NINTH REPORT

(SECOND BIENNIAL)

OF THE

BOARD OF TRUSTEES

OF THE

ILLINOIS INDUSTRIAL UNIVERSITY,

URBANA, CHAMPAIGN COUNTY, ILLINOIS,

FOR THE TWO YEARS ENDING SEPTEMBER 30TH, 1878.

SPRINGFIELD:
WEBER & CO., PRINTERS FOR THE STATE,
1878.

"In a word, these great improvements, which distinguish our age from all preceding ages, have been obtained from nature by addressing her in the language of science and art,—the only language she understands."—HORACE MANN.

"He is no whole man until he knows how to earn a blameless livelihood."—EMERSON.

ILLINOIS INDUSTRIAL UNIVERSITY,

URBANA, ILL., OCTOBER 15TH, 1878.

To His Excellency, SHELBY M. CULLOM,

Governor of Illinois:

I have the honor to submit herewith, the Ninth Report of the Board of Trustees of the Illinois Industrial University, with accompanying papers. This is for the two years ending September 30th, 1878, and closes the first decennary of the history of the institution. Your attention is invited to the evident and marked progress that has been made during these ten years.

Very respectfully yours,

T. J. BURRILL,

Corresponding Sec'y.

BOARD OF TRUSTEES.

UNDER LAW OF MAY 7, 1873.

EX-OFFICIO.

His Excellency, Governor SHELBY M. CULLOM.
HON. JAMES R. SCOTT, President State Agricultural Board.

TERM EXPIRES 1879.

J. J. Byrd, Cairo.
J. H. Pickrell, Harristown.
D. D. Sabin, Belvidere.

TERM EXPIRES 1881.

A. M. Brown, Villa Ridge.
Emory Cobb, Kankakee.
D. Gardner, Champaign.

TERM EXPIRES 1883

R. B. Mason, Chicago.
*W. C. Flagg, Moro.n
Alexander McLean, Macomb.

OFFICERS OF THE BOARD.

Emory Cobb, Esq., President.
Prof. T. J. Burrill, Corresponding Secretary.
Prof. E. Snyder, Recording Secretary.
John W. Bunn, Esq., Treasurer.

EXECUTIVE COMMITTEE.

Emory Cobb, Chairman.
D. Gardner,
J. H. Pickrell,

S. W. Shattuck, Business Agent.

*Deceased.

TRANSACTIONS OF THE BOARD OF TRUSTEES.

MEETING OF THE BOARD OF TRUSTEES OF THE ILLINOIS INDUSTRIAL UNIVERSITY, DECEMBER 5TH, 1876.

The board met at the University parlor at 3 p. m. Was called to order by the president.

Present: Messrs. Byrd, Blackburn, Cobb, Gardner, Gillham, Mason and Sabin.

Absent: Gov. Beveridge, Messrs. Brown and Flagg.

The minutes of the last meeting were then read and approved.

Dr. J. M. Gregory submitted his report, which was received, and placed on file.

REPORT OF REGENT FOR THE QUARTER ENDING DEC. 5TH, 1876.

GENTLEMEN :

Without preamble I proceed to lay before you at once the information and suggestions you have a right to ask of me.

CONDITION OF THE UNIVERSITY.

The opening term of the year is now well on to its close. The attendance, though somewhat affected by the continued hard times, is still encouraging. The total number of new students admitted is 119. Of these 37 were admitted to the college classes, and 82 to the preliminary studies. Of the preparatory students 44 expect to pass the examination and enter the present freshman class before the close of the year. I believe that the experiment of a preliminary year is likely to prove quite successful in accomplishing the objects aimed at by the board.

Among the new students, an unusual number has entered for the course in mechanical engineering.

The whole number of students in attendance this term, is 330. Many of the old students, now out, hope to return before the close of the year.

It was found necessary to employ but one additional teacher for the preliminary classes, the changes in the course allowing other assistant teachers to do the work.

Prof. G. E. Morrow has accepted your appointment as professor of agriculture, and will enter upon his duties at the opening of the next term.

Mr. Peter Roos, of Boston, has been employed to teach free hand and industrial drawings and designing. His classes are large and quite enthusiastic, and may we hope that this new field of industrial education will prove not only a success here, but of great value to the manufacturing interests of the state. To meet the needs of this new work, I was obliged to authorize the construction of some models and supports. A full set of these has been designed by Mr. Roos, which it is hoped may be introduced into other schools in this state, and thus furnish some work for our shops, and contribute to the advancement of this important branch of practical education. This University, indeed ought to furnish to the state a body of competent instructors, and apparatus of instruction in these purely industrial departments of education.

The renovation in the machine shop ordered at your last meeting, has been accomplished, and this shop has been much improved in convenience and appearance. The appropriation was slightly exceeded, as it was found necessary to give a new roof to the forge shop. A similar renovation to the carpenter shop should be made whenever your funds will allow it.

CENTENNIAL EXHIBITION.

The articles sent to the centennial industrial exhibition have been returned safely. We have the satisfaction not only of having contributed to an important extent to the educational exhibit made by our state and county, but also of having won the favorable judgment of many prominent educators, both American and foreign. One of the most prominent educational periodicals in this country, pronounces the exhibit made by this University the only complete exhibition made by any institution of higher education. I believe it to have been the largest exhibit made by any educational institution from either side of the Atlantic. The impulse given to our work by the labor of preparing it amply compensated for all the expense attending it. I hope we may be permitted to prepare something for the international exhibition to be held in Paris in 1878. The great distance will of course forbid our making so large an exhibit, but I believe we can prepare a smaller and more select representation of our work, which will not disgrace the University of our state.

