THE SPECULUM.

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[CONTRIBUTED.]

Students' Life in Ithaca.

It may be a matter of interest to some of your readers to know how students live, and what is done outside of college hours, in Cornell. In the first place you must know that the city of Ithaca is located at the head of Cayuga Lake, a sheet of water averaging about two miles wide, that stretches to the north and east for over forty miles. The main part of the city is on the flat and low land near the lake, and is surrounded by hills except in the direction of the lake. These hills are from four hundred to eight hundred feet high, and are in the main composed of solid rock, covered with a scanty supply of soil. In many places the rock outcrops, forming precipitous and dangerous ledges. Through these rocks various streams have worn channels, and fall more or less rapidly into the waters of the lake. Some of the channels worn out by the waters are on a magnificent scale, and present most picturesque and beautiful panoramas. These channels thus cut are here termed gorges, although at the head of Seneca Lake they are termed glens. The walls of the gorges are usually precipitous rocks, fifty to one hundred and fifty feet in hight, with a stream in the center which is continually tumbling over falls or shooting rapids in its descent to the lake. Many of these streams fall more than three hundred feet in a distance of half a mile.

Cornell University is situated on one of these hills, and is about four hundred feet higher than the main portion of the city of Ithaca. From the center of the city to the edge of the campus does not exceed one-half mile, but most of the college buildings are on the farther side of the campus, still another half mile. This half mile of walk, with its high hill, requires more muscular effort than a walk from Lansing to M. A. C., and consequently is not much sought for. Quite a good deal of building has been done the last three or four years on East Hill, near the University, and students much prefer rooms in that locality to walking up or down the hill, yet some exceptions are to be found. Rooms on the hill rent for about $2.50 per student, while those lower down cost fifty cents to one dollar per week less. These rooms are kept in order by the proprietor of the house, but students furnish their own coal and light. Fully one-half of the students are members of some fraternity, and these fraternities, with few exceptions, own or lease houses and live together. Some of these fraternity houses are very fine, and in every case the expense of living in them is very great. It is generally thought that while the expenses of an ordinary student at Cornell will average from four hundred to five hundred dollars per year, those of the fraternity members will average from six hundred to one thousand dollars per annum. In some of the fraternities the initiation fee alone is $150, while in most of them it is rarely below $50. The fraternities at the college are both represented by fraternities here. None of these fraternities maintain boarding establishments, but take their meals at adjacent restaurants, so that the fraternity buildings consist exclusively of suites of rooms, used as studies and dormitories.

The number of students in attendance this year is about 1,400, distributed about as follows: In Sibley College (mechanical and electrical), 400 students; in civil engineering and architecture, about 200 students; in agriculture, about 100; so that about one-half of the

students are pursuing courses relating to industrial pursuits. This has an influence on the spirit of the whole body of students, and no doubt accounts in a large measure for the earnestness and zeal which they exhibit in their work. This may also, in part, be due to the fact that instruction in nearly every department is given largely by laboratory methods, and the standard of admission has been raised to such an extent that all the elementary studies are obtained before entering the University.

The athletic exercises of the University are provided for by a regular professor of gymnastics, who requires certain courses of training for each student. Military drill is also compulsory during certain times of the year, in charge of an officer detailed from the army. Shop work is required of all the Sibley students, but the most interest is centered in the various athletic sports—the leading ones are boating, foot-ball, and base-ball. During the fall and early winter foot-ball is the principal game, and no weather is too cold or stormy to interfere with this sport. The University team plays a very scientific game, and easily out-plays all other colleges excepting Yale and Princeton. The team organized for this year is a very good one, and promises to play Yale a strong game. The men selected are strong, active and heavy, and in a game played recently against Rochester University scored over 100 against nothing. To play this game well, a man must be fearless of danger, and must run a great risk of a permanent injury. About two men out of each team, per year, receive injuries that are lasting. One of the men in the team of last year had his spine injured and will never recover, and although but one game has been played so far this year, one collar bone has been broken. It is a game more like an actual battle than any yet devised, and one that is brutal in the extreme. Boating is the great sport here, and the University has the fastest boat crew of any of the colleges of the country. This is a summer recreation, and we hear nothing of it now, although the crew for next season has already gone in training. Base ball is not so popular, and the last year's team has not a good reputation, but it will be reorganized on another basis and much is expected of it. The students have a good athletic field.

Arkansas.

It was with a thrill of pleasure that I received a telegram on the 15th of August calling me for a two-months' period to the southern cotton fields. The call meant a chance to visit former slaveholders in their homes, to see something of the southern portion of our grand domain and to enter upon a new field of conquest in my vocation. The journey was a pleasant one and full of interest, yet tedious and tiresome before the end was reached.

Before getting to my final destination it was was my privilege to stop for a short time at the Arkansas University, where are represented the agricultural and mechanical interests of the State. There are about 500 young gentlemen and young ladies in attendance. They have not the library, museums, laboratory equipments and some other things equal to those of M. A. C., but theirs is a much younger college. In many respects it has bright prospects of being one of the leading colleges of the South in a few years. The college is located at Fayetteville, on a hill above the beautiful little town nestled amongst the high sylvan bluffs of the Ozark Mountains. It is a delightful place; there is always a cool breeze and a bracing atmosphere full of health-giving elements.

All of Arkansas, however, has not such a delightful climate as the Ozark Mountains. When one gets into the bottom lands where the cotton is raised, there confront him the dreaded malaria and swamp fever. My predecessor, the entomologist of the Arkansas Experiment Station at Pine Bluff, had not been in the region two weeks when he was

stricken with the malady and my call was to temporarily take the place.

The work consisted in experimenting upon the cotton worm to find some cheap and efficient remedy that is not so dangerous to handle and apply as Paris green. The cotton worm is much dreaded wherever the staple is raised, and well it might be, for it is a formidable foe and destroys millions of dollars' worth of cotton in seasons when numerous. It is the larva of a noctuid moth and is about an inch and a half long when full grown, resembling in general appearance and in locomotion the well known "measuring worms" or Geometers. There are four or five broods through the season, but they do not become numerous enough to do any serious damage to the plants till the third brood which appears the latter part of August or in September.

