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Economic Entomology.

C. F. BARKER, PHI DELTA THETA FRATERNITY.

A comparatively new science and one which is well on its way towards becoming very important, is Economic Entomology. It may be defined as the science which relates to the natural history of injurious and beneficial insects, together with the best means of preventing their ravages, or exterminating the injurious, and propagating the beneficial.

Every injurious insect has its enemies, which serve to keep it in check and prevent its becoming too abundant. But some of these injurious species may come out in such large numbers, that they will do a great amount of damage before their enemies gain the upper hand. To overcome this difficulty, entomologists acquaint themselves very thoroughly with the life histories of the injurious insects and their enemies, and the comparative value of each of the different insecticides. By doing this and making the results of their investigations widely known, farmers, gardeners, fruit growers, etc., are enabled to overcome and destroy insects that may annoy them.

It has been thought by many that for the public to support entomologists, who should carry on these investigations and experiments, was simply folly. At the present time people can see this need more plainly than they could twenty-five years ago, and stern experience has taught them the lesson. According to an estimate by Prof. Riley, the loss resulting from the depredations of the chinch bug in Missouri, during the year 1874, was about $19,000,000. In Illinois, during the same year, the loss was $30,000,000, or $11.50 to each inhabitant. During the year 1888, in Nebraska, the loss through the same cause amounted to $4,000,000. In 1887 the lowest estimate for loss through the chinch bug, in nine grain growing states, was $60,000,000. Mr. C. R. Dodge estimated the loss caused by the cotton worm (*Aletia argillacea*, Hübn.) during fourteen years after the close of the civil war. The average loss per year for the cotton raising states was $15,000,000, while in Mississippi alone it was over $6,000,000. During years when the cotton worm was doing its worst, the loss ranged from 30 per cent. to 98 per cent. of the entire crop. The Prairie Farmer for 1861, page 31, gives the following account of the depredations of the cotton ball worm (*Heliothus armigera*, Hübn.) on corn. In one county in Kansas, where, in in 1859, 436,000 bushels of corn were raised, in 1861 there were not even 5,000 bushels of wormy corn. It was the same in most of the other counties during that year. In Kentucky, whole fields of corn have been ruined by this insect, and in southern Illinois they have also done considerable damage. In Kansas, during the dry season of 1860, the ravages of the cotton ball worm reduced the corn crop to one-fifth of the average yield. In the same way numberless instances of the ravages of such insects as the Colorado potato beetle, currant saw fly, plum curculio, cabbage butterfly, wheat plant louse, Hessian fly, codling moth and canker worm might be given. The census of 1880 gave $200,000,000 as the aggregate annual loss through the agency of injurious insects, in the United States.

It is the work of the economic entomologist to find means which will reduce this loss to a minimum, with the least possible expense. The facts that for some of our native injuri-

ous insects, no adequate remedy has been found, that native species which have not been injurious, have become so through various circumstances, and also that injurious insects are continually being imported from other countries, show that the subject of Economic Entomology will ever be a live one. Many practical results have already been obtained. In 1873, the potato beetle was so abundant in the Mississippi valley, that, in St. Louis, potatoes sold for $2.00 per bushel at wholesale. Now, thanks to London purple and other efficacious remedies, people need have no further fear in this direction. Prof. Cook, in 1875, stated that if this beetle was fought by the most approved methods, it would add at least $100,000 to the wealth of the State of Michigan, during the next year. A more forcible illustration of what the practical entomologist can accomplish, is seen in the treatment of the fluted scale in California during the past year. The fluted scale was imported from Australia and became such a serious pest that it threatened to destroy most of the orange groves of California. Many remedies were tried but were found to be of no avail. An agent was sent to Australia, in order that the parasites which worked on this insect might be studied. Under Prof. Riley's direction numerous importations of these parasites were made, and through their agency, the fluted scale was exterminated. Up to the present time, remedies have been discovered and means of applying them devised, for many of our worst insect foes.

Large numbers of insecticides and patent devices for applying them, are manufactured and sold as "just the thing" for exterminating injurious insects. It is the office of the economic entomologist to experiment with these, and judge of the actual merits of each. It can be plainly seen that the farmer, gardener, or fruit grower could not carry on these different investigations and experiments for himself. It requires study, money, and time. Prof. Riley so aptly describes the work of the ideal economic entomologist that I cannot do better than quote directly from him. He says: "The economic entomologist, to do effective work, must possess not merely a knowledge of the particular injurious species and its habits, with which he wishes to deal, but must study its relation to wild plants, as well as to the particular cultivated crops it affects. He must also study it in its relations to other animals. Indeed, its whole environment must be considered especially in connection with the farmer's wants, the natural checks which surround it, and the methods of culture which most affect it. The habits of birds, the nature and development of minute parasitic organisms, such as fungi, the bearing of meteorology, must all be considered, and yet, with the knowledge that a study of all these bearings implies, he will frequently fail of practical results without experiment and mechanical ingenuity."

It might seem that the entomologist could do all that was necessary, but yet there will always be a great work for the farmer, the gardener, the fruit grower and the florist to accomplish in this same connection. Often, during the same year, crops in different sections of the country, are exposed to the attacks of different species of insects. It will be the duty of each person to observe the injurious insects of his district, and supply the entomologist with facts and specimens relating to them, so that the great work may be carried on to the best advantage.

Some Differences Between the Processes of Enameling and Japanning.

E. M. DEVENDORF, DELTA TAU DELTA FRATERNITY.

Although the processes of enameling and japanning have been known to science for many years, to the majority of people they are as yet comparatively unknown. To many the terms are synonymous, but there

are many essential differences in the two processes.

The term enamel is applied to any vitreous glaze fused to a metallic surface, though it is very often improperly used to designate the glaze seen on some kinds of earthenware. The essential difference between an enamel and a glaze is in the character of the surface to which it is applied, rather than in the kinds of chemicals used, or in the mode of application.

The process of enameling has been known and practised in many countries almost since the beginning of civilization, and has passed through many stages of development and decay. In its earliest stages it was used chiefly in the arts with a view of beautifying and making more permanent any definite design. This object was accomplished in different ways, depending upon the art with which it was being used. Sometimes the design was made in enamel alone, but more often it was used as a transparent covering and protection for pictures painted on metal plates. In case it was used alone, the design was made by applying either a single enamel or several of different colors, to metal plates prepared for the purpose with cavities, enclosed by raised lines of the metal in which to pour the enamel, leaving one substance to form the background and the other the outline of the design.

The metals commonly used in the making of these plates are gold, silver and bronze, and in the case of those fraternity and society badges that are enameled, the enamel usually forms the background and the gold the outlines of the design.

In the old and nearly extinct process of enameling painted pictures the enamel was fused onto the plate, covering the picture with a transparent layer which greatly increased the brilliancy of the painting as well as rendering it more durable. This is an example only of transparent enamel, the other colors, of course, being put to different uses.

The process of japanning is much more modern in its development, being an outgrowth of the enameling process. It is not used to beautify objects as much as enamel, but is used more for protection against the elements. Unlike enamel, it may be applied to other than metallic objects, and is very extensively used in the finishing of certain wooden articles that are to be roughly used, or exposed much to moisture, as handles of tools and tin pails. It is often regarded as a process intermediate between ordinary painting and enameling, and is extensively used in the finishing of domestic iron and woodenwares—neither of the other processes being suitable for the purpose. It is often applied to blocks of slate to make an imitation marble for chimney pieces and brackets.

