

## **The daily cardinal. Vol. IV, No. 121 February 27, 1895**

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# The Daily Cardinal.

UNIVERSITY OF WISCONSIN.

VOL. IV—No. 121 ]

MADISON, WIS., WEDNESDAY, FEBRUARY 27, 1895.

[PRICE THREE CENTS.

## ON RADIAPHONY.

LECTURE BY ALEXANDER GRAHAM BELL.

TRANSMISSION OF SOUND WITHOUT A WIRE.

Some Experiments in the Teaching of Deaf and Dumb.

Yesterday morning the Physics lecture room was crowded to the doors with students and visitors who had gathered to hear Prof. A. G. Bell lecture on Radiaphony. President Adams introduced the speaker, congratulating the students upon their good fortune of hearing one who not only is a very entertaining lecturer, but has been a very successful inventor, speak on such an interesting branch of scientific research.

In introduction Prof. Bell referred to the discovery and the first use of selenium, a substance which has played a very important part in the development of radiaphony. In its vitreous amorphous condition it is a non-conductor of electricity, but in its crystalline condition it is a conductor of very high resistance. A piece the size of a pencil and an inch long would have a resistance as great as that of a telephone wire long enough to reach to the sun. Because of its high resistance it was used to balance the resistance of the insulation of ocean cables when testing during the operation of laying the cables. But it was noticed that its resistance varied and that it was less in the daytime than at night. Prof. Bell conceived the idea of utilizing this curious property in the transmission of current through a circuit containing a telephone receiver and a piece of selenium in series. Then, by causing the intensity of a beam of light falling upon the selenium, to vary, the current would be made to fluctuate and this would cause corresponding sounds in the receiver. The problem was to cause the intensity of the beam of light to vary in correspondence with the sound waves of the voice. This result was accomplished by having the beam of light reflected from a mirror, which was used as the diaphragm of the transmitter. The mirror is thrown into vibration by the sound waves, and this causes the rays of light to converge and diverge. The first attempt to use this combination was made in Washington, and was quite successful; the message was transmitted very distinctly along a reflected beam of sunlight. For further experiment, as it was very inconvenient to have the assistant at some distant point, an instrument was fitted up which could be used in the laboratory for producing fluctuations in the intensity of a beam of light. It consisted of a revolving disc with perforations through which the light passed; the light was then focused upon a piece of selenium in the circuit with a receiver. This gave a musical tone, the pitch of which was of course proportional to the rate of interruptions of

the beam of light. One day, wishing to stop the sound for a minute, and nothing else being handy, Mr. Bell placed a sheet of hard rubber in the path of the beam; but, to his surprise, the sound did not cease. He noticed also that the rubber plate was emitting a tone. Investigation here resulted in a series of discoveries—first that rubber was diathermanous; second that radiant energy, either luminous or non-luminous, will affect the conductivity of selenium; third that all solid and some gaseous substances are sonorous when subjected to a fluctuating beam of light.

For simple experimenting a test tube with a rubber tube connecting with the ear may be used. The substance to be investigated is placed in the test-tube, and held in the beam of light. If the intermittent beam of light be passed through a prism, and the test-tube be held in the spectrum, the intensity of the sound will vary with different positions in the spectrum. If the substance in the test-tube be lamp-black, the sound will increase in volume as the tube is moved from violet to the red and is loudest in the ultra-red part of the spectrum. If the substance be red the sound will be loudest at the green band, that is, where the red appears black. The intensity of the sound is proportional to the absorption of the light by the substance. Owing to this, some substances have a very limited range. The vapor of sulphuric ether responds to only one band of the ultra-red portion of the spectrum. Lampblack has the greatest range. Investigation with absorption spectra, gives very interesting results. For instance if the beam from the prism be passed through a copper sulphate solution, all that will be seen on the screen will be a blue band. If a test-tube with lampblack in it be passed through this band it will respond with a tone, but if carried along further there will be no further tones until a certain position in what would be the ultra-red portion of the spectrum be reached, when it will respond again; thus, this absorption spectrum gives two bands to the ear, where it gives but one to the eye. Prof. Bell then concluded, expressing the hope that this field of research, in which little or nothing is being done at present in this country, would soon be occupied by American scientists.