With the concurrence of the professors concerned, we effected some exchanges which give important additions to our collections, Besides the specimens gained by exchange, the University has received large and important donations from Spain, Brazil, Portugal, Canada, Australian colonies, Sweden and Russia. Those from Spain are especially costly and valuable, embracing a magnificent volume of architecture published by the Spanish government, the usual price of which is not less than $150; also a large number of casts of Spanish and Moorish architecture, of great value to our schools of architecture. I respectful-

ly suggest that suitable resolutions be made and communicated to Col. Lopez J. Fabra, the royal commissioner from Spain, and to the Spanish government for these valuable gifts. Some acknowledgments are due also to other commissioners and governments for the favors received.

SCHRŒDU'S MODELS.

By request of several professors, I looked over the models on exhibition from the celebrated establishment of Schrœdu, Darmstadt, Germany, and finding among them some models in Stereotomy and other departments not hitherto represented in our collections, and having offered these at an unusually large discount, and the freight and custom charges having already been paid, I ventured to purchase to the amount of $105, which I paid from my own funds and now hold the goods subject to your orders. These models will be the more valuable to us, as they afford examples after which we can manufacture many additional models in the same department for ourselves.

THE STATE TEACHERS' ASSOCIATION

Has chosen Champaign as the place for its next annual meeting, and through its executive committee has requested that the state criminal school exhibit shall be retained here and put on exhibition during their meeting. I request permission to use one of the lecture rooms temporarily for this purpose, and also that rooms be tendered the association for such meetings as its members may wish to hold in the University building. It is understood that the most of the meetings are to be held at a public hall.

The thermometer graduating machine made for the centennial exhibition is still on hand, and I communicate herewith a letter from a party desiring to purchase the same.

APPROPRIATIONS DESIRED.

The following small appropriations are asked in addition to the appropriations heretofore made for this half year. After careful examination, I recommend them to your favorable consideration :

1. To Prof. Robinson for materials for the physical laboratory for the instruction of classes next term, $20.

2. Additional tools for machine and pattern shops, as per Prof. Robinson's report, $50.

3. For refitting and improvement of the machinery in machine shop, $25.

4. For shelving in the pattern room, $5.

I forbear from recommending any appropriations for the other purposes mentioned by Prof. Robinson, not from any doubt of their desirability but because they seem at present to be beyond our means, and because I hope that the legislature will consent to make a regular appropriation for the maintenance and supply of the shops.

5. For instruction of band as per request of Prof. Snyder, $15.

6. For additional apparatus for the calisthenic classes, $25.

7. To cover expense of models already made for drawing and designing classes, and for additional ones needed, $10.

8. To cover clock and other articles needed for civil engineering classes, $30.

At the request of Dr. Prentice, I again ask your attention to the propriety of ordering at once the large model of the horse from Dr. Anzoux of Paris. At least six months must elapse after the order is made before the model can be finished. There is an unexpended balance of the state appropriation nearly sufficient to cover this purchase.

I desire to call your attention to the music for our daily general exercises in the chapel. This daily assemblage of the whole body of students is in my estimation one of the most important educationary influences of a general character amongst us. It affords opportunities for familiar practical lectures on subjects not taught in classes and yet of high importance in the formation of character. The general discipline of the University depends largely upon this daily assembly. To give it additional attractiveness and power, a choir is organized, and with the aid of Prof. Robinson I have undertaken to procure a new organ without calling upon the friends of the University for aid. Miss Patchin has at my request undertaken the lead of the choir and with a success which has been gratifying to us all. I wish some appropriation might be made to compensate her for these valuable services. At least the compensation she receives for private lessons for the same time.

HEATING APPARATUS.

Our heating apparatus has been found liable to many accidents, and to frequent failures, and lately a new difficulty has shown itself. The steam force pump is inadequate for the work required of it. It cannot draw from the well and lift to the present tanks the water required. A remedy is demanded at once or we must frequently be left without steam and with cold rooms. A new and more powerful pump will cost $200 or $300, as I am informed. Two other expedients offer themselves : 1st, to employ additional labor to work the pump, lifting the water first into a barrel or hogshead and thence to the tanks, or, 2nd, the construction of two new tanks over the water closets. This would probably be the cheapest, and would serve some good purposes.

But ultimately a new pump must be purchased.

APPROPRIATIONS FROM STATE.

Several weeks since, Governor Beveridge visited the University to ascertain the amounts of the appropriations which it would be needful to ask from the approaching general assembly. In connection with Mr. Gardner, I laid before him our wants, subject to the revision of the board of trustees, and he deemed the following worthy of recommendation, the board of trustees concurring.

1. For the payment of taxes	$3,000	per annum.
2. For ordinary repairs and improvements	2,500	" "
3. For chemical and physical laboratory	1,000	" "
4. For mechanical, engineer and architecture shops.	1,500	" "
5. For cases for cabinets and library	5,000	
6. For books and apparatus, (agricultural and other departments)	5,000	
7. For fence	2,000	
8. For new chemical laboratory building	25,000	
9. For refitting dormitory buildings for use of young women students	25,000	

These last two items were given as rough estimates. Plans and estimates have now been carefully prepared, and it is found that the amounts required will be a little larger than those given, but if the legislature will authorize the appropriation for the freight on materials, they can probably be constructed with these appropriations.

But there will be needed also money to furnish and fit up both buildings.