The beautiful work done in this line by the artisan owes its principal features of hardness and durability to the natural varnish which forms the basis of the preparation. This varnish is the product of a tree, and is abundantly produced throughout Japan, being one of the principal articles of commerce. The methods employed in its production are very similar to those used in the production of India rubber.

In doing the finest kinds of japanning several coats of the preparation are applied, the surface being ground and smoothed between the application of each coat, giving an exceeding high polish. Wooden articles finished in this manner are often capable of undergoing great extremes of heat without injury to the surface. Those in the form of dishes are used to hold hot tea, and often highly heated spirituous liquors. Of all colors, jet black is most commonly used.

In the mode of application of the two preparations, enamel and japan, there is a great resemblance, though there are some essential differences, the principal one being the fact that enamel is melted till it forms a coating over the object, and is afterwards dried slowly; while the japan is put onto the object in a liquid state, and is afterwards

dried hard in a furnace made for that purpose. All wooden articles, to be japanned, must be thoroughly dried and oiled before the varnish is applied, else the change in shape or size during the heating process would give the coating a rough appearance.

A person unacquainted with the subject seems to have a very vague idea of the extent to which these processes are used in the manufactories of this country. He has only to look around him in almost any direction and he will see many things upon which these two processes have left their mark. The door-plate upon his own door is apt to be composed of enamel, while the lock upon the same door is incased in a coat of japan. As a rule enamel is used on the more expensive and delicate articles—jewelry, society badges, and things intended for show. Sometimes what we think is a jewel of some kind is nothing but a composition of enamel made and colored to represent it. Japan is used more as a protecting coat, and is therefore applied to articles intended for use, namely, sewing machines and bicycles. The lead-pencils and cheap pen-holders with which we are all familiar are often coated with japan, improving their appearance and increasing their durability. In this country both processes are in extensive use, and our manufacturers are noted for producing the best articles and at the lowest prices.

Sleeping Bear.

B. A. HOLDEN, OLYMPIC SOCIETY.

In the western part of Leelenaw County, on the shore of Lake Michigan, is situated a huge bluff of barren sand, about three miles wide and five miles long. On top of this bluff is another, Sleeping Bear proper. How it received the name is not known. There are many theories as to its origin, but the one most credited is the following: It is supposed that it was seen by some sailors when crossing Lake Michigan. Its appearance to them was that of a bear asleep and it is universally known by this name throughout northern Michigan.

The large bluff lies between Lake Michigan on the west and a small inland lake on the east. At the north it runs down to a distance of twenty or thirty feet above the level of the lake and then extends out into Lake Michigan over half a mile. Commencing at the north, it gradually rises as you go south until at the southern extremity it reaches a height of nearly two hundred feet. The western bank descends as abruptly as sand and gravel will lay to the beach of the lake, which is from three to five rods wide. But so steep is the bluff that a stone started at the top goes thundering down the side and out across the level beach into the foaming waters beneath. At the southern extremity so far down is this that a stone thrown from the hand appears at first to go far out over the deep water and then, as it begins to fall, it seems to come back and finally buries itself in the sand near the bottom, or in the edge of the water. In only one place is the western edge marred by a ravine, of which at a distance of ten rods only a small depression is seen; but as it is approached, the eye follows the opposite side down until as one stands upon the edge the bottom is seen. Starting from the western edge and proceeding eastward, the surface is level and is composed principally of stones. The rocks range from the size of one's head to small fine pebbles, the larger being on the western edge and gradually decreasing in size for the first mile and a half when one comes to pure white sand. This sand is not as would naturally be supposed, so soft that the foot would sink in up to the ankles, but so hard that scarcely a foot print is left. Here it begins to be rolling and the way is up and down hill, through holes or places forty to fifty feet in diameter, which were dug out by the wind. When the wind changes new holes are formed and the old ones filled, hence the surface of this

bluff varies greatly in different years and different times of the same year.

You now have reached the eastern edge but here a different scene presents itself. The sand is soft and flows down the side in rivers, as it were, on to the level grass land below. How long this has been going on is not known, but you can judge for yourself, as there are tall trees half way up the side whose trunks and most of their tops are buried beneath the running sand. This sand is brought from the western side of the bluff by the west winds.

Sleeping Bear proper is situated on the southwestern part of this gigantic bluff. It rises abruptly one hundred feet from the level surface of the large bluff. The sand here is kept from running down the sides by a slight vegetation of grass on the north and a small dense growth of birch, cedar and popple, on the east and south; while the west side is bare from the top to the beach, a distance of nearly three hundred and fifty feet. Here the northeast portion is hollowed out in the form of a washbowl, while on the southwestern part a sharp spur, densly wooded with mountain ash, popple and elm interwoven with berry bushes, rises a distance of nearly fifty feet. This is by far the highest point on the bluff and is the part supposed to be the bear's head. Here by climbing a tree in order to get a clear view above the surrounding shrubbery, ships may be seen far out on the deep waters of Lake Michigan. By the aid of a glass the shores and much of the rich farming lands of the interior of Manitou Islands can be seen. On the other hand the eye sweeps over a large expanse of forest, dotted here and there with little villages, broken with small clearings, with the clear blue water of many lakes and with ridges and small hills which in any season of the year except winter, makes the scene one of unsurpassed beauty in northern Michigan.

The vegetation has in part been mentioned. A few rough, sickly popple may be seen scattered about on the sandy portions of the bluff, laboring hard for their life. The sand cherry has its home here, and on many places of the bluff is very luxuriant. The pitcher thistle is here quite common, as well as a small grass, which when growing, rolls its blades in the form of a sharp needle. This is often the source of much displeasure to the barefoot traveler as well as of much amusement to his companions.

SCIENTIFIC.

The Water Beetles of Michigan.

Water beetles are divided into four families, each of which has distinguishing characteristics by which they may be easily classified. The first family, *Haliplidæ*, is very small, containing but seventeen species, which are divided among three genera. Of these seventeen species, only five have been found in Michigan. The *Haliplidæ* are very small, and by many amateur collectors are discarded on this account. But to an entomologist the smaller forms are most prized, for as a rule they are most rare in collections. The members of this family can be readily distinguished from the other families by their general shape and the number of joints to the antennæ. In shape the head is small, thorax and anterior part of abdomen broad, the posterior part ending in a sharp point. The antennæ have but ten joints, while in other families of water beetles they have eleven.

The next family, *Dytiscidæ*, is the largest family of water beetles, and consists of many species of different sizes. The general shape of these, however, is the same, being more boat-shaped than those of the preceding family. The antennæ are filiform. There is one species which is very common in this locality, which is the pride of the water beetle collector, as it is the largest species in the family. This is *Dytiscus Harrisii*, named after the pioneer entomologist, Thomas Harris.

The members of the third family, *Gyrinidæ*, are the most easy to classify of all beetles. This family includes the "water whirlers," which are so often seen swimming in circles on the surface of stagnant pools. They remain on top of the water almost entirely, seldom diving unless frightened. Living in this manner, they have need to see objects out of the water as well as objects in the water, and for this reason they are provided with four eyes, two above and two below. The members of this family are quite common in the ponds of the wild garden, but are seldom seen on the river or on any rapid stream.