Pres. Adams then said that there was still considerable time at the disposal of those present, and asked him if he would not relate some of his experiences in the development of the telephone. In response to this invitation, and the hearty applause from the students, Prof. Bell told of his becoming interested in teaching deaf children to read and repeat speech. He said when he first became interested in this he could readily believe that deaf persons could be taught to talk, but he was skeptical concerning the possibility of teaching them to read speech by watching the movements of the mouth. He worked out a plan of talking against the diaphragm of the gas capsule of a manometric flame, and then having the image of the flame in the revolving mirrors, photographed. Then a deaf person could be given a photograph, starting with the simple sounds, and be set to talking against the diaphragm until he

Continued on third page.

## MEET AT CHICAGO

WISCONSIN TO BE REPRESENTED IN THE TEAM RACE.

HOPKINS, PITTMANN, FRAME AND TOWER WILL RUN.

Downer to go as Substitute—The Men may Enter Other Events.

The first indoor meet of the Chicago athletic association will be held Saturday night, March 2nd, in the First Regt. armory in Chicago. The entries already closed show that 143 individual athletes intend to compete and this entry list alone guarantees the success of the meet. The open events include 40 yd. dash, 880 yd. and mile runs, potato race, running high jump, pole vault and putting 16 lb. shot. Besides these there are team races for the western colleges, the Cook county high schools and the regiments of the Illinois National guard. The prizes in the open events will be handsome medals for the first three men in each event and the prizes for the winning teams in the relay races will be very handsome banners. The individual members of the winning teams will also receive prizes.

The event in which men here will be most interested is the western inter-collegiate team race, in which Wisconsin will enter a team. The men who will carry the cardinal are Hopkins, Pittmann, H. Frame and Tower, with Downer as substitute. The other colleges represented in the race will be University of Illinois, Lake Forest university and University of Chicago. No attempt will be made to take men for the other events but some members of the relay-team may compete in some of those which come after the team race. Downer will probably run in the 40 yd. dash and Hopkins and Tower in the half mile.

The men have been trained since the first of the term and specially for this race for three weeks, so they are in pretty good shape now, although they had to train under considerable disadvantages in the way of conflicting classes, drill, meets, etc., in the gymnasium. They will go down Saturday morning and come back Sunday morning.

It will be hard to predict much as to the outcome of the race but it is safe to say that the men chosen are worthy of the honor and that the team is the strongest one which could have been picked. All three of the other institutions are rivals who have proven their quality and the race will probably be fought out to the very end.

## REFORM OF CRIMINALS.

Lecture by Prof. Wilkins of Viroqua Before the Class in Charities.

Prof. Frederick Wilkins of Viroqua spoke before class in American charities, on the "Reform of Criminals." He spoke largely from the medical

stand point, laying emphasis at times upon the legal aspect of criminology. In brief he said:

Criminality is in an organized society the lower self in comparison with the higher self, the brute with the man. Criminals may be divided into five classes: Impromptu, occasional, habitual, instinctive and insane criminals. The five differ in the kind of hereditary tendencies, environments natural weaknesses and lack of responsibility that characterize them.

Man has two natures: that of a brute as displayed in an isolated life and the other as shown in his dependence upon society. The latter is a developed state in which the altruistic spirit is most manifest. Environment is the medium in which the criminal is cultivated. Rural and city life present contrasts that bring out plainly the tendencies in the latter to breed a criminal insane class.

It has been asserted that an increase of crime accompanies advancement of education. This is not so, for well understood statistics will prove otherwise. In Massachusetts where the standard of education is highest, crimes have seemingly increased, but this is due to the fact that her laws are more stringent and a higher state of perfection is expected of her people; the number of convicted is consequently increased.

Deceit is a stepping stone to crime. Heredity and sanguinity are conditions which favor an increase of the criminal population of the country. Small heads and large heads are characteristics of the thieves and murderers. All lack that moral responsibility which makes them strangers to remorse. A mental aberration afflicts the insane criminal which makes him irresponsible. There should be a thorough medical examination of a convicted criminal before he is questioned as to his guilt. Monomania often has its accompanying irresponsibility. Society too often has little sympathy for criminals and makes use of the halter when it should treat them as patients.

## DIPLOMAS IN AGRICULTURE.

May be Received on the Completion of the Two years.

There is every reason to believe that, when the short course students complete their second year's work next month, they will be presented with some form of a certificate showing that they have completed the required work at the university. Hitherto graduates from this department have gone out of the university without a sheepskin to adorn the walls of the front parlor at home, but if the efforts of the Dean are successful, the board of regents will undoubtedly decide upon some form of recognition for work done in the line of agriculture.

Of course, diplomas will be issued only to students who have spent two winters at the school and have finished the course in a satisfactory manner. The feeling among the students is decidedly favorable to the change and it will undoubtedly be brought about.

