a careless or ignorant man, as while it increases desirable qualities, and renders them stable, it also doubles up undesirable ones.

"The general farmer, although vitally interested in improved live stock, has no such complicated problems to solve as the breeder.

"A sire that would be of little value to the advanced breeder will be of great value to him, as his females, being of more mixed blood, will be more easily impressed than the highly bred ones required by the breeders."

"To the farmer the breeder is a benefactor if he will only accept the privileges offered him, and utilize them to his own great advantage."

(Report concluded in next issue.)

HOWARD EDWARDS.

## News from Graduates.

Geo. Gould, '99, of Saranac, Mich., spent a few days at the College, attending the institute.

Max Groat with '02, has been working for Russel & Co., carpet department, Erie, Pa. His address now is Niles, Mich.

Mr. and Mrs. Ellis Ranney of Belding, attended the Feronian party last Friday evening and returned home Saturday.

W. J. Merkle, '98m, is in business with his father and brother, manufacturing bicycle motors. Address, 59 31st St., Milwaukee, Wis.

John Hooker, '86, of New Baltimore, Macomb Co., was at the farmers' institute. He is managing a farm of only 1200 acres.

R. L. Biglow, with '01m, is working in the engineering department of the Pere Marquette R. R. Address, 238 La Fayette ave., Detroit, Mich.

Grayson E. Miles, with '96m, of Kalamazoo, Mich., visited the College during the institute meeting. His address is 1528 West North St.

A letter from Guy Stewart to Prof. Kedzie states that at Grafton, W. Va., he met a gentleman named Alex. Leeds, D. D. S., and discovered that he had attended M. A. C. one term in '59.

"Well, you may just 'reckon' our tongues wagged," says Stewart. When he last saw the place he said they had two buildings and eight acres cultivated; said he went to Jackson, took stage for the College "over a road that was half plank and half plank once in a great while." Of course I told him of the progress of the old place, and he was anxious to know more. He is very anxious to get a copy of the "Alumni Cat." and if you can I wish you would send him one. I shall give him a chance to get acquainted with me. Perhaps I had better not."

First Lieutenant R. S. Welsh, '94, is (according to the Washington Post) one of two supervisors immediately under the governor in the province of Tarlac, P. I.

## Annual Banquet.

The second annual banquet of the C. L. S. '02 Debating Club was held in the society rooms Friday night.

Shortly after midnight the members gathered around a heavily laden table and ample justice was done to the following menu:

*Ostrea edulis* soup  
*Olea Europæa*      *Apium graveolens*  
Crackers  
*Ostrea edulis* unrefined  
*Cucumis sativus* pick  
*Phaseolus vulgaris* pick  
Siliceous witches  
*Citrus aurantium* cider      Cream puffs  
*Acer saccharinum* syrup  
Ice cream      Cake  
*Citrus aurantium*      *Coffea arabica*  
*Tilia Americana* extractors

The President E. R. Bennett acted as toast-master and these are the toasts responded to:

The Witch of Ingham, L. D. Rudolph.

This Solempne Occasion, B. Wer-muth.

Swords and pens, M. B. Stevens.

The Lady of the Villa, J. A. Dunford.

The Spark in the Dark, D. S. Bullock.

The Evolution of the Octahedron, W. K. Wonders.

Dame Fortune, W. J. Geib.

After giving their class yell and singing a few songs the club adjourned, having enjoyed one of the pleasantest evenings in its history.

D. S. B.

## Athletics.

The basket ball game Saturday afternoon between Ypsilanti and M. A. C. resulted in a victory for the latter by a score of 21-6. It was a fast game throughout and both teams deserve great credit for their work. The visitors did some most excellent individual playing but were entirely outclassed by M. A. C.'s united team work.

Ypsilanti.	Position.	M. A. C.
Sherman,	Right guard,	Blanchard (capt.)
Gannon,	Left guard,	Edgar.
Cross (capt.)	Center,	Balbach.
Hollier	Right forward,	Haftenkamp.
Ireland,	Left forward,	Cooper.

H. E. Y.

# We Welcome

## THE STUDENTS' RETURN AT THE M. A. C.

It gives new life to the Capital City. We cordially invite all to make their home at our store. Mr. Homer Burton and Mr. Arthur Hart will make daily trips to every one who desires to see them on the M. A. C. grounds or in the vicinity. If you are not called upon drop us a postal and we will call. Samples sent on application.

## We Guarantee Satisfaction.

## Visit Donsereaux's Department Store, and the Donsereaux Clothing and Grocery Store.

312 to 320 Washington Ave. South. One door south of Hotel Downey.

## CHAS. A. PIELLA . .

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DIAMONDS, WATCHES, JEWELRY, CLOCKS, SILVERWARE, ART GOODS.

Repairing Neatly Done.

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## ALL MEATS . . .