This leaves out of account the appropriations which will soon be needed for current expenses, when your investments are reinvested, as they soon must be, at lower rates. This question will become within the next two or three years the most serious of all. Perhaps by that time the legislature will be willing to follow the example of Michigan and Wisconsin and give to the University a regular income from a fixed tax of one-tenth or one-twentieth of a mill on the dollar of valuation. If the state will carry out the policy begun, and require the investment of the funds to be made in state bonds, and will itself take the funds and issue the bonds therefor, it will give great stability to the finances of the University, and simplify our work on this side. Ought not a separate memorial to be made on this subject and laid before the governor and through him before the legislature? The state has assumed an important trust and has built for itself an important interest. It seems fitting that it should at once be asked to consider the full import of this trust, and this interest, and adopt a wise and permanent policy concerning it.

GREEN HOUSE.

Another item omitted from the list of appropriations desired, is that of the removal and reconstruction of the green house. You have directed estimates to be made for this removal, but the cost being too large for our present means, I think it was determined by the board to ask an appropriation for it. If the laboratory is built as proposed, to the south of the present main building, the green house should also be removed to these grounds.

LIBRARY.

The report of the librarian will show you some wants in this direction. An appropriation of $300 is needed for periodicals and binding.

The catalogue has been prepared and will be submitted for publication in the annual report.

UNIVERSITY, DEC. 5, 1876.

Dr. J. M. Gregory, Regent, I. I. U.

SIR: The question of moving the green house to the grounds near the University building was brought before the board nf trustees at the June meeting, 1876. Action was then postponed with a view of asking of the state legislature the necessary means. According to the estimates then presented, it would require about $1,000 to place the house as it is upon the selected site. Its inconvenient location now, and its condition, (need of extensive repair), demand urgently its removal. But for the required use it can be vastly improved. A part needs to be higher than at present, some plants being already too large for the house and others rapidly becoming so, and a part should be lower for small plants and propagation. Besides being less expensive to heat the low roof is much better for these plants. The heating apparatus is also deficient, nor can it be remedied at small cost.

Again, the botanical work urgently requires a well appointed laboratory. The two rooms now used in the main building being connected by a doorway is a great improvement over those used before, but it is not possible to secure the requisite light and heat; besides the inconvenience of obtaining material from the green house when the latter is at a distance. For the study of many of the lower plants, such as the parasitic fungi, cultures must be resorted to, and these need uniform heat, Saturdays and Sundays as well as other days and daily observations. So large a part of botanical study, except the mere reading of books, is by the aid of microscopes, that special adaptations for the latter is all but imperative. In Europe, botanical laboratories are as common as those for chemistry, and the best institutions in this country are making provisions for the practical work upon plants, as well as for the theoretical study of text-books. A sketch of the main floor of a building is herewith presented. This is designed for the south side of the west entrance of the new University grounds, the plant houses to be attached as shown. The building is 32 X 58 ft. facing north, the longway being east and west. The laboratory room has an abundance of northern light, which is by far preferable to any other for microscopical purposes. Tables are placed at each window, and a sink and hood (for boiling preparations with chemicals) are provided. Room will also be found for a case of books, apparatus etc. Opening from this room are three others as marked, a laboratory for the instructor, which is almost as essential as the other, if any advance is to be made, a class room or lecture room and a museum. In the latter, collections of all kinds of botanical specimens, plants, seeds, woods, fruits, textile fabrics and vegetable productions would find a place and aid in efficiency in the instruction. The growing plants being also at hand in the winter time, when most of the work is done, would contribute largely in the same direction. At the east end of the building is an entrance shall and a room, for the person in charge of the plant houses.

The boiler, potting and storage rooms would be in a basement story. The same heating apparatus (hot water) would answer for the work rooms and the plant houses, being constantly in use for both purposes.

A glass structure of good heignt and of such construction as chosen is represented as attached to the east, and the low house at the south. For the former a curvilinier roof in two parts might be used with good effect. For the latter the ordinary 3 X 6 sash, of which we have on hand nearly enough, could be used.

The cost of all this will entirely depend upon the style adopted. For plain building, but with best fitting as regards real service, $5,000 with the material on hand would probably be required.

It seems to me the necessities and advantages of such a combined structure, can be so clearly shown that success in obtaining the money from the state would be at least probable.

Respectfully submitted,

T. J. BURRILL.

The board took a recess of two hours to visit the shops and inspect the drill of the University battalion, to meet again at the Doane House, Champaign, at 7:30 p.m.

EVENING SESSION.

The board assembled as by adjournment.
The following resolutions were passed:

Resolved, That the board of trustees of the Illinois Industrial University, do hereby express to Senor Colonel Lopez Fabra, royal commissioner from Spain to the International Exhibition at Philadelphia, our thanks for the valuable donation of a copy of the "*Monumentos Arquitectonicos de Espana*," of interesting casts of Spanish and Moorish architectural ornaments and of agricultural specimens.

Resolved, That we respectfully request Senor Fabra to accept for himself, and to communicate to his government, our profound expression of esteem and gratitude for their generous recognition of this University of our state.

The treasurer, Mr. J. W. Bunn, then read his report, which was received and ordered to be placed on file.

JOHN W. BUNN, TREASURER, IN ACCOUNT WITH THE ILLINOIS INDUSTRIAL UNIVERSITY.