The last family, *Hydrophilidæ*, are the "water scavengers." These feed almost entirely on vegetable matter, while the members of the preceding families feed more on animal life within the water. The distinguishing characteristic of this family is in the antennæ, which are clavate, the three outer joints forming a distinct club. The general shape of the members of this family is nearly like that of the *Dytiscidæ*, but there is, however, a difference which is best shown by comparing them to row-boats. The flat-bottomed boats would be represented by the *Dytiscidæ*, while the round-bottomed ones would resemble the *Hydrophilidæ*.

The transformations of all water beetles are nearly the same. The eggs are laid in the water, generally attached to grass, chips, etc. From these, in about two weeks, the larvæ hatch. The larvæ are predaceous, feeding on lower forms of life. The larval state lasts about two months, when the larvæ crawl up the bank and pupate under about three inches of earth. If in early summer, the mature beetles will emerge in a few weeks, but if in late fall, they do not appear until the next spring.

It is interesting to watch water beetles secure their supply of air. The mature beetles do not breathe the oxygen of the water as do the larvæ, but come to the surface every few moments for a bundle of air, which they carry around with them secreted under the wing covers. That water beetles when flying are attracted to the water by its shining surface is shown by the fact that they often alight upon greenhouses, mistaking the shining surface of the glass for water.

In collecting insects there are many things to be learned as to time, place and manner of securing specimens. Much depends on where the collector looks for his specimens. Of course everyone would look for water beetles in the water rather than on land. This is as it should be, as the water is their natural habitat. In order to collect them, a dip-net is necessary. This is made of screening, about three or four inches deep. I have found, however, that a plain piece of screening fastened to a common net answers all purposes, and can be made much easier. Fasten this to a long pole, drag it along the bottom of some pool, and you will be surprised at the number of water insects which can be collected. But one can secure the greatest number of water beetles in a certain time by collecting under an electric light. Here they are attracted by the strong light, and congregate in great numbers. The larger forms are most easily taken here.

H. E. WEED.

Mechanical Club.

The Mechanical Club met in the Mechanical Building, June 13 and listened to the following program: Storage Batteries, Mr. Spaulding; The Modern Torpedo Boat, F. Goodenough; Diamond Cutting, A. F. Stowe; Wire Drawing, J. Potter: Measuring the Base Line, C. E. Ferris.

Secondary or storage batteries are designed to store up electrical energy, which is accomplished thus:

The plates, composed usually of lead, are placed in a solution of diluted acid. A current is then sent through them which produces chemical changes in the solution. This process is continued until the battery

is fully charged, when the current is shut off and the battery is ready for use.

The storage battery is far from an unqualified success, though it has been used to provide energy for car and boat motors. The principal objections to them are their weight, expense, and liability to get out of order. Their life is limited to six or seven years, on account of the decomposition of the lead.

A torpedo boat, invented by Edison and Simms, stands at the head of such boats at the present time. This boat is long and narrow and so arranged as to navigate under water. The power is furnished by a storage battery and the boat is entirely controlled by means of a wire connection with the operator. It can be operated at a distance of fifteen hundred yards, changed in direction and even brought back to the starting point.

In the present method of wire drawing, reels are used to wind up the wire and pull it through draw plates, at the same time. Brass or iron wire can be drawn by this means at the rate of from one to four feet per second, gold and silver wire as high as six feet per second. The draw plates are about six inches long and one and one-half inches thick and are made of hardened steel. These plates are filled with a series of conical holes of the desired size.

By enclosing a platinum wire in ten times as much silver and drawing out the bar, a wire has been made, a mile of which weighs less than one grain. One hundred fifty filaments of this wire would equal in size an ordinary filament of silk.

Wire gauges range from 0000, which is 1-454 of an inch in diameter, up to No. 36, which is 4-1000, and from 1-1000 by regular gradations up to 1-2 inch. 1-000 being No. 1, 2-1000 being No. 2, and so on up to No. 500 or one-half inch.

The apparatus used to measure the base lines upon which all triangulation is founded was invented by Prof. Backe, Superintendent of the United States Coast Survey. This instrument is made to such a nicety that repeated measurements of a line twelve miles long varied less than 4-100 of an inch.

Natural History Society.

At the meeting of the Natural History Society, June 20, Miss Jessie Beal gave an interesting talk on the development and characteristics of slime moulds, illustrating her remarks with numerous drawings.

She said: "The *Myxomycetes*, or slime moulds, belong to the lowest division of plants, and consist merely of a naked mass of protoplasm, varying in size from a minute speck to a mass nearly a foot in diameter. There are some hundred and fifty species, which are found on old sticks and leaves in damp places.

"The life history of these low organisms begins with a spore, which, being exposed to the proper conditions, bursts, and the protoplasm forms what is called the swarm-cell. This contains a nucleus and a pulsating vesicle; the latter allying it closely to some of the lowest animals. It moves about freely with an amœba-like motion, aided by cilia. The swarm-cells multiply by division very rapidly, so that immense numbers are produced in a short time.

"Their further development consists in their uniting together to form the plasmodium, the large mass of protoplasm before referred to. This plasmodium moves about like the amœba, by extending and withdrawing pseudopodia. There is also a slight rising and falling of the mass near the edges as well as a streaming motion in the inner protoplasm.

"Both swarm-cells and the plasmodia may remain for some time in a resting state. The swarm-cells and young plasmodia assume a spheroidal shape, and inclosed in a cell

remain in this condition until again subjected to moisture, when they assume their original shape with their characteristic motions. The plasmodium, in its resting state, draws in its processes and forms a sieve-like plate. The solid matter, which is often carbonate of calcium, is exuded, and the whole body breaks up into innumerable very minute cells. In this state it may retain its vitality for six or eight months. When subjected to moisture and heat the cells extend pseudopodia, move about and coalesce, thus forming the plasmodium as before.

"The sporangia, or spore cases, are formed in many ways, varying with the species. In this specimen, found on an oak leaf, the plasmodium grows up with minute pedicles, upon the apices of which grows a flattened bunch, the whole looking like a minature mushroom. The frosty appearance is due to the carbonate of calcium which exudes and then crystallizes upon the outside. Inside these sporangia the spores are formed which finally burst forth to develop into the swarm-cells."

In the discussion which followed Miss Beal's talk, Prof. Cook stated that a German chemist had succeeded in manufacturing a substance which seems to possess all of the properties of protoplasm.

Mr. H. J. Hall then gave the following talk on "Plant or Animal, Which?"

The *Euglena vividis* is found in late spring floating in masses on stagnant ponds, forming a thick green scum. The individual organisms as seen under the microscope consist of a thin sac, filled with granular protoplasm colored green. Each has a slender flagellum near the base of which is a minute red dot called the eye-spot. Each moves independently through the water with a contractile, twisting motion, which gradually becomes less rapid as the animal changes from an elongated to a spherical form, about one three-hundreth of a millimeter in diameter. They then become encysted and either break up or segment, forming new individuals.

The *Englenæ* are chiefly interesting as they show symbiosis, the association of certain chlorophyll-bearing plants with certain animals, a condition frequently met with in the study of lower life. Each individual of the *Englenæ* is supposed to be an animal, bearing within it green algæ identical with or closely resembling protococcus. The relation of plant and animal is here ideal, as the carbonic acid and nitrogen given off by the animal nourish the plants contained, and the oxygen exhaled by the plants furnishes food to the animal. This is not parasitism and there is no weakening of the animal, for species of the sea-anemone containing algæ far outnumber all others combined. The whole subject needs further very careful investigation.