Last year was one of the bad seasons for them and it was not three days after the third brood was seen by the planters till every vestige of leaf and bract and even portions of the bark, had been eaten from the plant, injuring the maturing cotton and stopping further growth. Such attacks are sometimes local but usually extend throughout the cotton belt. This year the third brood did no injury and the fourth brood but little. It was not till late in September that they were found numerous enough to commence experimenting upon. From that time on, experiments were made with fair satisfaction and considerable success.

The people of the South are very kind and hospitable and after being with them and conversing with them it gives one far more liberal views and a kindlier feeling toward them than was previously entertained.

G. C. Davis.

Partisanship in the Press.

CHAS. P. LOCKE, UNION LITERARY SOCIETY.

There seems to be among the writers of the present a tendency to criticise and, perhaps, to complain of the many institutions of our nation. For the time being I must comply with this more popular way of thinking, and invite the attention of the reader to a few of the many evils resulting from the extreme dealings of questions of politics by our State and local papers.

We know the constitution of the United States to be the compromise between two opposing parties. We know that since its adoption party contests for our nation's high honors have been continued. It could not have been otherwise under our republican form of government. But these honest contests of the past established no precedent by which the press of to-day can be justified in its extreme and pessimistic statements, each involving some element of falsehood, and this for the purpose of influencing public opinion.

The press of to-day is radical in the extreme. Buoyed up by party conservatism rather than by the love of truth, the press spreads before the public that bountiful repast of party issues—a blending of both falsehood and truth. The readers of Republican papers only, are at the present rigidly convinced that prices of protected articles must go down as the result of the McKinley bill. In the opposing party we find men reading only Democratic papers, who, without the least hesitation, have conceded that prices must go up from the effect of the bill and therefore cry out against the "iniquity" of it.

But upon these two classes of citizens the newspaper works only to establish or confirm a man's belief. It is the man who reads the papers of both parties that inevitably becomes the victim of a confusion of ideas. He found in the last campaign charges made by the press against a party's candidate. The papers supporting the principles of one party published statements to prove these charges true, while papers supporting the opposing party, by means of sworn affidavits, proved them false.

One reads the Democratic papers and

brands the Republican party as the party of corruption and monopolies. The same man, if he reads only the statements in the Republican papers is forced to the conclusion that the Democratic party is equally as corrupt in the other extreme. If he reads both the Republican and Democratic papers he becomes confused and stops to meditate. Almost a mugwump in belief, and anxiously awaiting the appearance of a new and virgin party, he either witholds his ballot or perhaps casts it with the Prohibition party.

Newspapers are not courts of law. It is to be regretted that every political issue is taken up by the press, discussed, and then approved or condemned, according to the party origin of the measure. A still greater evil is the attack of the press upon the individual candidates of opposing parties for office. In fact, the brazen attacks of the press upon candidates, independent of their qualifications, makes the probability of being slandered and defeated too great for the honest and moral man to enter the field of political strife as a candidate for office.

The political speakers of to-day are addressing their eloquent and silvered phrases to their many constituents. With a surprising exposition of the crimes of the opposing party, a dazzling array of statistical information in support of his own party, or an exhaustive effusion of convincing logic, the speaker preys upon the simplicity and confidence of the people. In the same way the press deludes its readers. Gorgeous headlines and diverse factious editorials carry conviction with them to the minds of many, even without proof. The press seems to conceive itself in duty bound to exhort the public to decide great questions, and to pronounce, according to its political belief, its verdict upon those questions.

Extreme conclusions drawn from the same data are placed before the public by the press. The statistical records used by the Republican press may seem to prove without question the stability of the issue under discussion. The Democratic press, on the other hand, by using the same data, can prove the truth of the opposite extreme with equal satisfaction to its readers. The fallacy lies in the reader's own mind as well as in the arguments adduced. The reader is too anxious to believe certain statements, while the press is too anxious to prove them. The reader calls party prejudice to his aid; the press, party confidence.

The newspaper has ambitiously surpassed the original intention of its advocates. It has become one of the many institutions of our country, which, through their unchecked prosperity, have failed to guard off pending evils. They have filled its columns with rash and meaningless editorials, editorials destitute of every element of the ideal, and which by their stout and impressive language serve only to delude the people.

Thomas Jefferson's ideas of the press were much the same as those entertained by the thinking men of to-day. He conceived that with freedom of the press this right of freedom would be abused; that the press would become an organ of slander and abuse, a medium for the publication and exchange of lies. What Jefferson foresaw and predicted has been and is to-day extant in no weakened sway. Yes, more than this, the evils have now reached their maximum. The organs for the origination of slander and falsehood are capable of no greater efficiency of action than that which they now have attained.

Granting that the maximum efficiency of the press in effecting delusion and abuse is attained, and that these evils can be magnified no more, we still feel that they must be eliminated from the truth which they serve to cover. The process of elimination to be pursued is that of addition and subtraction. Add much of truth, subtract all of falsehood. Yes, this is indeed a good process, but how can it be brought about? Let us see.

Educated people now pay little or no

attention to the class of newspaper articles to which the above refers. The evil effects are most shown among the less intelligent classes. The remedy then is education. The public must be raised to that state of intelligence when they will ignore these articles in the newspapers, and, more than that, cease to support them. More stimulus must be given to independent papers. Then, when education is more general and the newspaper is edited independently of party feeling, we may say that the process of elimination has been completed.

The "Force Bill."

GEORGE W. DAVIS, OLYMPIC SOCIETY.

Within the last few years, there has been much trouble in regard to elections, both national and local. Accounts of fraud and force are frequently reported from all parts of the country. Among the many means suggested to remedy this evil, the latest is the Lodge Election Bill. Nearly all of the information which the people can obtain in regard to this bill, comes through the columns of partisan newspapers. By one party it is regarded as an effectual solution of the election difficulties. By the other party, it is denounced as being a "force bill" and characterized as sectional, tyrannical and unjust.

The one great object, which the bill proposes, is to make public the result of all Federal elections—to make public the result of the election as shown by the actual count of the votes, and not after the tally sheet and return blanks have been so tampered with as to make an expression of the direct will of the people almost impossible. To secure this end, it provides that there shall be present, at each national election, two or more officers of the United States, whose duty it shall be to see that the voting is carried on in a proper manner. In case a whole district is to be taken under the law, a board of canvassers is appointed, to take the vote of each precinct and, from these returns, determine the result of the election. A certificate shall then be issued to the candidate so elected. If this certificate agrees with the one issued by the state, it is supposed to be correct. In case it does not agree, the state certificate is set aside.