1876		DR.			1876		CR.		
Sept.	12	To balance		16,591 89	Nov.	30	By am't paid Salaries		8,636 85
"	30	" am't rec'd on acc't Agricultural Departm't	2,393 58		"	30	" " on acc't Mechanical Department		665 28
"	30	" " " Horticultural "	44 76		"	30	" " " Architectural "		462 94
"	30	" " " Mechanical "	86 65		"	30	" " " Agricultural "		2,344 33
"	30	" " " Architectural "	7 10		"	30	" " " Horticultural "		283 91
"	30	" " " Fuel and lights	35 50		"	30	" " " Chemical "		176 84
"	30	" " " Library	6 61		"	30	" " " Military "		28 28
"	30	" " " Fees and room rents	1,662 50		"	30	" " " Library		255 40
"	30	" " " Tuition (prep'r. dep't)	785 00		"	30	" " " Stationary and printing		65 22
"	30	" " " Incidentals	20	5,021 90	"	30	" " " Fuel and light		911 72
Oct.	1	" Interest on Sangamon county bonds		1,125 00	"	30	" " " Building and grounds		462 56
"	1	" Am't rec'd on Benton judgment		95 00	"	30	" " " Board expense		67 65
"	1	" " of J. O. Cunningham		150 00	"	30	" " " Incidentals		90 91
"	23	" " " Burnetts for land		721 34	"	30	" " " Salaries, fees from prep. stud'ts		207 00
Nov.	30	" " on acc't Agricultural Departm't	2,173 43		"	30	" " for Regent's desk		102 90
"	30	" " " Horticultural "	180 17		"	30	" " " Cabinet cases		50 00
"	30	" " " Architectural "	401 02		"	30	" " " Microscopes		9 75
"	30	" " " Mechanical "	547 15		State appropriation, buildings and grounds				20 00
"	30	" " " Buildings and grounds	21 00		" " Veterinary department				2 75
"	30	" " " Fuel and light	63 42						
"	33	" " " Microscopes	70 10		Balance				13,287 32
"	30	" " " Fees and room rents	150 50						
"	30	" " " Salaries	270 00						
"	30	" " " Tuition (prep'r dep't)	85 00						
"	30	" " " Library	90						
"	30	" " " Ill. Cent. R.R. donat'n	526 80	4,489 48					
				28,194 61					28,194 61

Urbana, December 5th, 1876.

JOHN W. BUNN, Treasurer.

The following report of a committee authorized to employ an assistant teacher in English and ancient language, made the following report:

To the Board of Trustees, Illinois Industrial University:
Your committee appointed to employ an assistant teacher of English and ancient languages for preparatory classes, report that they employed for this purpose, Charles E. Pickard, a graduate of the University of Wisconsin, at a salary of $45 per month, for the nine months, beginning September 15th, 1876, and ending June 15th, 1877.

Respectfully,

J. M. GREGORY,
D. GARDNER.

The report was accepted, and action approved.

The state teachers' association was invited to occupy rooms in University building, at their meeting at this place, in December, 1876.

The question of purchasing some of the cases used for the educational exhibition at Philadelphia, was referred to the regent and Mr. Gardner, with power to act.

The purchase of the model of the horse, from Dr. Auzoux, Paris, for the veterinary school, was referred to Dr. Gregory, Mr. Gardner and the business agent, with power to conclude the purchase, if deemed desirable.

A communication in regard to the sale of the thermometer graduating machine, was reported to Mr. Gardner and the business agent.

The business agent then read his report, which was received and placed on file:

ILLINOIS INDUSTRIAL UNIVERSITY, December 5th, 1876.

Hon. Emory Cobb, President Board of Trustees, Illinois Industrial University.

Sir: I have the honor to offer the following report, as business agent of the University, for the three months ending December 1st:

Paper "A" is a statement of the state and current appropriations, the expenditures under the same, and their credits.

Paper "B" is a list of the warrants drawn since the last meeting with their vouchers, including those offered for auditing at this time, the last being from 125 to 166 inclusive.

Paper "C" is a communication from parties in New York, in regard to duties paid upon University goods without authority. I do not think the bill should be paid.