Following Mr. Hall, Mr. Munford gave a short talk on "Farm Experiments," which we omit, since practically the same ground is covered by Mr. Holden's article. Under the head of "Observations," Mr. C. F. Baker made the following remarks on willow galls:

During the past winter at least six different kinds of galls were found to be very common on the willows along the river. Upon investigation, two kinds in particular proved especially interesting. One of these, produced near the ends of the smaller twigs, is caused by a fly, *Cecidomyia salicis*, Fitch, while the other, which appears as an enlargement of the branches or of the main stem, is produced by either Saperda concolor, an unknown Buprestid, or an Aegerian, all of which are found living in it. In the galls of the first kind examined, now and then specimens would be found which contained a brown Tenthredinid larva instead of the Cecedomid fly. Of several hundred which were examined, over fifty per cent were parasitized. The parasites, of which there were two species, were chalcids. In the galls of the second kind examined, large

numbers of the larvæ of Saperda concolor were found, but only one Buprestid larva and three Aegerid larvæ. The Buprestid is about half an inch long, and black in color. The Aegerian is two or three times as large as the common currant Aegerian, and has a black body with one yellow band around the front part of the thorax and three around the abdomen. The legs are orange colored, and the wings brown. A tenthredinid was also found in this gall, which closely resembled the one found in the other gall in every respect except size. Of parasites, three species were found, an ichneumon and two species of chalcids. Which of the inhabitants of the gall causes it, and which the different parasites are parasitic on, yet remains to be determined. The Aegerian is probably rare, as no specimens of it are in the McMillan collection, which is supposed to be very complete as far as the Aegeriadæ is concerned. The study of the relations which the different inhabitants of these galls bear towards each other, would undoubtedly prove very interesting.

The Drumming of the Partridge.

In the so-called "drumming" of the ruffed grouse, that soft murmurous tattoo by which his ardent lordship musters his little company of willing captives, we have another familiar sound as yet as much wrapped in mystery as the "boom" of the nighthawk. What is the origin and nature of that "drum" which has so long puzzled the world? Many naturalists have definitely located this mysterious drum, the hollow "drumming log" having long been considered a necessary adjunct to this muffled roll. Such has been the most commonly accepted theory, seemingly abetted by the bird itself, from its singular preference for a fallen log as the seat of the musical performance. Brewer claims that the bird "beats its sides and the log" simultaneously—a belief which is shared by Samuels and many others. Against this I would oppose the witness of an unprofessional but close observer—the writer, in truth—who deposes, and says that the bird does nothing of the kind; that in the one instance, though brief, when its movements were observed by him, the clearly defined limit of the visible whirr of the wings, seen from behind, demonstrated that no feather of the bird's wing touched the body, or the log upon which the bird stood; while, upon the other hand, the featherly halo almost merged over the back, suggesting a new possibility in the resonant course. —*W. Hamilton Gibson, in Harper's Magazine.*

By good fortune I once had the opportunity to see a partridge in the act of drumming and to observe his movements closely while he drummed a number of times. This was when I was a boy and studying nature at first hand while sauntering through the dense woods of Lenawee county.

The partridge was on a moss-covered log about 15 inches in diameter and about a foot above the surface of the ground. The log was not hollow. I was within two rods of the bird, nearly in front, and could distinctly see all his movements, as the bushes were not in leaf at this time, He faced the length of the log and between drummings sat on the log. Before drumming he rose to his full height, inflated his lungs, swelling out his breast very perceptibly. He then began to beat his sides and breast with his wings with a slow movement but gradually increasing the rapidity of the beats till the full rolling sound was attained. The drum-drum-drumming at first was synchronous with the beat of his wings, and distinguishable as individual sound and motions, but as the rapidity of the wing-beats increased, the drum strokes increased equally until the movements of the wings and the drum taps could no longer be distinguished as individual motions or sounds. He did not beat the log in any of the drummings I witnessed but stood at full height above the log. He rehearsed his piece five or six times before he saw me and took wing in flight.

Good opportunity was thus afforded for observing and studying his movements. There could be no doubt of the synchronism of the wing-beats and the drum-drum-drumming of his love-call, especially in the begin-

ning. The sound is not produced by rapid air-beats as in the humming-bird and mosquito. No one watching the drumming in front of the bird could remain in doubt on this point. The *drum* is the air-filled chest of the bird, and the *drum-sticks* are the bird's wings. The log has no essential part in the performance.

Viewed from behind it is easy to see that the whirr of the wing feathers might give a very different and misleading impression.

R. C. KEDZIE.

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AGRICULTURAL COLLEGE, JULY 10, 1890.

THROUGH an error in reading our proof last month we were made to say "A list of books costing $32.60 at the college, can be purchased for $1.49 of the Ann Arbor firm" (Sheehan & Co.) "just mentioned." We meant to say $1.49 *less*.

THE utterly unfit condition of our water closets is something that demands immediate attention. With no adequate system of drainage they are becoming more offensive each year. If the health of the students is to be considered, if the good of the institution is to be furthered, the authorities should begin a reform in this direction at once.

THE rustic bridge near the Botanic Garden is becoming most woefully dilapidated, so much so that one risks his neck in venturing across it. The danger to persons in the day time is much, but at night it is greatly augmented. The railings are fast rotting and falling into the ravine below, while some of the lower timbers have ceased to do duty. It's about time a new bridge was constructed or the old one *re*-constructed. A fine new rustic bridge finished before commencement would add materially to a portion of the college grounds, already a favorite for its picturesqueness.

A PROTEST has gone up all over the State against such disgraceful performances as took place at Ann Arbor last May. This protracted outcry has not only produced a decided sentiment against bloody boxing matches, and a conviction that participants in them should be punished, but the existence of all boxing matches at Michigan field-days is threatened. The faculties of several colleges, including that of the University, have prohibited boxing at field-days.

We do not think this just. The great majority of boxers are able to keep their good temper, and the fact that a half dozen youngsters make savages of themselves is not sufficient reason for abolishing boxing at all our field-days.

WITH this issue of THE SPECULUM closes the work of the present Board. During the year the paper has undergone only a few changes, and none of them sweeping, but we sincerely hope that it is more firmly established than ever before. Within a few weeks, perhaps before the issue of the August number, a new society, the Hesperian, will be admitted to representation upon

the Board of editors. This cannot fail to promote the efficiency of THE SPECULUM. The work of publishing a college paper savors more or less of a task; yet the Board does not turn the responsibility over to other hands without the feeling that after all the "SPEC" has been our friend, that we are losing a companion that will be missed.

Before laying aside its work the Board wishes to acknowledge its indebtedness to the members of the faculty for the help they have so cheerfully rendered. We feel that the efficient and pleasant manner in which they have ever aided us has gone far toward giving the paper what excellence it may claim.

ANOTHER of the older members of the faculty, and one of the staunchest supporters of the institution has lately been called to a higher position. Prof. R. C. Carpenter has been tendered the position of Assistant Professor of Engineering at Cornell and has accepted. The work will be largely experimental and this principally machine testing.