To guard against any undue interference on the part of the officers, the election shall be conducted in such legal manner as the state shall decide. The local officials have the power to enter a complaint against the officers if they attempt to go beyond their prescribed duties, which are to see that no improper influences are brought to bear upon voters, and also to insure the counting and recording of the votes exactly as they were deposited in the ballot-box.

If such a law as this could be enacted and enforced, much of the trouble and expense incurred by contested election cases would be avoided. That many of the contests are taken on sufficient grounds no one will deny. The case of John M. Clayton, of Arkansas, is still fresh in our minds. He was undoubtedly elected to a seat in Congress, but through fraudulent returns he was counted out. While securing evidence with which to contest the seat of his opponent, he was murdered by his political enemies. Had there been United States officers present at the election, fraud would have been impossible, and instead of being in his grave, John M. Clayton would now be a member of Congress.

There have been many complaints as to the way in which elections are conducted in many parts of the country. The race question, in the southern states, hangs mainly upon the one point: Shall the negro vote as he pleases, or shall he have the choice of voting as he is told, or not at all? There is but little doubt that the negro's vote is controlled largely by force. He is not allowed to deposit his ballot as he desires unless, as happens in rare cases, his wishes coincide with those of the controlling element of the

whites. Many of the political leaders of the South deny that the negro vote is in any way influenced by interference on their part. Others are somewhat more candid, but even they excuse their acts by the old cry of "white supremacy."

If one even dares to object to these high-handed methods, he is accused of "waving the bloody shirt," or of attempting to stir up sectional feeling. Who is it that keeps alive the old war-like feeling? Do not the southern people, themselves, by continually teaching the rising generation that the negro must be kept down, do more than anyone else to stir up sectional strife? These are the men who cry "Force bill." These are the men who are trying to persuade Congress that the government has positively no right to interfere, in any way, with their elections. They do not seem to realize that no "force" will be used, as long as the elections are honestly conducted. The very fact of their objecting so strongly to the bill, betrays the weakness of their position. Do they not know that such a law would result in the complete solution of the race question? When *that* is solved they are deprived of the issue upon which their elections have turned for the past ten years.

People say the bill is sectional, and not national in its character. It is not sectional except that it is to be applied only where the circumstances seem to make it necessary. If there is any section of the country, where fraud and force are resorted to to carry the elections, the government officers are to be present. Just so far is the bill sectional.

In many of our large cities the elections are controlled by unprincipled "bosses," who have not the least regard for the rights of American citizenship. The Lodge Bill aims to give all voters, no matter where they are situated, or what their condition may be, the right to vote as they wish.

It is well to consider by whom the objections are made. In nearly every case, they come from those who depend upon unfair means to carry the elections. Such persons are the only ones who can reasonably object to such a law. The "force bill" has no terrors for the honest, law-abiding citizen. By him it is looked upon, not as an unjust usurpation of power by the government, but as a measure which will enable him to do his share toward making the laws of our country.

SCIENTIFIC.

Natural History Society.

At the meeting of the Natural History Society, October 10, Mr. L. H. Baker presented an interesting paper, the subject of which was "Tree Toads." He said:

Toward the close of nearly every pleasant day during spring and summer the *Hyla versicolor* and *Hyla pickeringii*, or the tree toads, are the principal songsters of the swamps and meadows. The former species is common in nearly every portion of the United States, while the latter inhabits the more eastern portion, and is much more generally known by its voice than by appearance.

The first thing that a casual observer would notice about the *Hyla versicolor*, or common tree toad, is its remarkable ability to climb the trunks and branches of trees, and even to jump from leaf to leaf. On examining the feet of this species it would be found that at the end of each toe there is a disk, by means of which the toad can travel up and down the trunks of trees with perfect safety, on the same principle that the fly is enabled to navigate on the window pane. Another very remarkable thing about this species is that it can adapt its color to that of the object on which it rests, whence its name, *versicolor*.

A few days ago, while walking through the woods north of the College, I captured one of these toads, and by putting him in a white insect net I succeeded in making him

turn from the bright green of the leaf on which he had been to nearly white. I then tried him with some red leaves, but he would not turn red. It is stated, on the best known authority, that *Hyla versicolor* readily changes to any color between deep brown to light gray, and from nearly white to a bright green, thus entirely barring out such colors as red, blue and yellow. The favorite color of this species is gray.

The most striking example of this power to change color is found in the American Chameleon. This animal is able to assume, almostinstantly, any shade between a beautiful emerald and a dark iridescent bronze color, and it is even said that a passing cloud may cause its customary bright green color to fade.

Hyla versicolor is capable of domestication to a limited extent. Mr. Jacob Geismar once kept two of these toads in boxes, which were placed by an open window. Toward evening they would leave their boxes and hop to a neighboring apple tree, where they would make the air ring with their melodious notes till late into the night. Before morning they would return, and by daylight would be found in their accustomed places.

The *Hyla pickeringii*, a species somewhat rare here, generally appears in the early spring, and their sharp notes may be heard from the colder swamps and meadows. Different individuals answer each other with differently toned voices of a single note. This is very shrill and loud, and may be compared to the rapid clicking together of pebbles. The muscular force employed in expelling the air from the lungs collapses the sides of the animal till they nearly meet, while the gular sac, or throat, is distended with each expulsion to one-half the size of the head and body together. Toward the fall this species goes up into the trees, where they call to each other as in the spring, but with a weaker note, much resembling that of the purple finch.

On the discussion following the paper Prof. Cook stated that reasons could be given for tree frogs not turning red when upon a red substance. He said that the reason for this animal having the power of mimicry is for protection. Throughout the summer months, when the prevailing colors are green to gray, and the enemies of this animal are most numerous, its powers of mimicry are very remarkable. In the autumn its enemies are fewer, and the red colors only last for a few days, hence it does not need this power to such an extent.

Mr. Hicks inquired the cause of this changing of color, but a satisfactory answer could not be given.

In regard to the fertilization of *Martynia* Mr. Bristol said: This plant is a native of the West and is occasionally raised in our gardens. The green fruit is sometimes used for pickling. The flowers are white to yellow in color, calyx five-cleft, corolla bell-shaped and somewhat two-tipped.