Respectfully Yours,

S. W. SHATTUCK,
Business Agent.

"B"—List of Warrants Drawn.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
1	Emory Cobb	Expense to meeting	$ 14 70
2	A. Blackburn	" "	18 75
3	R. B. Mason	" "	12 00
4	J. J. Bird	" "	22 20
5	J. M. Gregory	Salary, Sept., 1876	333 33
6	S. W. Robinson	" "	166 66
7	T. J. Burrill	" "	166 66
8	S. W. Shattuck	" "	166 66
9	E. Snyder	" "	166 66
10	D. C. Taft	" "	166 66
11	J. B. Webb	" "	166 66
12	J. C. Pickard	" "	166 66
13	N. C. Ricker	" "	125 00
14	J. D. Crawford	" "	125 00
15	H. A. Weber	" "	150 00
16	E. L. Lawrence	" "	100 00
17	S. C. Allen	" "	120 00
18	T. W. Prentice	" "	100 00
19	A. C. Swartz	" "	75 00
20	J. O. Baker	" "	75 00
21	F. A. Parsons	" "	75 00
22	M. A. Scovell	" "	60 00
23	A. E. Barnes	" "	60 00
24	J. Kenis	" "	75 00
25	Peter Roos	" "	75 00
26	C. I. Hays	" "	75 00
27	C. Pickard	" "	45 00
28	E. A. Robinson	" "	150 00
29	A. B. Baker	" "	50 00
30	H. Hanser	" "	15 00
31	W. L. Williams	" "	7 00
32	W. B. Clark	Books	25 00
33	Stackpole & Bro	1 Ground level	16 00
34	L. Prang & Co	Copies for painting	9 34
35	Fuller & Fuller	Chemicals and glass	11 45
36	Publishers of Illini	Balance on catalogue	40 00
37	H. Peddicord	Lime and plaster	8 90
38	E. V. Peterson	Stationery	17 81
39	J. T. Mitchell	Work on green house and grounds	22 47
40	Wm. Price	Paints, oil, putty, etc	4 30
41	Fuller & Fuller	Chemicals	100 15
42	T. B. & G. R. Armstead	Plumbing and putty	19 60
43	Crane Bros. Mfg. Co	Hardware	2 99
44	Agricultural Department	Farm expenses, September	676 63
45	Students' pay roll	September, 1876	154 39
46	H. R. Buckle	Labor and hardware	4 14
47	L. V. Manspeaker	Soda, soap, &c	1 75
48	Burt & Smith	1 Doz. brooms	5 00
49	I. B. & W. R. W. Co	Freight	2 85
50	Enterprise Coal Co	11 Cars coal	168 00
51	J. M. Gregory	Salary, October, 1876	333 33
52	S. W. Robinson	" "	166 66
53	T. J. Burrill	" "	166 66
54	S. W. Shattuck	" "	166 66
55	E. Snyder	" "	166 66
56	D. C. Taft	" "	166 66
57	J. B. Webb	" "	166 66
58	J. C. Pickard	" "	166 66
59	N. C. Ricker	" "	125 00
60	J. D. Crawford	" "	125 00
61	H. A. Weber	" "	150 00
62	E. L. Lawrence	" "	100 00
63	L. C. Allen	" "	120 00
64	F. W. Prentice	" "	100 00
65	A. C. Swartz	" "	75 00
66	I. O. Baker	" "	75 00
67	F. A. Parsons	" "	75 00
68	M. A. Schovell	" "	60 00
69	A. E. Barnes	" "	60 00
70	J. Kenis	" "	75 00
71	Peter Roos	" "	75 00
72	C. I. Hays	" "	75 00
73	C. E. Pickard	" "	45 00
74	E. A. Robinson	" "	100 00
75	A. R. Baker	" "	75 00
76	H. Hanser	" "	20 00

List of Warrants Drawn.—Continued.

No.	TO WHOM	FOR WHAT.	AMOUNT.
77	W. L. Williams	Salary, October, 1876	$ 10 00
78	Fuller & Fuller	Oil, glass and freights	35 75
79	Lyon & Healy	2 Brass mouthpieces	1 00
80	U. S. Patent Office	Reports	7 80
81	W. U. Telegraph Co	Messages	2 00
82	Webster & Davis	Hardware	10 70
83	C. & U. Gas Co	Gas Bill September, 1876	39 90
84	A. H. Andrews & Co	1 Polygon Desk	100 00
85	Crane Bros. Mfg. Co	Hardware	3 64
86	Hemingray Glass Co	101 lbs. Tubing	27 25
87	Brown, Holdaway & Co	40 Volumes Encyclopedia Britiannica	5 50
88	Agricultural Department	Farm expenses October, 1876	940 10
89	N. C. Thayer & Co	Photograph paper	11 05
90	Crane Bros. Mfg. Co	Hardware	47 50
91	F. W. Christern	Books	3 13
92	Leggatt Bros	"	56 22
93	Ill. Cent. R. R. Co	Advanced freights	9 60
94	Lyon & Healy	Repair of band instrument	8 00
95	E. A. McAllister	Postage, September and October, 1876.	10 12
96	S. W. Shattuck	Petty expense	34 52
97	Students' pay roll	October, 1876	275 17
98	J. M. Gregory	Salary, November, 1876	333 33
99	S. W. Robinson	" "	166 66
100	T. J. Burrill	" "	166 66
101	S. W. Shattuck	" "	166 66
102	E. Snyder	" "	166 66
103	D. C. Taft	" "	166 66
104	J. B. Webb	" "	166 66
105	J. C. Pickard	" "	166 66
106	N. C. Ricker	" "	125 00
107	J. D. Crawford	" "	125 00
108	H. A. Weber	" "	150 00
109	E. L. Lawrence	" "	100 00
110	S. C. Allen	" "	120 00
111	F. W. Prentice	" "	100 00
112	A. C. Swartz	" "	75 00
113	I. O. Baker	" "	75 00
114	F. A. Parsons	" "	75 00
115	M. A. Scovell	" "	60 00
116	A. E. Barnes	" "	60 00
117	A. Kenis	" "	75 00
118	Peter Roos	" "	75 00
119	C. I. Hays	" "	75 00
120	C. E. Pickard	" "	45 00
121	E. A. Robinson	" "	100 00
122	A. B. Baker	" "	75 00
123	H. Hanser	" "	20 00
124	W. L. Williams	" "	10 00
125	I. B. & W. R. W. Co	Freight	4 75
126	Colman's Rural World	Advertising	4 80
127	Crane Bros. Mfg. Co	Hardware	28 26
128	Sabin Bros.	Coal	9 00
129	J. M. Gregory	Books	7 20
130	Chicago Screw Co	Screws and nails	40 00
131	A. Grover	Hardware	8 00
132	Peoria Pottery Co.	Flower pots	29 00
133	Am. Social Sience Ass'n		6 00
134	E. N. McAllister	Postage, November, 1876	7 00
135	E. A. Swannell	12 Band books	10 60
136	Locke & Saxton	Paper bags	1 20
137	McClarke & Moore	" and tacks	3 00
138	Fuller & Fuller	Chemicals and glass	9 50
139	Richards Iron Works	Hardware	14 75
140	Bloomington Nurseries	Trees and plants	4 60
141	A. R. Short	Nuts	3 70
142	Ill. Cent. R. R. Donation	Freights, Sep., Oct. and Nov	526 80
143	Chas. Helmut	Fr't & Ep., microscopes from Bremen	9 75
144	H. B. Ingalls	Whitewashing	4 00
145	M. E. Lapham	Lumber	21 45
146	S. V. Manspeaker	Brooms, etc	3 73
147	Webster, Davis & Co	Plaster and lime	6 25
148	C. & U. Gas Co	Bill for October	32 70
149	Horticultural Department	Work for buildings and grounds	21 55
150	Mechanical Department	" other departments	198 17
151	H. Swannell	Chemicals, brushes and glass	10 16
152	Dodson & Hodges	Hardware	20 11

List of Warrants Drawn.—Continued.