Prof. Carpenter graduated from this college in 1873 and from the University in '75. From the fall of 1875 till 1878 he held the position here of instructor in the Department of Mathematics, after which he became Professor of Mathematics and Engineering, his present position. He has seen the attendance more than double, and the capacity and influence of the institution immensely increased. In 1880 Prof. Carpenter became a member of the Michigan Engineering Society and has since been intimately associated with the proceedings of that organization. From 1882 to 1886 he held the office of its secretary; he was elected to its presidency for 1890.

Though we students feel that in his new position Prof. Carpenter can better serve his profession and himself, yet we will witness with extreme regret the departure of our kind and efficient professor.

THE question as to what is the best plan upon which to conduct our boarding system is one that is constantly coming up for the consideration of the students. More than likely another year or two will bring a necessity for a change, and, for that reason, any new plan is worthy careful thought. In the report of Harvard College for 1888–89 is given a short resumé of a club, known as the Foxcroft Club. Each dish is charged for individually and considerable opportunity for selection is given. We give a portion of the table of prices.

BREAKFAST AND LUNCH.

Oatmeal and milk (a large saucer of oatmeal and a gill of milk), sugar free,	4 cts.
Crackers and milk,	7 "
Bread (two slices),	1 "
Butter (about 1¼ x 1¼ x ½ inch),	2 "
Baked apples (two, with milk),	3 "
Cold meat,	7 "
Hot potatoes (baked, one large or two small),	2 "
Hot baked beans (large plate),	5 "
Hot eggs, boiled, dropped, or on toast (two)	8 "

DINNER.

Soup, various kinds,	2 cts.
Hot meat and potatoes (a fair slice),	9 "
Hot pudding,	5 "
Pie,	5 "

AT ANY MEAL.

Coffee (a gill of milk, sugar free),	3 cts.
Tea, with milk and sugar,	3 "

The report says; "Any student who is forced to economize can procure at the club a luncheon for ten cents and a sufficiency of plain food for a day for thirty-five cents." The majority of M. A. C. students are blessed with vigorous appetites, and with the scale of prices just given, would find no difficulty in running up a bill of twenty cents for a meal. Ignoring the fact that we eat more than do the students at many other colleges, our prices are lower than are those just given. The price per day in our most expensive club is about thirty-six cents, and the average is much below this, while, according to the report, the average cost on this European plan is thirty-five cents. The advantage seems to be in favor

of our own system, nevertheless, the new scheme might possibly be adopted here with success. It might be found that under our system of buying and our manner of hiring cooks that the prices of some of the dishes might be reduced. The new plan is worth considering, at least.

THE Inter-state Oratorical Association comprising Ohio, Indiana, Illinois, Wisconsin, Minnesota, Iowa, Kansas, Nebraska, and Colorado, held their annual contest last June. The men who organized our own Association took for their model this same Inter-state Association. Some curious facts and some worthy the attention of the M. A. C. association are brought to light by the table of percentages and rankings of this last Inter-state contest.

It will be remembered that in our contest last fall a disagreement arose as to the right manner of ranking in cases where the judge saw fit to mark two orators tie, it being maintained that two men cannot occupy the same rank, that they should be placed half way between the two ranks which they would have occupied had no tie occurred. For example, A's percentage gives him first place in a certain judge's marking, but B and C are marked the same. Now, shall we place B and C in rank 2d, or where? By some singular arguments it is claimed—and so decided—that these unfortunates should be placed in the 2½th rank. By so reasoning, our logicians seem to overlook the ludicrous error they fall into in thus denoting sequence by fractions, while, also, the two orators, B and C, are both second in order from A in spite of this ingenious contrivance to place them otherwise. This fractionalizing of ranks shows its effects when the sum of each orator's ranks is taken to denote his final standing. By the method three orators shared the honors of first place in the M. A. C. contest last October.

If we examine the table of rankings and percentages of the last Inter-state contest, we shall find that in several instances two orators have been given the same grade by the same judge; in fact, the third judge, on delivery has set the orators off in pairs, yet the committee in making the rankings from these percentages saw nothing wrong in putting two orators in one rank indicated by an integral number. In the columns of the judge just instanced occur the ranks 1, 1, 2, 2, 3, 3, 4, 4, although eight men competed.

This putting eight orators into four integral ranks comes far from harmonizing with the blundering, bull-headed manner in which our committee arrived at their ridiculous decision, yet it is the method by which the great Inter-state contests are decided.

To the Editor of The Speculum:

During the last year I have been a careful student of THE SPECULUM, and have been helped and encouraged by the study. It is always a help to a college president or professor to know that the very large majority of the students favor good order, and earnest work, and clean living, and to learn from the work that they do that they are profiting by their study.

In its editorial statements THE SPECULUM has shown careful thought, a sincere spirit, and freedom from prejudice and passion. The contributors have nearly all written articles of interest and real value, indicating careful preparation, and an interest in important themes. The news and personals have shown a genuine newspaper instinct in getting hold of all that is going on. The advertising pages have been entirely free from objectionable announcements, a freedom which I appreciate the more highly as I see how many secular, educational, and religious papers publish advertisements of a very objectionable character. I know that the course of THE SPECULUM has won for it many friends, for members of the faculty and of the Board of Agriculture have spoken to me, commending it in warm terms; and letters which come to me from the alumni make not infrequent mention of

it. That our college paper under other editors in coming years may be equally strong and pure is, I am sure, the hearty wish of all its best friends. O. CLUTE.

July 7, 1890.

COLLEGE NEWS.

Mr. Cordley's sister visited here.

Mrs. Durand's sister was here a few days.

A new self-binder in the agricultural department.

Experimental grasses on the Delta are prospering.

A new hydrogen apparatus for the chemical laboratory.

The annual catalogue of the college is now being printed.

Mrs. Carpenter, mother of Prof. Carpenter, was here on a week's visit.

Prof. Durand is to have charge of subsequent classes n Strength of Materials.

Mr. C. H. Baldwin, of Dayton, Ohio, father of Mrs Cook, spent a few days at the College.

Prof. Taft is to conduct experiments at the forcing-houses to test heating apparatuses, etc.

Brown, the photographer of Lansing, has been taking many views and groups at the college.

The number of students enrolled during the year is about 350, the greatest number yet attained.

The botanic garden has been enlarged and now is in about as fine a condition as for a good while.

J. W. Toumey, of the botanical department has been home on account of the sickness of his sister.

The annual reports of the Board of Agriculture for 1889 are out and are being mailed in bulky quantities.

Prof. Anderson, of the English department has resigned, his resignation to take place the end of this term.

Two or three cases of genuine measles recently appeared, but prompt measures prevented their distribution.

Mrs. L. G. Carpenter is spending a few days here. Prof. L. G. expects to stop here on his return from Washington.

The Y. M. C. A. is getting out a new hand book. It will embrace many characteristics of last year's and many new ones.

Seniors, from experience, can predict for the Juniors a delightful time in their class-day at Grand Ledge, the 18th of this month.

Books added to the library this last month by purchase, 54; by donation, 68; from the bindery, 56. Number of visitors, 74.

V. H. Lowe has gone, as representative of the Y. M. C. A., to Moody's summer school at Northfield, Mass., for a stay of two weeks.

The old gas-machine in the chemical laboratory has given out after a usefulness of fourteen years. It will be replaced by a new one.

President Clute attended the quarter-centennial exercises at Hope College, where he took part in the program. Hon. C. W. Garfield also attended, as representative of the State Board.