The flowers are fertilized by bees. The bee will generally light upon the lower lip of the corolla. The weight of the bee tips the corolla down so that the stigmatic surface comes in contact with the bee's back, which previously has been covered with pollen from other flowers. The bee passing further into the flower comes in contact with the anthers and becomes dusted with pollen which in its turn will be carried to a neighboring flower. As the bee *first* comes in contact with the stigmatic surface the flower is very likely to be cross-fertilized.

Mr. Cummings reported the fertilization of the *Helianthus*. He said: The time from the beginning of flowering uutil the last flower sheds its pollen is from twelve to twenty days. I made visits to these flowers a number of times and found honey bees and bumble bees working upon them. Toward night I also found a few moths and occasionally a butterfly about the flowers. The bees light upon the showy-ray flowers, it apparently being the bright yellow of these

corollas which attract them. The style is deeply two-cleft, the parts being well curled back, exposing the stigmatic surface above the syngenesious anthers. The insect, in getting the nectar, brushes its body against the exposed stigmas. Before the flowers opened I tied a piece of netting over several of them to observe the fertilization without the aid of insects. I found that the flowers would fertilize without the help of bees or other insects, but thought that the fertilization was not as perfect.

Mr. Crosby described the fertilization of our common thistle, *cnicus lanceolatus*. The heads stand upright, and in each are many tubular flowers, the pistil in each instance projecting above the anthers, so that fertilization without the aid of insects is very improbable. The flowers to mature first are those on the outside of the head, and gradually ripening toward the center. Bumble-bees were the only insects observed at work upon these flowers, the tubes of the corollas being so long that honey bees cannot reach the nectar. The bees invariably light on the outside flowers of the head, and systematically work toward the center. As the flowers are *proterandrous*, and those at outside of the head ripen first, the bees in a measure do not fertilize the flowers of any one head by pollen from the same, but covered with pollen they fly to a neighboring head, aud sipping the nectar come in contact with the exposed stigmatic surfaces, hence cross-fertilizing the plant.

In the description of the fertilization of the closed *gentian* by Mr. Campbell, he said: The study of the fertilization of the *closed gentian* has been a host of surprises to me. This plant grows in moist soil, being found in a number of places in the vicinity of the college. Generally there are eight to ten terminal flowers, and frequently a number of axillary ones. The corolla is regular, with plated folds which bear teeth at the sinuses. Thus the corolla at all times completely shuts the essential organs of the flower from the outside world. Yet as the stigmatic surface is above the anthers, this plant depends upon insects for fertilization. A bumble-bee lighting upon the flower gradually works apart the folds of the corolla and soon disappears within. In doing so it necessarily comes in contact with the exposed stigmas. As far as observed these flowers are only fertilized by bumble-bees.

Mr. Harvey described the fertilization of tow flax. He said: This is one of our most common weeds, growing generally on sandy soil. It is a native of Europe and for the past few years has been spreading rapidly in this State. The plant has a large dense raceme of yellow flowers, with two-lipped corollas and four stamens. A small groove at base of stamens leads to the nectary or spur. The plant is aided in fertilization by bumble-bees. They light on lower lip of corolla, their weight pulling it down until about horizontal. In reaching the nectar the back of the bee comes in contact with the stigmas before reaching the anthers.

General Observations.

Prof. Cook: In the American Naturalist for Sept. 22, there is a cut of a wooden caterpillar. The article states that in the development of this caterpillar a plant grows out of it and after a time the caterpillar turns to wood. The article may be true to the extent that the caterpillar was attacked by some form of fungus, but it is not probable that it afterward turned to wood, although it might become hardened by the action of the fungus.

Our common white grub is sometimes attacked by a fungoid growth which gives it the appearance of a plant growing from it.

Chas. Baker: There is no boy living upon the banks of the Mississippi river who is not acquainted with the "lucky-stones." These are two peculiar shaped bones, taken from the head of a large fish found in several of our western rivers. These bones have a peculiar marking, looking very much, in out-

line, like a polliwog. The marking is rather dark and finely dotted.

Mr. Wheeler read the following extract from a letter recently received from a gentleman in Montana: On my way down a ravine I met a huge porcupine. He did not seem glad to see me and tried to hide. I thought it a good opportunity to see whether he could throw quills. I got a long stick and poked him a little. He threw his tail about wickedly with the object of sticking quills into his supposed enemy. He did not seem at all inclined to run, but kept his head curled under. He threw his tail about so hard that he actually threw quills out of it, but it is perhaps because they had been loosened by hitting my stick. The stick was stuck full of quills. I am now inclined to think that after the tail quills are loosened at the joint, a porcupine can throw them out.

Mr. Nis vander: While in the garden today I found the common wasp feeding upon the larvæ of the cabbage moth.

Some time ago I observed the humming bird getting nectar from the cardinal flower. The opening into the flower is so small that it was with much difficulty that the humming bird reached the nectar. It would dart toward the flower and if its bill did not strike the opening it would back up and try again, sometimes trying several times before succeeding.

Mr. Bert Cook read a semi-scientific article, "A fox hunt," which is not reported.

Some Factors in the Study of the Distribution of Plants in the Lower Peninsula of Michigan.

The geographical distribution of plants is coming to occupy the attention of students of biology. Some of the most famous men of science have been actively working in this fascinating and fruitful field for many years. Darwin, Wallace and our own Asa Gray have brought together a multitude of interesting facts. Upon these, generalizations have been made, and the foundations have been laid for all future workers. The labors of Prof. Chamberlain and Dr. Geo. F. Wright of Oberlin, during the past five years, have settled the limits of the southern extension of the ice during the glacial period. Very many facts in regard to the distribution of plants in Michigan, which were before inexplicable, now become quite plain. No one is found at the present time who denies the fact that there has been a great ice age in the Northern Hemisphere; that animals and plants were driven southward by its gradual march; that finally these animals and plants followed the retreat of the glaciers northward as the climate grew milder. In the light of the facts which have been found out lately in regard to the details of the present distribution of land and water, ranges of hills and valleys, we can now begin to draw some conclusions as to why certain plants occupy certain particular localities in our State. For instance, last May it was found that a little colony of primroses, *Primula Mistassinica*, were growing clustered in the mosses which cover the almost perpendicular face of the rocks at a point near Grand Ledge. Here was a suitable place, as the water of a spring high up the bank trickled down over the rocks, furnishing the proper conditions of growth. The question to be solved is, how this little colony of primroses came to be found so unexpectedly at Grand Ledge, when its nearest neighbors, so far as known, in our State, are at two very widely separated localities, one in Monroe county and the other near the pictured rocks of Lake Superior. According to the explanation given by the glacialists these little primroses, on their way back to their Northern home at the close of the glacial period, found in these few widely separated places the only spots where the requisite conditions of growth were combined, and here, with their rootlets always bathed in the cold spring water which is surcharged with carbon

dioxide, they have defied their enemies. This line of study will yield fruitful results to all who will patiently follow it out.