No.	TO WHOM.	FOR WHAT.	AMOUMT.
153	Baldwin Bros.	Freight and custom fees	5 05
154	Trevitt & Gr een	Hardware	20 47
155	W. P. Ward.	Painting and glazing	40 30
156	S. W. Shattuck	Petty expenses November	24 31
157	Students' pay roll	November, 1876	277 06
158	S. W. Robinson	Expenses to Chicago and Exposition	9 79
159	A. Brown	Mason work and material	2 25
160	Enterprise Coal Co.	10 cars coal	168 00
161	Horticultural Department	Rent of house	54 00
162	Architectural "	Work for other departments	385 92
163	Agricultural "	Expense November, 1876	279 18
164	" "	Work for other departments	229 93
165	I. B. & W. R. W. Co.	Freights.	20 78
166	Salary accountant	Teaching in preparatory department	270 00

The matter of paying a certain bill of custom house duties to Oehlrichs & Co., New York, was referred to Mr. Gardner and business agent, with power to act.

The bills presented for payment were then audited and allowed.

Mr. W. C. Flagg, at this juncture, arrived to meet with the board, having been delayed by trains.

The matter of repairing or exchanging the pump in heating apparatus, was referred to the executive committee.

Miss C. E. Patchen was allowed $25.60 per term, for instruction of choir, to begin January 1st, 1877.

The salary of M. J. Kenis was increased to $75.00 per month (for ten months).

The following special appropriations were then made :—

$20 00 for materials, etc., for physical laboratory.
50 00 " tools for machine shop.
25 00 " repairs and improvement in shops.
5 00 " shelvings in pattern room.
15 00 " instructor of military band.
25 00 " apparatus for calisthenics.
40 00 " models for classes in designing.
20 00 " clock and other articles for dep't of civil engineering.

The report of head farmer E. S. Lawrence was then read, received and ordered to be placed on file.

To J. M. GREGORY, Regent Illinois Industrial University :

I herewith present a report of the operations of the agricultural department, for the year ending November 30, 1876.

The year, on the whole, has been prosperous. Fair crops have been raised, and fair prices realized.

The crops raised, have been as follows : Corn, 150 acres ; meadow, 120 acres ; pasture, 145 acres ; oats, 40 acres ; rye, 8 acres. Besides this there was 15 acres of corn, and 10 acres of clover in the experimental orchard.

The corn yielded from 80 bushels down to nothing. About 20 acres was drowned out, so that the yield was practically nothing. The average for the whole planted was 45 bushels to the acre. The usual number of hogs and cattle have been kept. Hogs have done well, been healthy, and sold for paying prices. Notwithstanding the fact that cattle have fallen from 1½ to 1 cent per pound in the last year, a small profit has been realized.

Oats looked fine during the fore part of the season, and up to harvest, but were injured by heat and wet, so that the yield was only 15 bushels per acre.

The crop of hay was large, and secured in fine condition.

Rye, potatoes, fruit, &c., were good.

The total amount of sales, and credits for other departments, (mostly for work) amounts to $11,450.48. This does not include any credits for expense of experiments. For a detailed account of receipts, see paper marked "A."

The total amount of expenses for the year, including salary of hired farmer, and salary of "foreman of experiments," is $8,305.70. This includes cost of wind mill, and other improvements, for an account of which see paper marked "B."

For a list of improvements, see paper "C."

It is believed that the repairs on wagons, harness, &c., (see items of repairs in expense account) will make all tools in as good order as at the beginning of the year. Aside from repairs shown, the wagons have been painted, and two hay frames made and painted, on the farm. This leaves the purchase of new tools to go to the improvement account.

Mr. Hume, foreman of experiments, was paid $540, of this amount $112.50 was charged to the horticultural department, for services rendered, the balance, $427.50, together with $161.97 for scales fertilizers, thermometers, &c., purchased by Prof. Miles, is reckoned as expenses on account of experiments, making $589.47.

For inventory of salable property, see paper marked "D."

Three years ago a pair of mules were sold for $340, and a pair of horses (colts) raised on the farm, were put in their place, and continued on the inventory to last year, at $300. This year I have left them off and deducted the amount from the last year's inventory.

There was an experiment made on the stock farm, under the direction of Prof. Miles, in cattle feeding. As far as it went (only including out door and stable feeding on the same food) it did not vary in result from experiments in the same line before reported.

Two acres was sown with winter wheat in March, seed from Michigan. It came up in good shape, but failed to head out, which should have been expected. The land was plowed June 20th, and planted to early corn, and gave a fair yield.

The four acres of experimental corn was taken to pay for cultivation and gathering.