Mr. Wheeler has been on a collecting tour through Berrien, Cass, St. Joseph, Monroe and Ionia counties. He returned with his arms full.

This year is remarkable in that so little honey has been gathered. Up to June 22 the bees had done practically nothing in that line.

Prof. Cook, president of the entomological club of the A. A. A. S., expects to attend the meeting at Indianapolis, Indiana, August 19.

The Veterinary Department has a dozen guinea-pigs, four of which are Abyssinian. They are kept for experiment in animal diseases.

Prof. P. B. Woodworth, of the physics department, recently received a diploma from Cornell University in M. E. with special mention of E. E.

Pipes have been laid, and gas is now conducted from the Mechanical Building to the Veterinary Laboratory, to aid in the investigation of animal diseases.

On the evening of the 27th ult. the "Phi's" celebrated with a "blow-out." All had a very enjoyable time, as was indicated by the late hour of breaking up.

The Morrill bill, mentioned in our last issue, has passed the Senate, and we are now almost ready for our "chunk," if the House sees fit to be so generous.

Wm. Merrylees, nephew of Mrs. Clute, from Melbourne, Australia, spent a few days here a short time since. He was en route for Scotland and expects soon, with an uncle, to make a tour of our country.

Dr. Beal went to the Walton and Baldwin experiment stations the last of last month. He reports things quite promising. The oldest resident at Baldwin says this is the best season in his experience.

Two genuine rattlesnakes, *Crotalus horridus*, have been shipped to the college, one from Louisiana and the other from Pennsylvania. They are about twice the length of the ordinary massassauga, being about five feet in length.

Prof. F. S. Kedzie and wife contemplate spending the winter in Europe. Mrs. Kedzie will leave in the latter part of the summer, followed by the professor in November, who will not return in time for the spring term.

On Friday eve, June 27, Prof. Beal, of Albion, gave an entertainment of dramatic readings in the college chapel. He was assisted by Miss Etta Carrier of Lansing. The programme was very much enjoyed by all who listened to it.

Mr. Wessels, of South Africa, accompanied by Mr. Kolvoord, of Battle Creek, visited the College June 12. Mr. W. and brothers carry on farming, and he is making an extensive tour of the United States, studying our methods of agriculture.

At the annual business meeting of the Y. M. C. A., July 1st, the following officers for the ensuing year were elected: President, K. L. Butterfield; vice president, W. O. Hedrick; corresponding secretary, M. S. Gregory; treasurer, Burnam.

During the month of June there were six thunder-

storms. The total rainfall for the month was 3.92 inches, a little below the mean. The greatest fall was 1.03 inches on the 10th and 12th The lowest temperature was on the 7th, it being 39°; the highest was on the 28th, it being 92°.

At a meeting of the State Board coming vacancies in our corps of instructors were filled as follows: Lieut. W. L. Simpson, U. S. A., of our military department was unanimously elected to fill the chair of mathematics left vacant by the resignation of Prof. R. C. Carpenter, who accepts a professorship at Cornell University; Prof. Howard Edwards of the Arkansas Industrial University at Fayettville, Ark., takes the chair of English literature and modern languages left vacant by the resignation of Prof. Anderson. Prof. E. comes well recommended, having spent many years of special work in the line of his prospective work here; Prof. Davenport, last year, was made Professor of Agriculture on one year's probation. The general satisfaction of his work has been such that he has been installed indefinitely as professor of that department; Albert Curtis, of Lansing, is to occupy the position of foreman of the wood shop, left vacant by the resignation of Mr. Campbell. For many years Mr. Campbell has labored in the capacity of foreman, and all who have been under him recognize him as a proficient workman. He will leave many friends among his acquaintances here. Herbert Thurtell, '88, for the last two years instructor in mathematics here, was promoted to assistant professor of mathematics; W. J. Meyers, '90, takes the position as instructor in mathematics left vacant by the resignation of F. H. Hall, '88, who accepts a government position as topographic aid on the geological survey; F. J. Niswander, '89, is to fill the place of A. B. Cordley, '88, in the entymological department, provided the latter accepts the proffered position at the Virginia Agricultural College, and G. C. Davis, '89, is to fill Mr. Niswander's place; H. J. Hall, '90, will take the place occupied by D. Anderson, '89, on the horticultural department, as Mr. Anderson expects preparing for the legal profession.

Our Summer school has called out the following:

Edwin De Bar, from Almont, Michigan, works here in chemistry.

Miss C. A. Burnett of Bancroft, Mich, takes geology and botany.

Miss Janet Claflin, of Toledo, Ohio, making special study of botany.

W. F. Seed, of the Lansing High School, is taking botany and chemistry.

H. W. McArdle, M. A. C. '87, of Homer, is occupied in botany and geology.

W. T. Kidd represents Allouez, Mich. Chemistry and geology are his specials.

Miss Katie Lapman of Evarts, Michigan, will devote her time to drawing and geology.

F. W. Nagler of Freeport, Michigan, pays attention to chemistry and shop-practice.

Miss Adah Curtiss, teacher from Owosso, Mich., favors botany, geology, physics and entomology.

C. E. Cone comes from Vandalia, Michigan. Spends his time in chemistry, physics, botany and zoology.

W. C. Hewitt, of Normal '82, principal of schools at Three Rivers, studying chemistry and physics.

D. W. Duffield, '89 of the Normal, teacher at Saginaw, Physics and botany are meeting his attention.

A. C. Roberts, of West Bay City, class '89 of the Normal. Physics and chemistry are his specialties here.

W. S. Palmer, M. A. C. '89, teacher in the seminary at Ypsilanti, Michigan, is occupied in botany and chemistry.

L. E. Miller, Normal '88, principal last year at Birmingham, next year at Hanover, spends his time in chemistry and astronomy.

A. C. Grawn, class of '82 of the Normal, teacher at Traverse City, Michigan. Physics and quantitative analysis were his specials here.

Henry C. Houvenir, formally at Albion, now teacher at Caseville, Michigan. Specializing here chemistry, rhetoric, botany, and geometry.

Mrs. G. V. T. Comstock, of the Normal '85, and superintendent of the schools at Stanton, Michigan, is here for work in physics and geology.

E. S. Ferry, a graduate of Cornell University, with the degree of B. S., at present professor of sciences at Kalamazoo. Chemically occupied with us.

Miss M. A. Cummings, class of '90, of Olivet, and preceptress of the schools at Cadillac next year, is occupied in our chemical and physical departments.

L. D. Remmington, originally with class '89 of M. A. C., attended Normal after leaving here, goes to Fenton next year as principal. Delving in physics and chemistry.

R. C. Crawford commences his fourth year next year as principal of the schools at Richmond, Michigan. Taking chemistry, physics, botany, physiology and entomology.

Miss E. Jeffreys, teacher of the sciences in High School of Portland, Michigan, a graduate of Oberlin, O., devoting her time at M. A. C. with botany, chemistry, and physics.

PERSONALS.

We desire the earnest co-operation of every person who has ever been connected with the college in trying to make this department an interesting one. Let every alumnus and every person who has been with classes here send in news to the editor of this department, often, thus making his work much easier and the department more interesting to all.

'64.

Lewis Vanderbilt is prospering at Pittsville, Shasta Co., Cal. His experience during the years since he graduated leads him to speak in strong praise of the system of education at this college.

'71.