C. F. WHEELER.

Mechanical Club.

The last meeting of the Mechanical Club for the present term was held in the chapel, Friday evening, Oct. 17. Although an entertainment by one of the societies prevented a large attendance, several interesting subjects were presented and discussed by those present.

Mr. W. J. Meyers gave an informal talk describing the construction and mentioning the advantages of the trapezoidal weir, much used in the western states in apportioning water for irrigation. The weir is built wider at the top than at the bottom, in a proportion such that the tangent of the angle between the sloping side and a vertical line from the lower corner is 0.25. All computations of the amount of water discharged are then made by using the measured depth on the weir and the length of its bottom as the required dimensions. If the velocity of the water be small, all contractions of the jet are compensated for; so that for example the volumes discharged over weirs at the same depth are to each other as the lengths of the weirs. In the old form of weir, with perpendicular sides this proportion does not hold, as the number of edges at which contraction will be noticed is decreased.

Mr. R. M. Kedzie read a paper on the manufacture of coal gas, giving a good description of the methods and some conjectures as to the sources of light and heat when the supply of coal shall have been exhausted.

The manufacture of seamless tubing by the Mannesmann process was the subject of a reading by Mr. Bauerle. The process consists in drawing or kneading the tube from a block of red hot metal by means of ridged, conical rollers. The tubes thus made are perfectly weldless and very strong.

Prof. Durand next gave a very interesting talk on the principles and some of the details of electric welding. Currents of great volume but of low tension are used in this work and its main advantages are that power derived from a water-wheel is as applicable as that from any other source. No fire is necessary and the beauty of the process lies in the fact that resistance, and consequently heat, is developed at exactly the point where heat is most needed. Unlike ordinary welding, no laps are necessary and but little distortion is produced. Besides this, the range of work is very greatly extended; dissimilar metals, copper and even cast iron being readily welded.

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V. H. LOWE, - - - - College News.
DELTA TAU DELTA FRATERNITY.
J. L. POTTER, - - - - Athletics.
OLYMPIC SOCIETY.
H. W. MUMFORD, - - Colleges and Exchanges.
UNION LITERARY SOCIETY.
A. R. LOCKE, - - - - Personals.

W. A. FOX, - - - Business Manager.
J. E. HINKSON, - - Asst. Business Manager.
SEC. H. G. REYNOLDS, - - - Treasurer.

AGRICULTURAL COLLEGE, NOV. 10, 1890.

IT will be a great accommodation to the editor of the Personal Department if all readers of THE SPECULUM will send to him the names, and addresses if possible, of for-

mer students who did not graduate. We wish to get the whereabouts of as many M. A. C. men as we can.

EVERY one in college knows of the annoyance that has been caused to many students at different times by the taking of livery rigs during some entertainment here and returning them ——? Considerable loss has been sustained as well. It is perhaps one way to get enjoyment out of life, but, fellows, don't do it.

Is it not possible to extend the electric lighting system so as to illumine some of the campus? The walk between Wells and Williams halls is a very unpleasant one to travel after dark. There are other such places, also, where students must pass. For a considerable part of the spring and fall terms students must go to supper, to the library or to the halls, after dark. May we have some light upon the subject?

THE fire-drill, from a practical standpoint, is not a complete success. True, the boys get accustomed to the positions of the hydrants about the grounds, and they learn to handle the hose-cart and other appliances to a certain extent. But they take very little interest in the drill—indeed, it is a positive bore to most of them; it takes time which they feel ought to be their own, and it does not *train* a fire company. We would respectfully ask the State Board to consider the plan of having a paid department, consisting of students from the various classes, with regular ranks, weekly drills, and definite responsibilities for each person and for all members. It would cost but little money, and in our opinion might possibly be made very efficient.

AT the last meeting of the State Board of Agriculture a resolution was voted to diminish the stock of the college farm. The principle of selection and breeding in the future will be an educational one. Comparatively small herds of the leading breeds of stock will be kept and specimens of other breeds. This was the original policy of the institution, but in course of time became perverted. A return to this admirable feature of the agricultural department is fortunate. The study and comparison of breeds of stock has been a weak point in the system of instruction in that department. No doubt this plan will tend to remedy the deficiency to a very marked degree.

ONE of the orators in the recent contest voiced our sentiments exactly when he urged the students to become conversant with politics and to be politicians, in a good sense, when they go out into the world. If we do our duty in our college work, it follows as naturally as day follows sunrise that we will in the future occupy positions of considerable prominence. We will be able to influence men, to some extent at least. How important, then, that our political views be sound. We ought to go forth so thoroughly imbued with the great principles of our government, the great principles of liberty and justice and integrity, that no partisanship can ever cause us to depart from them. The difference between the independent, thinking, manly citizen, and the cringing party serf, ought to be so powerfully fixed in our imaginations that we will ever be found advocating, not simply the party issues, but the statesmanlike questions. But to be able to judge intelligently, our education in politics must not be neglected. Let every student, when he enters college, resolve to decide for himself in these matters. Let him read all sides of political discussions; let him read deeply enough to discern between partisan babble and wise doctrines. Then, when he takes up life's work, he will, if he is conscientious, be one of the small but useful minority who vote with independence and true intelligence.

COLLEGE NEWS.

President Clute spent a day in Detroit recently.

Prof. Frank Kedzie sailed for Europe Saturday, Nov. 1.

Dr. Beal will spend the winter at Cambridge, studying grasses.

Some of the old farm fences are being replaced by new ones.

Eighty varieties of tomatoes were grown on the garden this year.

Dr. Beal is studying structural botany with a number of post graduates.

Prof. and Mrs. Davenport have left for a somewhat extended tour through the South.

Mr. Wheeler, assistant in the botanical department, will graduate with the class of '91.

Rev. C. H. Beale's instructive lecture on a "Trip through Europe" was well attended.