—The pharmacy students are moving into their new room on the first floor of North hall. This laboratory is light and roomy and has been supplied with a quantity of new apparatus.



# The Daily Cardinal.

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Governor Upham, through the adjutant-general of the state, has extended an invitation to the officers and members of the university battalion to attend the exhibition drill of the Governor's guard at the gymnasium this evening. This company is one of the best drilled in the state, and students will have an excellent opportunity to see what can be done in the way of artistic drilling.

It has been repeatedly urged by the Cardinal that a Greek play is the proper thing. Beloit's historic talent has already covered itself with glory and may repeat Oedipus the King, in Chicago. After all that's been said and all that's been done why do not the students wake up to the crying needs of the hour and give us a Greek play. Is our dramatic talent so modest as to let slip the golden opportunity. Let the custom of an annual presentation be inaugurated and after ages will rise up and call us blessed for our courage and forethought.

The bad bold sophomore is at last compelled to submit. Inevitable military drill is at hand and with much grumbling '97 again assumes the dignity of the soldier. It has long been the tendency among the students, no one ever knew exactly why, to make themselves believe that drill is a bore. Each succeeding class would catch the spirit from its predecessor and no matter how much real pleasure and benefit was felt to come from drill no one dared admit it. That this tendency is passing away is evident from the

increased interest in the contests for promotion and the manifest snap and vim in executing the commands. Much of this improvement is due to the instruction but no doubt the general interest in athletics brought out by the new advantages furnished in physical training has served to stimulate the interest in drill. Upon this interest depends largely the benefit to come from the limited military discipline of the course, and now that it is present there can be no question as to the results.

## PROFESSIONALISM AT NORTH-WESTERN.

The faculty of the Northwestern university, adopted the rules recommended by the western college presidents, with the exception of the one in regard to professional athletes. This was laid over for one year. According to this Northwestern has a good chance of being represented by a good, although professional, team as Griffith, their pitcher, played with the Cleveland league team last summer. It is also stated that another member of the team is as much a professional as Griffith.

This action of the faculty cannot be defended by anyone and it is not likely that even the members of the faculty, who voted for the one year suspension of the rule, would attempt to say anything in justification of their votes. But it is a little strange that of the action will more than counter-balance any victories which Griffith may win for the team. For the action of the faculty is a reality and Griffith's victories are not and perhaps will never be. And then no college will feel particularly bad over a defeat on the diamond by Northwestern's professional team. Amateur and a professional teams are in two entirely different classes and the fact that they both are college teams does not alter the matter in the least. Other colleges will have no objection to playing Northwestern, any more than they would to playing a team in the National league. But for Northwestern to claim any ranking with the other college teams would be absurd. If she has a successful season this year the title "Champion professional team of the colleges" would be appropriate, but no other.

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**ON RADIAPHONY.**

Continued from First Page.

could produce the same images. The plan was good, but on attempting to photograph the image he found they were too faint. He then turned his attention to the use of the phonograph for this purpose. In this instrument a point, connected to the vibrating diaphragm, traces a curve on smoked glass as the glass is drawn along. He got the curves, but found that they did not correspond closely to the images of the manometric flame, on account probably, of the clumsiness of the phonograph. He then made up his mind to investigate the human ear in the hope that he might get an idea of value from this source. He visited a doctor to get what information he could on the subject and the doctor recommended that he try a human ear and furnished him with one. He connected this up as a phonograph and obtained excellent curves and another idea. He had at this time completed an invention of a harmonic tone telegraph in which four sheet iron reeds of different pitches were set in motion before four magnets. This set up an undulatory current in the telegraph wire and this current in turn set up similar vibrations in four reeds at the other end of the line. The signal thus sent was interpreted from the resulting tone. The thought occurred to him that, if the diaphragm of the ear could be caused to vibrate in accordance with the resultant of any number of sounds, a diaphragm in front of one of his magnets could be caused to do the same thing, and would produce a like vibration in a diaphragm at the other end of the line. The experiment was made and the telephone was invented.

The lecture was of great interest throughout, not alone on account of the general interest in the subject but also on account of the expressiveness and earnestness of the speaker.

**YALE'S CHEMICAL LABORATORY.**

The new chemical laboratory being erected at Sheffield Scientific school (of Yale university) will be the finest in the country when completed. The building has been inclosed for some time and workmen are now engaged in finishing the interior, which, from the solid nature of this construction, must of necessity progress slowly.