Prof. B. D. Halstead of Rutgers College, N. J., writes, "more than all I bless the day that I decided to go to the M. A. C. It has kept me in line with industrial thought and opened up the field of natural sciences, in which ever since it has been my pleasure to drive a harrow if I could not hold a plow."

'73.

R. M. Brooks answered to Death's "roll call" last winter in Lansing. He was a member of the first class in 1858, entered the army as a volunteer in 1861, and for a time endured all the horrors of prison life at Andersonville. He returned to M. A. C. in 1871 and completed the course. He was, in every respect, a model husband, a gallant soldier, and a true citizen.

'74.

M. T. Rainer writes from Kingsley, Iowa, in health and prosperity. He says: "The surroundings of the M. A. C. and the training I received there, and especially the influence of Dr. Abbot and Prof. Fairchild were the means of shaping and developing my life."

C. L. Ingersoll hopes to be at M. A. C. in August.

R. H. Mc Dowell is conducting the experiments of the Colorado Agr'l College this season, the Professor of Agriculture having just resigned.

Of all the letters we have received from all sources, one lately received from Donald MacPherson was the fattest, most politic and most fruitful of advice. He is in the practice of law at Washington, D. C., and farming at long range in Montcalm County, Mich. His home is brightened by an eighteen months old boy, wise and bright—like his mother.

'76.

J. D. Stannard is county surveyor and a busy engineer at Greely, Col.

'77.

Albert Dodge is a lawyer at Fowlerville, Michigan. He is secretary of the I. O. G. T. of Michigan and second vice president of the same Association in U. S. He is also chairman of the Prohibition State Central Committee, secretary of the Fowlerville Agricultural Society, and superintendent of the Demorest Medal Contest Bureau. We wonder if he has time to eat.

E. H. Hunt is handling a new style low down binder at Saranac, Mich.

'78.

Geo. E. Breck, a lawyer of Paw Paw, Mich., took passage at Montreal for England, July 5. He intends purchasing a cargo of pure bred Cleveland Bays and Shropshire sheep.

Dr. J. S. Pardee is permanently located at Three Oaks as a successful practitioner.

'79.

M. S. Thomas, his father and brother, are engaged in the dairy business at Decatur. Their business is increasing to such an extent that they are compelled to double their herd of Jerseys next year to meet the demand.

Prof. L. G. Carpenter, for the past six weeks has been trying to be in two places at once—attending to college duties and carrying on an investigation of artesian wells ordered by Congress, covering Colorado and New Mexico. In writing to President Clute about the proposed history of M. A. C., he says:—"The more I see of the growth of other institutions, the more important has seemed to me the work which President Abbot performed at the college in guiding it, when there was no model, and when the idea of agricultural education was laughed at and derided. The later graduates know very little of President Abbot and he himself was so quiet and modest that it needs some one to show the importance of his work."

C. S. Guile graduated at Ann Arbor, in the Law Department in 1883, and is now rapidly coming to the front as a lawyer at Bellaire, Mich.

WITH '79.

C. E. Ingersoll, after three years experience in southeastern Colorado, gave up farming without irrigation, and is now "on the road" with headquarters at Denver, Col.

'81.

Byron S. Palmer favored Prof. Cook with a most beautiful little card, announcing the birth of a girl baby. What is singular about it is that it is just three years to the day since a similar card announced the birth of a boy.

Arthur Jones is a lawyer at the flourishing city of Muskegon. He thinks Muskegon, with its cool and pleasant climate, and its affable people, the city elect of God. He says, "Only words of praise for M. A. C. are heard in Western Michigan."

Chas. McKenney and Miss Minnie Aldermar, of Vermontville were married June 25.

Alva Sherwood is in partnership with E. K. Warren in breeding registered stock at Three Oaks, Michigan. He is married and doing a splendid business.

'82.

G. W. Thompson, formerly a lawyer in Minneapolis, for the last six months has been dealing in real estate at West Superior, Wisconsin, and has made a small fortune in a short time. For the benefit of the boys lately graduated and those graduating this year Mr. Thompson says that West Superior is one of the best places for an active young man with a limited capital.

W. T. Langley is superintendent of the schools at West Superior, Wis. He is succeeding in making himself very popular and his schools a success.

'83.

Clarence M. Weed is doing excellent work in the Department of Entomology at the Ohio Experiment Station, Columbus, Ohio. His latest work is "A Monograph of Harvest Spiders of America, North of Mexico."

W. H. Bahlke recently visited at the college. He is organizing a Farmer's Institute in Gratiot County.

J. H. Smith has been re-elected Principal of the Rogers Park School in Chicago, at a salary of $1,600. As this is quite an advance over his salary last year, it shows that Jeddie is "getting there" right royally.

'84.

Chas. McDairmid is doing good business breeding Hereford cattle and Cotswold sheep at Bear Lake, Mich.

Fred and C. E. Herrington are familiar names at Basth Block, Denver. They are making a success, socially and financially.

J. J. Bush is one of the efficient aldermen of Lansing.

Colon C. Lillie took unto himself a wife, June 27, 1890, in the person of Miss Julia Lawton, of Coopersville, Mich.

'85.

E. T. Gardner remits in splendid style and says he is always glad to get THE SPECULUM. In his letter, Mr. Gardner incidentally offered us some valuable hints about the management of our college paper. It strikes us that when the alumni can advise us or help us in any way they are responsible for their failure to do so.

WITH '86.

J. J. Jakeway, who lives at Benton Harbor, Michigan, went to Chicago, June 9, to work in a commission house.

H. A. Snowden is now at Arlington, Mass., working in a market garden. He has invented a fich-plate for railroads, from which he expects to reap a fortune.

'87.

H. H. Winde is U. S. census enumerator at Brampton, Mich. His favorite yell is; "'Rah for M. A. C. and THE SPECULUM."

We noticed in the last issue that H. L. Chapin had gone on a surveying trip in the southern part of the State. That statement was really true, but he was surveying the rosy cheeks of Miss Ina M. Daglish. The marriage occurred May 29.

WITH '87.

H. S. Thiers of Hollyrood, Kansas, and Miss Mertie Flanders of Ellsworth, Kansas, were married May 24. Mr. Thiers has changed his residence from Langley to Hollyrood. THE SPECULUM extends congratulations.

'88.

W. M. Munson spent a few weeks here studying botany.

H. B. Cannon intends resting up until next fall, when he will take a course in law at Ann Arbor.

WITH '88.

D. M. Myers is superintendent of schools at Ada, Mich.

'89.

D. Anderson leaves the Horticultural Department in August, and intends to study law at Memphis, Tenn.

E. A. Holden has invested in a hundred and sixty acre farm, and has settled down to business. He is president of the local board of P. of I.; also holds the same position in the county board of that society.

J. W. Earle has succeeded in establishing quite a reputation as a teacher, and will hold forth as principal of public schools at Wawaka, Ind., next year. Shake, "Deacon."

WITH '89.

Henry Avery of Port Huron was visiting at the College a few days recently.

From report, W. J. Myers gave excellent satisfaction in Colorado.

WITH '90.

Jay Rogers is head over heels in the stock business. He says: "When the wind blows right I shall steer for M. A. C. again. Possibly I shall be there at commencement this year."

Misses Champion and McCurdy entertained some of their classmates June 28.

A. B. Holman intends leaving Durand, Wisconsin, soon, but is yet doubtful as to where he will locate.

WITH '92.