The Shakespeare club has graduated in Shakespeare, and are now attacking Emerson.

Prof. Cook still receives calls for our graduates to fill important positions in other colleges.

Prof. Taft goes to Detroit Monday, Nov. 10, to act as one of the judges at the chrysanthemum show.

The reading room will be open and warmed during the winter, with an assistant librarian in attendance.

Students who spend the vacation in and about Grand Rapids will participate in a mid-winter reunion.

Banquets were held by the Hesperian, Olympic and Eclectic societies immediately after the oratorical contest.

Messrs. Toumey, Hall, Payne, Gladden and Rittinger have applied for the degree of M. S. at the close of the year.

All of the professors on Faculty Row, excepting Dr. Beal, will remain at the college during most of the winter vacation.

The entomological laboratory will be open during the winter and courses of study similar to those of last year, will be pursued.

Considerable damage has been done to the plants growing in the wild garden ponds by the sewage from the open drain which leads into them.

Dr. C. V. Riley, United States entomologist, visited the college recently to secure aid for his department at Washington. He was the guest of Prof. Cook.

Prof. McFarland, professor of zoology at Olivet, spent a day at the college recently and gave a very interesting and instructive address before the zoology class.

President Clute visited the experiment stations at Baldwin, Grayling and Walton during the past month. He was accompanied by Hon. C. W. Garfield of Grand Rapids.

President Clute lectured before the Ladies' Club of Kalamazoo, Monday afternoon, Oct. 13, and before the Lansing business college students Wednesday evening, Oct. 22.

Mr. G. C. Davis has returned from Arkansas, where he spent over two months studying the cotton-boll worm under the direction of the Arkansas experiment station.

Dr. N. S. Mayo, formerly assistant in the veterinary department, has accepted a call to the chair of veterinary, zoology and physiology in the Kansas Agricultural College.

Prof. Taft will experiment, during the winter, with different chemical fertilizers, to determine their relative value in growing lettuce, radishes, beans, and other forcing crops.

Dr. Beal frequently receives specimens of wild grass seed from various parts of the United States, sent here to be experimented with, while he, in turn, supplies numerous experiment stations with specimens of Michigan grass seeds.

Prof. Taft received four peas from a man in Macomb County, who says they originally came from peas taken from the hand of an Egyptian mummy and given to Dr. Livingstone's sister. They are of average size and of a light brown color, mottled with white. Next!

Mr. W. H. Van Devort, foreman of the iron shop, sailed, Nov. 8, from New York for Glasgow. After visiting a few of the larger machine shops and technical schools in England, he will make an extended tour through Holland, Germany, France and Italy, arriving at Naples the last of February, thence sailing for home.

Mr. Yoshida, who for some time past, has been studying botany under the direction of Dr. Beal, will take the degree of M. S. at the close of the term. After spending some weeks in South Carolina, studying our methods of raising rice, Mr. Yoshida will return to Japan to accept a chair in one of the agricultural colleges of that country.

The college herbarium is rapidly increasing in size. Over four hundred specimens were received from Alabama recently, and contributions from all over the United States are coming in almost every day. In making an exchange with Cornell, Dr. Beal sent them twenty-eight species of compositæ that were not in their collection, while they could send him but eight which were new to us. The herbarium now contains over 30,000 specimens instead of 3,000 as heretofore stated.

President Clute, Prof. Cook and Prof. Taft were appointed, by the Board, as delegates to the meeting of presidents of agricultural colleges and directors of experiment stations, to be held in Champaign, Ill., about the middle of November. Prof. Cook will attend the meeting of the Association of Economic Entomologists of which he is vice-president and will lead in the discussion of "Work of Entomologists in Experiment Stations." And Prof. Taft will lead the discussion on "Best methods of testing fruit."

We are indebted to Mr. F. B. Mumford for the following:

It is a deplorable fact that the efficiency of experiment stations in the United States is far below what it should be, or might be, if the directors of the stations were not so anxious to obtain results immediately. Often bulletins are published giving results of only one year's trial. Conclusions are drawn, and a basis for practical application is arrived at, and recommended to the farmers. No account of favorable seasons or peculiar climatic conditions enters into the report. Some time since a bulletin was published, giving a test of cultivation vs. no cultivation for corn. The results plainly showed that cultivation for corn was useless. But no amount of bulletin philosophy like this could convince the average farmer that good cultivation not only pays, but is absolutely necessary for the full development of the corn crop. Such instances are not rare, and only serve to illustrate the uselessness of many of our experiment station bulletins.

The experiments at the College are carried on with an honest purpose to make all results and conclusions reliable. To do this requires time. One season's experiments will be of little value unless backed up by a series of experiments extending over many years. This will be the aim of the experiments here.

The experimental field contains twenty-five acres, accurately surveyed. One-half is divided into one fourth, one-half and one acre plats. The other half is divided into one tenth acre plats. There are seventy-two of the latter, and all are thoroughly underdrained. On either side of a road extending the entire length of the plats, and dividing them from one another, is a drain. At the middle of each plat is a silt-basin connected with the main drain and with a drain running through the middle of the plat. The opening of this drain is so arranged that the drainage water may be easily collected and analyzed. In this way it will be ascertained whether or not the fertilizers applied leach away in the drainage waters.

The experiments proper will consist of a test of varieties, influence of selection, rotation, and constant summer-fallowing.

The selection of seed will be carried on principally with wheat. The best heads will be selected from the best stools, and from these the best kernels will be chosen and used for seed. The same process will be carried out with the poorest seed, and also with the medium.

The effect of rotation will be closely studied. The rotation will be grass, corn, oats and wheat. It will be determined, if possible, whether or not this rotation will preserve, increase or decrease the fertility of the soil. A test of fertilizers will also be made in connection with the other experiments.

All these experiments will extend over a period of years, and will be the more valuable as the time lengthens.

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.

'69.

R. Haigh, Jr., of Kalamazoo, is "still looking after the oil and trying to induce people to have their lives insured." He says that the oil goes, but the other is a little slow.

'70.

G. A. Farr "stumped" the fifth Congressional district in the interest of the republican condidate, C. W. Watkins.

'73.