The building will be an ornament to the Yale campus and has an excellent situation. It is north of Winchester hall and near Hillhouse avenue. It is so located as to have abundant light

for its own purposes and yet not to interfere in any measure with the light of the other buildings of the school. The material used in its construction is pressed brick, trimmed with terra cotta and East Haven sandstone.

A great deal of special furniture will be introduced, one of the most noteworthy features of which being the form of drying oven which will be employed. This was designed by Professor Wells and is a novelty in chemical laboratory apparatus. There will be altogether five such ovens in the building. There will be a special steam bath for the hoods, the porcelain funnels for which have been ordered from the royal porcelain works in Germany. White glazed tiling will be used on the back of the hoods, largely for the property which they possess of resisting the action of chemicals; the fact that they give good light for work was also an important consideration in their adoption. Distilled water, which is largely used for experimental purposes, will be generated on the top story of the new building and piped down into the different rooms. The machinery throughout the building has been ordered, and will be of the best and most lasting character. The building will contain a library and reading room in which a complete list of books and journals will be kept. There will be places in the building for about twenty-four assistants and graduates, forty seniors, eighty juniors and eighty-eight freshmen. As the freshman laboratory is designed for four divisions of eighty-eight each, who will work at different periods, the total number that can be accommodated will be about five hundred. The seating capacity of the five lecture and recitation rooms will be about three hundred.

**HISTORY STUDY.**

The University Association for the Systematic Study of History, with headquarters in Chicago, is a new organization which has been perfected largely through the efforts of ex-President Upton. The plan proposes the organization of clubs and the delivering of courses of lectures. Printed outlines also will be sent out. Many prominent educators and professors are associated with President Upton, including Professors Krohn and Greene, of the University of Illinois. The latter is to prepare the outline of studies for the seventeenth century history.

—Fred Bell, '94, of Milwaukee, is visiting friends in the city.

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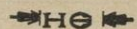
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## OFFICIAL NOTICES.

WEDNESDAY, FEBRUARY, 27, 1895.

**CONDITIONS IN ANCIENT HISTORY:**—The examination for the removal of conditions in the fall term's work in Ancient History, will be held Wednesday, March 6, at 2 p. m. in Room 12. Students who were absent from the regular examination last term must present satisfactory reasons for their absence before they will be admitted to examination.

Charles H. Haskins.

**ECONOMIC SEMINARY:** All students who are writing theses on economic topics are expected to meet in the economic lecture room, on Wednesday evening, Feb. 24.

Wm. A. Scott.

**GYMNASIUM:** Beginning next week, (Monday, March 4,) the Sophomore class in gymnastics will meet Mondays and Wednesdays, at 5 p. m. Class exercise for sophomores tomorrow (Thursday) as usual.

J. C. Elsom.

## EXHIBITION DRILL.

The Governor's guard will give an exhibition drill in the gymnasium this evening before the military committee of the legislature. The men will be fitted out in field uniforms and the drill will consist mainly of fighting manoeuvres. The faculty, battalion, and students are invited to attend.

## DE PAUW-INDIANA DEBATE.

The annual intercollegiate debate between De Pauw and Indiana universities was held last week. Bloomington sent fifty representatives to Greencastle to back their orators, who were Everett W. Brook, of Marion; Orville P. Foreman, of Terre Haute, and Robert Brock, of Cambridge City. They had the negative side of the question, "Resolved, that the general government should own and operate the interstate railroads of the United States." De Pauw had the affirmative side and was represented by Harry L. Murray, of Para, Ill.; James M. House, of Bicknell, and Watson Lewis, of Wheeling, Ind. The judges were Professor David Kinley, of the University of Illinois; Professor C. A. Tuttle, of Wabash College, and Professor Howard Sandison, of Indiana State Normal. Their decision was unanimously in favor of De Pauw, the affirmative side.

The students of pharmacy in the University of Michigan for the next two years will have a new fellowship of \$600 for two years for which to compete. This fellowship is the gift of Frederick Stearns, of Detroit, and his offer was first conceived at the meeting of the American Pharmaceutical association held last September. The details having since been completed, it is now made known for the first time.

—A dancing social will be given at the new dancing academy next Saturday evening. University students are especially invited. Ladies admitted free.

—Another order for athletic goods will be sent from Co-op to Spalding and Bros. Saturday night.

—Cabinet cigars on sale at Palace of Sweets, 109 State street.

—Fine Chocolates, at U. W. Confectionary.

—Joe Dunkel repairs the students shoes, at 622 University Ave.

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