This statement will show the profits of the year:

	Cr.
By receipts and credits	$11,450 48
" experiments	589 47
" improvements	1,064 40
" inventory	7,442 80
	$20,547 15

	Dr.
To expenses	$ 6,565 70
" head farmer's salary	1,200 00
" Mr. Hame's "	540 00
" inventory, Dec. 1875	10,083 60
Balance, profits	2,157 85
	$20,547 15

By the fall of prices, from $800 to $1,000 was lost on the inventory of last year. Hay was put in last year at $10, this year at $7, making a difference of $3 00. Last year cattle were put in at 3½ to 4¾ cents. There was also a loss on wheat and rye. I think the indications now are that prices will go the other way the coming year. By putting prices on property the same as last year, a profit of about $3,000 would appear, which is about what the farm should pay.

Respectfully submitted,

E. L. LAWRENCE,

Head Farmer.

It was voted to ask the following appropriations from the state:

$3,000 per annum for taxes on lands.
$2,500 " " " repairs of buildings.
$1,000 " " " apparatus etc. in chemical and physical laboratories.
$1,500 " " " mechanical and architectural shops.
$5,000 " " " collections for cabinets, books for library, and cases for both.
$1,000 " " " for fences and repairs.
$5,000 for the horticultural department, moving and enlarging green house, heating apparatus for same, and botanical laboratory.

$40,000 for chemical laboratory, heating apparatus and fixtures for same.

The plans and estimates for these buildings were approved in the main, and authority given to the executive committee to change the same in detail, if desirable or necessary.

Mr. Gillham moved to also ask the state for an appropriation of $35,000, for refitting and remodeling the old university building into a ladies' dormitory.

The motion was lost.

The executive committee were instructed to lay these requests before the general assembly, at their next meeting, also to memorialize the legislature in reference to defining and increasing the power of this board in regard to investments of funds, sales and purchases of lands, etc.

An amount of $105 was allowed for a purchase of apparatus and models, made at the Centennial Exhibition by Dr. Gregory.

The executive committee were directed to employ head farmer E. L. Lawrence for the next year.

Mr. Flagg submitted a series of by-laws for the faculty; they were referred to the executive committee, the regent, and Mr. Flagg, for report at the March meeting.

It was moved to reconsider Mr. Gillham's motion in regard to the appropriation for refitting old building. Carried.

The subject was then referred to the executive committee, with power to recommend the appropriation if deemed expedient and desirable.

Adjourned.

BOARD MEETING, MARCH 13, 1877.

The board met in the University parlor, and was called to order at 4 o'clock, p. m., by president E. Cobb, who read the scriptures, and was followed with prayer by Mr. Blackburn.

Present: Messrs. Blackburn, Cobb, Flagg, Gardner, Gilham, Mason, and Sabin.

Absent: Governor Cullom, Messrs. Byrd, Brown and Pickrell.

A letter from Mr. Brown was read, regretting the impossibility of attending this meeting, on account of ill health.

The minutes of the meeting of the last meeting were read and approved.

Reports of officers now being in order, Dr. Gregory presented his report, which was received and laid upon the table.

REGENT'S REPORT.

To the Trustees of the Illinois Industrial University:

GENTLEMEN: This meeting closes the first decade in the history of the University, and opens a new one. I have deemed it wise and fitting that the history of the several colleges and schools, constituting

the University, shall be written up to this time, for the guidance of our successors, and for the information of the people of the state. I accordingly requested the professors in charge to prepare for your use and disposal, short historical sketches of their several schools. These sketches I now lay before you, with the recommendation that they be communicated to the governor as a supplement to the last annual report now in his hands.

TERM REPORTS.

The term reports of the several professors and teachers, show that during the term the following classes have been instructed:

		Classes.	Students			Classes.	Students
9	Chemistry	2	39	13	German	3	67
8	Botany	1	8	14	French	3	60
7	Horticulture	1	9	26	Military	2	39
10	Microscopy	1	1	19	Civil engineering	6	56
11	History	1	38	25	Domestic science	2	20
15	Latin	5	44	27	Calisthenics	2	70
16	Greek	1	6	2	Zoology	1	18
12	English	5	142	3	Geology	1	24
17	Elocution	2	71	23	Physical geography	1	34
24	Book keeping	2	48	28	Designing and drafting	3	66
6	Agriculture	2	18	29	Modeling	1	6
5	Physics	1	36	31	National philosophy	3	58
20	Mining engineering	1	1	22	Veterinary	1	15
18	Mechanical engineering	3	11	1	History of civilization	1	38
21	Architecture	6	25	30	Music	–	15
4	Mathematics	6	126				

CHANGE IN REGENT'S TERM.

The close of another biennial term suggests to me to call your attention to the possible embarrassment, to which the University may be subjected by the termination of the regent's term of service, in the midst of the academic year. My first election was made at the first meeting of the board, March, 1867. I made my acceptance, and entered upon service the first of April, and my salary began at that time. As the law establishes the term of service at two years, the term expires either at the biennial anniversaries of the meeting when the original election occurred, or on the first of April, when the service actually commenced. In either case it may require a change in the head of the University, to take place in the midst of a term. It is certainly desirable for the trustees to determine when the term properly begins, and to make an arrangement to have it terminate, if possible, at the proper close of the year's work.

STATE APPROPRIATIONS.

In accordance with the votes of the board, in concurrence with the ex-committee, I sent to the governor the list of appropriations asked for by you, from the general assembly, and on request of our members from this district I drafted a bill for the same. This bill is now

pending in both houses, and with a fair prospect of its passage without serious diminution of the amounts. These amounts are as follows:

For taxes	$ 3,000	a year.
" repairs	2,500	"
" chemical and physical laboratory expenses	1,000	"
" shop classes work	1,500	"
" library cases	1,000	"
" " books, &c	1,500	"
" cabinet cases	2,250	"
" " specimens	1,000	"
" fencing	1,000	"
" chemical laboratory	20,000	"
	$34,750	a year.
Total for two years	$69,500	
For green house and botany laboratory	5,000	
	$74,500	

Two items, amounting to $3,000, have been rejected by the senate committee on state institutions.