G. C. Nevins is superintendent of the public schools at Otsego, Mich.

J. H. Tibbits, of the treasury department at Washington, besides attending to his office work has become somewhat interested in real estate. He sends us a copy of the constitution of the Fidelity Investment Company, of which he is secretary and treasurer. The investments of the company promise to be profitable. Mr. Tibbits's sentiments are, "Long live the SPECULUM!" He expresses his wishes for the welfare of the college and all connected therewith, and assures us that he has the highest faith in its mission.

'74.

D. C. Oakes yet fills his position as cashier in a bank at Shelby, and is president of the village. He has recently assumed the control of paste pot, shears, and pen for the *Shelby Republican*, and there shows the same hustling qualities as when at M. A. C.

Donald McPherson, of Washington, D. C., is engaged in the real estate and law business and is making a great success. He is most happily married, and is the proud father of as fine a boy as you would expect of a graduate of M. A. C.

C. L. Bemis, the County Secretary of schools of Ionia has begun his visits and lectures for the coming school year. He makes it a point to visit every school, and lecture to the patrons and students in the evening. The work that he is doing for the schools of Ionia county is appreciated by every one who has a desire to see the standard of instruction raised in our district schools.

'75.

B. A. Nevins is postmaster at Otsego, and is also a stockholder in the recently organized Otsego Chair Company. He was permanent chairman of the Allegan county Republican convention.

'76.

H. S. Hampton, a little over a year ago, moved from Albion, Mich., to Shoshone, Logan county, Idaho,

where he is engaged in the practice of law. He was a member of the convention held at Boise City in July, 1889, and at the first State election, held October 1, 1890, he was elected to the office of probate judge and superintendent of public instruction for Logan county. He was married three years ago and is the father of two children, a boy and a girl.

Wm. Caldwell is one of Oakland's most respected farmers. He had many times to repeat a most emphatic "no" to escape the nomination on the Republican ticket for representative to the State legislature.

'77.

L. A. Lilly still runs his dairy farm at Hilliards, Allegan County, and reports pronounce him successful.

'81.

A. H. Voight is in the furniture business, being connected with the L. A. Furniture Company, the largest house of its kind in southern California. He is a supporter of the republican candidate for governor, who is, in fact, the president of the firm with which he is associated.

Howard Holmes is prominently connected with the *Detroit Evening Journal*. Howard is a hustler in any line of work.

'82.

J. M. Hollingsworth, a farmer at Ridge Farm, Ill., was, so he says, "most profoundly surprised" recently by his attention being called to the SPECULUM. He says, "Indeed, and so THE SPECULUM still lives! Just to think that after waiting these many years, all the while wondering why the "SPEC." never came to my table, at last you ask for personals!" And further he says, "If like Jacob of old I could but see its face once more before I die, I could lay me down in peace." Well, gentlemen, cash brings THE SPECULUM every time, and you, gentle reader, can draw your own inferences. He has a wife, two sons, and two daughters, who each and all are an honor to his name. His life is a busy one. He works on the farm during the day, and writes for the papers at night.

C. F. Snyder daily wends his way to the signal station on Jefferson Ave., Detroit, looking every inch a man--he was married last winter.

WITH '82.

E. C. White, who is widely known as the writer of articles on South American topics over the *nom de plume*, "Kal Blanco," was married in Cincinnati, Oct. 1st, to Miss Mary J. Gould.

'83.

A. C. Bird is a prosperous farmer at Highland, Michigan.

One of the latest new books is entitled, "Andersonville Violets, or A Story of the War and After," by H. B. Collingwood.

WITH '83.

E. S. Palmiter is editor of the *Hart Argus*, and is the prohibition candidate for Secretary of State.

WITH '84.

S. K. Woodman is in the manufacturing business, and chairs and furniture are his specialties.

'85.

R. M. Bates, the father of a son, born Sept. 2d, '90, gives us a personal.

E. S. Antisdale, having graduated at the medical department at Ann Arbor last June, located in a prosperous farming community at Berrien Centre, Michigan, and has already secured a good practice. He anticipates studying for an M. S. degree, and writes for particulars as to a line of work at M. A. C.

WITH '85.

L. H. Harrison is engaged in the manufacture of electrical apparatus at Chicago, Ill. In a recent visit to the college he expressed his regrets that the mechanical department had not been in existence while he was a student here.

'87.

O. C. Wheeler was temporary chairman of the county convention held by the Republicans at Mason, Oct. 7th, and J. D. Towar, of '85, was one of the delegates.

W. C. Sanson is "teaching at the same old stand as of yore," at Clifford, Mich. Near him are several other old M. A. C. boys, and Sanson says they anticipate a grand time this coming winter.

H. W. McArdle is principal of the high school at Marlette, Mich., and report claims for him success.

Geo. J. Hume, of Walla Walla, Washington, was married, Oct. 26, to Miss Nettie McCurdy, of Lansing. Congratulations, George.

'88.

C. B. Waldron has accepted the professorship of forestry and horticulture at the North Dakota Agricultural College, and has offered him the opportunity of spending the winter where he chooses. Of course "C. B." has decided to spend it at M. A. C., and while here he will study horticulture.

F. H. Hillman, of the Nevada Agricultural College will be at M. A. C., after the first of June next, until August, working for his M. S., and Mrs. Susan A. Hillman will return in March to complete the course with '91.

George Teller reports a busy and pleasant work in teaching chemistry and physics at the Industrial University of Arkansas.

H. B. Cannon is now hard at work in the law department at Ann Arbor.

W. J. Hinkson worked on the Illinois Central Railroad with a surveying party during the summer, and now is back at Ann Arbor to complete his last year of work in civil engineering.

W. F. Staley, employed in one of the departments at Washington, D. C., visited the college recently. He was home to vote.

J. C. Stafford is teaching in VanBuren County, and

promises to be present at the next reunion together with his wife.

WITH '88.

Chas. M. Underhill, living at Pentwater, Mich., is county supervisor.

Herbert Thurtell is now spending his second year in the medical course at Ann Arbor.

H. J. DeGarmo is developing his taste for good stock on his farm at Highland, and is as full of business and fun as ever.

J. A. Thompson is yet principal of the Clifford high school, and enjoys his work as well as ever.

'89.

David Anderson, instead of going to Memphis to study law, will remain in Michigan. There is a rumor floating about that David will soon be married. If that is the case we can not blame him for not leaving old Michigan.

Harry Martin, of VanBuren County, is the happy father of a child.

W. E. Rohnert is in the employment of D. M. Ferry & Co., of Detroit, testing seeds.

G. L. Chase is working in a savings bank in Detroit.

WITH '89.