Chas. Angell is working for the firm of Forrest Bros, at Flint.

EXCHANGES.

The *Abbott Courant* again greets its many friends, after a long absence, which makes its appearance all the more welcome. The *Courant* being a semi-annual, resembles more a regular college annual than it does a college paper. The literary department is well filled with well-written and interesting articles, that make its readers wish that it visited them more often.

As an example of what college papers should be, and what the majority of college papers usually are, the *Hillsdale Herald* is but a poor specimen. If the paper were published in some unknown college, in some unknown corner of the world, there would be more excuse for its appearance, but, as the representative of one of Michigan's best and most widely-known colleges, it falls far short of what is expected. It is true that the paper is a weekly; but with only three pages of reading matter in each issue, it presents a far less favorable appearance than if its publication were less often and of better quantity and quality. The paper consists of a review of society programs, a few locals, and generally a poem which, is the most redeeming feature of the whole. Why don't the students take hold of the paper, make it a monthly, add more departments, and make it a paper of which Hillsdale College can be proud?

The commencement number of the *Simpsonian* is nearly three times its regular size, and is filled from cover to cover with articles that well pay one for the time spent in reading them. This number contains all of the graduating orations, baccalaurate sermon, and several other addresses of interest. The issue is one that deserves much favorable comment.

The *Fortnightly Lantern* of the Ohio State University is a regular and welcome visitor. The last issue contains a four-page supplement that gives vent to the enthusiasm aroused by the good work that the University boys have been doing in athletics and oratory.

The Commencement numbers of many of the exchanges are of unusual interest, due to the orations and commencement topics with which they are filled. Space forbids a mention of all of these, but the majority are above their usual excellence.

The *Emory Phœnix* would be much improved by being reduced to magazine form, as in its present shape it is a very inconvenient sheet to handle.

With a pleasant remembrance of the pleasure and profit derived from a year's work on THE SPECULUM, I drop the editorial "we" with the best of wishes toward all exchanges.

COLLEGES.

College Spirit—Spirits Frumenti

Longfellow was but nineteen when made professor at Bowdoin.

Four college dailies are now in circulation. Princeton, Harvard, Yale, and Cornell each publishing one.

Russia is closing her colleges, because she finds that higher education is incompatible with absolute monarchy, and her plan is to uphold monarchy even at the expense of education.—Ex.

Regarding the incomes of Harvard graduates, it is estimated that, when about thirty years of age, or ten years after leaving college, about twenty-five per cent. receive from $4,000 to $6,000; fifty per cent. from $2,500 to $4,000; and the remainder from $1,000 to $2,500.—Ex.

One of the highest honors ever bestowed upon an Ann Arborite has just lately been conferred upon Rudolph Brunnow, who succeeds the late Dr. Thorhecke as professor of Oriental languages at Heidelberg, Germany. No American or person who was not a graduate of that institution was ever before appointed to a chair in that University.

ATHLETICS.

Saturday, June 21, the College base ball team played a game with the Jaxon Mutuals, and gave the best exhibition of ball playing they have done this season. The game was close and exciting up to the eighth inning, when the College boys got their eye on the ball, and, assisted by errors, made the circle of the bases seven times. The features of the game were Burnett's fine pitching and Cordley's batting—he making four base hits in four times at bat. The score at Lansing:

M. A. C.	AB	R	BH	SB	PO	A	E	Mutuals.	AB	R	BH	SB	PO	A	E
Wilson, c.....	5	2	2	0	5	2	1	Tray, c.....	5	1	2	1	8	0	1
Burnett, p....	5	0	1	0	3	6	0	King, p.....	5	2	1	1	0	7	0
Cordley, r f..	5	1	1	1	0	0	0	Riley, s s ...	4	0	0	0	3	0	0
Rittinger, 3b	4	1	1	0	1	2	3	Harris, 2b...	5	0	0	0	0	3	0
Hall, c f	4	1	1	0	1	0	0	M'Don'ld,rf	4	2	3	4	3	0	1
Gardner, 1b..	4	0	2	0	12	0	2	Murphy, l f	4	1	1	1	1	0	0
Weideman2b	4	0	0	0	2	1	1	Towse, 3b...	4	0	1	0	2	1	1
McArthur, lf	4	0	1	0	1	0	1	Stinson, 1b ..	4	0	0	0	10	0	0
Foster, s s....	4	0	0	0	2	0	0	Castner, c f.	4	0	0	0	0	0	1
Totals	39	5	9	1	27	11	8	Totals.....	39	6	8	7	27	11	4

Earned runs—M. A. C. 1. Two-base hits, Tray, Burnett. Base on balls, Riley. Base on hit by pitched ball—Riley, Hall 2. Passed balls—Tray 2, Wilson 3. Struck out—King 8, Burnett 5. Umpire—Morrison.

The team is scheduled to play with the Mutuals again July 12, and with the Michigan Athletic Association team July 19. The team has played five games this season, and has lost four of them, which is not a very good showing for a team that has done such good work in the past.

Average of players for year 1889-'90:

Name.	Games Played.	Times at Bat.	Base Hits	Per Cent. Average.	Accepted Chances.	Errors.	Per Cent.
Burnett.....	6	29	3	.104	41	1	.976
Wilson.....	7	31	7	.226	50	6	.880
Gardner.....	7	29	7	.240	60	5	.917
Weideman.	6	26	3	.115	11	2	.818
Foster.....	7	29	2	.069	23	2	.913
Rittinger...	6	25	9	.360	38	15	.605
McArthur..	6	23	2	.087	6	2	.666
Hall.....	7	28	8	.286	14	3	.786
Cordley.....	6	26	12	.461	6	0	1000
Gibbs.....	4	18	15	.166	17	5	.706

Saturday, June 28, the College team played a return game with the Mutuals, and were beaten by a score of 6 to 5. The playing of the infield was not up to its usual standard. Burnett pitched a winning game, but lost through ragged support. McDonald's batting and base-running was one of the features. Score at Jaxon:

M. A. C.	AB	R	BH	PO	A	E	Mutuals.	AB	R	BH	PO	A	E
Wilson, c	5	1	0	6	0	2	Harris, 2b.....	4	0	1	6	3	1
Cordley, r f....	4	2	4	1	0	0	Casner, l f.	4	0	0	1	0	1
Rittinger, 3b..	4	1	1	1	2	1	Riley, s s.....	4	1	2	0	1	1
Hall, c f.....	4	3	2	3	0	0	Towse, 3b..... .	4	0	0	2	1	1
Gardner, 1b ..	5	1	0	10	2	1	Burrow, 1b	3	0	0	7	0	4
Weideman,2b.	5	1	0	2	2	0	Pomvits, c f....	2	1	1	0	0	0
Burnett, p.....	5	1	1	2	12	0	Stinson, c.....	3	1	0	8	0	3
McArthur, l f.	4	1	1	0	0	0	Failing, p.....	4	0	0	0	7	0
Foster, s s.....	4	1	0	2	0	0	McDonald, r f.	3	1	1	0	0	1
Totals.....	40	12	9	27	18	4	Totals 31		4	5	24	12	12

Two-base hits—McArthur, Cordley. Home run—Riley. Double plays—Mutuals, 2. Base on balls—Burnett 3. Failing 5. Hit by pitched ball—Burnett 2, Failing 2. Struck out—Burnett 6, Failing 5. Umpire—Brown.