May look alike to you, but there is a very great difference in the quality we handle and that sold by some other markets. We handle none but the very best. Like the pudding, the proof of good meats is in the eating. A trial will convince you that you ought to trade with us.

We make daily trips to the College. BOTH PHONES. Careful attention given to 'phone orders.

GOTTlieb REUTTER, Washington Ave. South.

## FURNITURE DEALERS.

M. J. & B. M. BUCK.—Furniture. Cor. Washington Avenue and Ionia Street. See ad.

## HACK AND BAGGAGE LINES.

ORDER your hacks for parties at Carr's Hack Line. Livery in connection. 410 Washington Ave. N.

## HARDWARE, STOVES AND TINWARE.

NORTON'S HARDWARE—General Hardware, Stoves, Tinware, Graniteware, Cutlery, etc. 111 Washington Ave. South. See ad.

JACOB STAHL & SON.—Wholesale and Retail Hardware and House Furnishings. 211 and 213 Washington Avenue North.

## HARNESS, TRUNKS, ETC.

J. W. EDMOND'S SONS—Keep the finest stock of Trunks, Traveling Bags, Pocket Books and Leather Goods in the city. Also a full line of harness and horse goods. Repair shop in connection. 107 Washington Ave. South.

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THE DYER-JENISON-BARRY CO., LTD., (Incorporated) Hollister Block. All kinds of the best insurance. Strongest agency in city.

## JEWELERS.

B. P. RICHMOND—Watchmaker, Jeweler and Engraver. 200-202 Washington Avenue N.

## LAUNDRIES.

THE VANGORDER PALACE LAUNDRY. College agents, Rudolph and Mills. S. P. Lantz, Prop.

TAKVORIAN & JEWELL.—Agents for STAR LAUNDRY. We return your work on Thursday p. m. Either high polish or dull finish. No saw-edge collars.

## MANICURE AND HAIRDRESSING.

MRS. O. T. CASE—Manicure and Hairdressing Parlors. Masquerade wigs for rent. All styles of hair goods in stock or manufactured on short notice. New 'phone 118. 222½ Washington Avenue S., up stairs.

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WOODBURY & SAVAGE.—Tailors. Student trade solicited. Opposite Hotel Downey, North.

JOHN HERRMANN'S SONS. Fine Tailoring. 218 Washington Avenue N.

## MUSIC, PIANOS, ETC.

THE POST & BRISTOL CO. Pianos and everything in the line of music and musical instruments. 219 Washington Ave. N., Lansing, Mich.

## OCULISTS.

JOSEPH FOSTER, M. D.—Eye, Ear, Nose and Throat. Hours 9 to 12 A. M. City National Bank Building, Lansing.

## PHYSICIANS.

A. D. HAGADORN, M. D.—Office hours, 11 to 12 A. M., 2 to 4 and 7 to 8 P. M. Office at 212 Washington Avenue S.; home 419 Seymour St.

## RESTAURANTS.

GILBERT M. HASTY, Proprietor Hasty's Gem Lunch. Best meals and lunches in the city. Quiet place for adies. 118 Wash. Ave. S.

# DIRECTORY

## LANSING BUSINESS and PROFESSIONAL MEN

The names in this Directory, as well as those of all our other advertisers, are of reliable parties. We hope that the faculty and students will take pains to patronize those who patronize us.

## ARCHITECTS.

W. JUDD CUMINGS—Architect, Sparta, Mich. Rural architecture a specialty. Patronage of M. A. C. men solicited.

## BARBERS.

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LANSING BOOK AND PAPER CO. Waterman and Sterling Fountain Pens, Stationery, Pictures, Frames, Wall Paper. 120 Wash. Ave. N.

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CAPITOL ELECTRIC CO.

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C. D. WOODRURY.—Boots and Shoes. We shoe the students. See ad.

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LOUIS BECK.—Clothier. Gents' Furnishings, Hats and Caps. 112 Washington Ave. North.

H. KOSITCHEK & BRO.—Clothing and Dry Goods. 113 Wash. Ave. N. 210 Wash. Ave. S.

## CROCKERY AND GLASSWARE.

H. LARNED.—China, Glass and Lamps. 105 Washington Ave. S.

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R. W. MORSE, D. D. S. Hollister Block, Room 517.

D. E. PARMELEE—Dentist. 218 Washington Ave. S., Lansing, Mich.

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DONSEREAUX'S DEPARTMENT STORE is the place to trade. You can get a warm lunch in our cafe for 10c. See ad.

## DRUGGISTS.

ROUSER'S CAPITAL DRUG STORE. Up to date. Corner store. Opposite Hollister Block.

## DRY GOODS.

SIMONS DRY GOODS COMPANY.—Dry Goods and Carpets. See ad.

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ELGIN MIFFLIN.—Ladies' and Gentlemen's Furnishing Goods. See ad.