A. L. Free is loading up in the law department of Ann Arbor for business in the future.

'90.

O. A. Turner is surveying with F. E. Skeels of Grand Rapids. He reports interesting work, and business while the good weather lasts.

A. L. Waters, of the Houghton mining school is pleased with the institution. He says that the instructors are all right, but out of the sixty students only ten have business in them, and of those ten three are from M. A. C.

E. A. Stricker is taking the law course at Ann Arbor.

Chas. Ferris, since August, has been working at the carpenter's trade. But he soon starts for Pineville, Kentucky, where he will engage with a surveying party.

W. W. Morrison, a law student, and R. B. McPherson, a student of political economy, both of Ann Arbor, took a vacation at election time. M. A. C. entertained them on the 31st of Oct. and 1st of Nov.

WITH '90.

Kumaroku Shoshima expects to be appointed official entomologist of the Empire of Japan.

E. J. Frost has accepted a position at Hamilton, Ohio, as draftsman at a good salary.

Carl E. Pray is attending college at Olivet.

M. P. Trask was recently married and is living at Aberdeen, Washington.

WITH '91.

A. Goldsmith is working in a printing office at Bay City.

J. E. Hill is teaching school at Eagle. He will commence work in a bank in the spring.

Allen Hopkins is attending the Lansing high school, preparing for the U. of M.

L. Burnett will return to college in the spring, and is prepared to sustain the college's reputation in athletic sports.

WITH '92.

Chas. Angell is spending his second year in the medical course at Ann Arbor.

J. E. Brown is at the State Normal.

A. C. Munson is preparing for the examination at West Point, which appointment he received last summer.

T. F. Marston is taking a course in mechanics at the U. of M.

C. P. Hulburd is doing work in electricity at Cleveland, Ohio.

Archie Himebaugh is farming at Burr Oak.

Chas. H. Spencer is studying civil engineering at the U. of M. His vacations will be spent in the city engineer's office at Grand Rapids.

WITH '93.

C. E. Hale, of Greenville, is attending the Grand Rapids Business College.

COLLEGES AND EXCHANGES.

The editorial column of by far the greater number of our recent exchanges is headed by an article filled with high hopes and promises. We admire the spirit of the editor-in-chief of the *Indiana Student* in writing in this connection, when he says: "Although our aims are high and our determination to make a success of the work as strong as could be wished, we prefer rather to show why success is probable, than to predict too strongly its certainty."

The *Normal News* is among our brightest exchanges; every issue contains interesting productions which evince much care and study. We read with especial interest the article: "The Boy on the Farm," and also the address by Prof. Daniel Putnam; in fact all the literary productions possess merit. When a college journal contains such articles it is surely deserving of the support of every friend of the school.

The new cover of the *Niagara Index* improves its appearance, but the management show good sound sense when they do not place all dependence in the cover, but succeed in making the substance of the journal the all-important factor. This mistake, however, seems evident by the seeming content that some of our exchanges manifest in possessing a pretty (?) cover, when the contents proper either show a lack of ability, or it may be, the lack of a proper appreciation of what an ideal college journal should be, and in this way overlook the vital point necessary for the success of any journal, namely—the subject matter.

College Days comes to us from Ripon, Wis. Among

the literary articles of her columns is one entitled "Genius." Although a deal of strong language is used, yet, on the whole, it has much foundation in fact. The last sentence, in speaking of one of Ingersoll's articles, tersely expresses a truth which is everywhere prevalent: "Mr. Ingersoll's entire article, like some of his speeches, *is a good example of how much one can prove if he does not allow himself to be hampered by facts.*"

We acknowledge the receipt of the *National View*, *The Politician* and *The Observer*. Although none of the above are college journals, yet we are glad to welcome them.

Daniel Webster was the editor of the first college paper.--Ex.

A resolution has been passed by the Cornell faculty to abolish athletics from the campus.—Ex.

The President of the United States, four members of the cabinet, every member of the supreme court, 44 of 80 senators, and 164 of 329 representatives are college graduates.

The oldest college in the world is the Mohammedan College at Cairo, Egypt, which was 1,800 years old when Oxford was founded.—Ex.

Grave senior, a lesson thou must learn,
With all thy great precocity;
To guard against, at every turn,
Undue conspicuosity.—Ex.

ATHLETICS.

Athletic contests of any description seem to have kept very far away from our College this term. Our ball team has not played a single game, and has not even practiced as a team, and the individuals only a very little. Some of the members of the foot-ball team have been upon the foot-ball grounds practicing on three separate occasions, and although there has been a class for instruction in the gymnasium, very little interest has been manifested in general athletics. As a team, and as individuals, each member of the ball team was too indifferent and too lazy to hold a meeting at which to elect its assistant manager. Each member wished somebody else in the team would get around to call a meeting and do something, but not one would do it himself. Must have all been too modest. The members of the team seem to want to be considered and used like oxen. They have to be run after and chased upon the field before more than one or two can be got out for practice, and even then never half play unless urged on by the assistant manager. The foot-ball team, since its organization, has very seldom had enough players out to form a second eleven to play against them. Next term is but a short time in which to practice for Field-day. If the classes will agitate the matter they can soon awaken an interest in sports, and by reviving the o'd inter-class foot-ball contests, new enthusiasm will be infused into the members of the teams and into the College generally. Unless interest is manifested by the College none of our games can be a success, no matter how enthusiastic the players. The managers of the teams should set aside certain days in the week upon which practice games shall be played, at a certain hour (5 to 6 P. M. is the only unoccupied hour for any day), and the players if absent should be disciplined. The faculty might set aside at least one hour in the afternoon with which no other class should interfere. If drill, as an exercise, is worth an hour (and it is), and if work, as exercise, is worth devoting two hours a day to, surely exercise itself is worth an hour. One unoccupied hour given would allow a general class to be instructed in the gymnasium, and would give a chance for team practice which is almost impossible at present, the time of different classes being so cut up, and being also so full. At the University fifteen hours of classroom work is considered a week's work, while here it is anything above thirty.

Those who have any idea of entering in any contest next Field-day should not lose sight of that fact this winter, and if they will return, and even if not wanting positively to take part in the inter-collegiate contests, if they will practice them they will benefit themselves and will urge on others until an effort will be exerted that on Field-day will achieve greater results for us than ever before.