SCHOOL OF DESIGN.

The success thus far attending our efforts to introduce industrial drawing and designing, induces me to ask that this department of our work be ranked as a district school, under the title of the "school of design," and that a separate course of studies for such school, be prepared and published in the next catalogue. There are now two teachers whose time is given to studies properly belonging to this school, Mr. Roos, the teacher of industrial drawing and designing, and Mr. Kenis, the teacher of clay modeling and architectural ornamentation. A large number of students are taking these studies, and the progress made is full of promise for the future. The public utility of this work can only be understood by those who have been led to consider the great importance given to drawing and designing, in the highest manufacturies of Europe and America.

THE DORMITORY BUILDING.

The chief dormitory building has been a source of much solicitude from the difficulty of securing the proper supervision over a building occupied by so large a number of young men alone. I wish to suggest the propriety of securing, if possible, a suitable family to take charge of the building, and perhaps to be allowed to provide board for such as may wish it. If the proper parties can be obtained, the building would be rendered much safer, as well as more home like and comfortable, and with no more expense than at present except, perhaps, some refitting of rooms for the family.

EXAMINATIONS FOR ADMISSION.

We have heretofore accepted students on the examinations of county superintendents, in the common branches. In Michigan and Wisconsin, the plan has been adopted of accepting the examinations of principals of the public high schools. This plan has thus far worked well. It has the advantage of saving candidates the expense of a long journey, and also brings the University into notice among the schools thus permitted to conduct examinations. After inquiring, I feel prepared to advise that the faculty be allowed to designate one or more high schools in each county, of sufficiently high grade, and good reputation, whose certificates of examination shall be received for students taught in such schools.

I would also recommend that the faculty make arrangements for examinations to be conducted by themselves, or some of their members, during the summer months, at several prominent places in the state, such as Chicago, Rockford, Galena, Peoria, Springfield, and perhaps other points.

REDUCTION OF SALARIES.

The action of the trustees, at the close of the meeting held last June, in giving notice to the faculty of an intention to reduce the salary ten per cent. from, and after next September, has naturally awakened some apprehension as to the effect of such a reduction on the character and prospects of the University. I appreciate fully the embarrassment occasioned by the shrinking of income from vested endowments, and the consequent difficulty, if not impossibility, of maintaining the teaching force of the University, at its present number, without some reduction of salaries, unless aid can be had from some new source. I am also aware that the general lowering of prices throughout the currency, or the appreciation of our country, will leave the new salaries proposed worth more than the present salaries were at the time of their establishment. But the question is sufficiently serious to demand a more protracted consideration, and a more careful inquiry into all the facts in the case. It is not the will of the employees alone, which can determine the rate of wages in any branch of labor, physical or intellectual. The market law of supply and demand controls the prices of efforts as well as of commodities. Nor will it be sufficient to inquire into the salaries paid in other classes of schools, such as high schools, normal schools, or even in the private or sectarian colleges. The wages paid watchmakers cannot be kept on a level with those of carpenters. Engineers, accountants, lawyers, and preachers, cannot be required or persuaded to work for the same compensation. Schools of the same kind must be compared with each other, high schools with high schools, normal schools with normal schools, and state universities with state universities.

I have deemed it wise to write and obtain, for your inspection, the rates of salaries paid by kindred institutions, and would respectfully suggest the propriety of further inquiry before the final action is taken. I submit the replies I have already received.

It is possible that some of your present faculty will prefer to remain at a reduced salary, rather than to incur the trouble and expense of a

removal, and the sacrifice of some part of their property invested here. And it is quite possible that you may be able to fill with cheaper men, the few places which will be left vacant. Two at least, of the faculty, have already been invited to other places, at equal if not greater compensation than they now receive. The question may prove a vital one. We cannot well afford a policy which will expose us to having our best men picked off by rival institutions.

It is doubtless the duty of the board to see to it that no money is squandered unnecessarily in paying extravagant or needless salaries, and I respectfully recommend that a committee be appointed to inquire whether the present salaries paid to teachers or any of them, are unusual or extravagant, and what reductions, if any, can be made without detriment to the best interests of the University.

If the salaries cannot be safely reduced to such extent as to bring them within the diminished income of the University, will it not be the duty of the board to lay this fact before the legislature of the state that the representatives of the people may have the opportunity to save from harm, if in their wisdom it is necessary, as Michigan and Wisconsin have done in similar case. Will the people hold us guiltless if we allow the fair fame and the bright prospects of an institution, which belongs to them and not to us, to be sullied or blighted without any appeal to their representatives for aid ?

If necessity compels a diminution of salaries I shall ask that the reduction shall begin with that of the regent, not because it is larger than is paid by other institutions of like grade, but because he will prefer to see his own pay lessened 20 or 25 per cent. rather than see the already too meager compensation of his associates lessened.

APPROPRIATIONS, ETC.

I lay before you papers from several of the departments asking for appropriations for needed apparatus, or current expenditures, as follows:

1. From Prof. Morrow and the head farmer for additional tools and seeds, &c. The requests for the replacement of the fine stock of several breeds, I believe to be especially important, if the agricultural college is to be maintained with any degree of efficiency or popularity. I concur also heartily in the asking for the appropriation for experiments in dairying. Our agricultural illustration should be made broader, and ought especially to include all those branches of farming and farm manufactures which may be made profitable in this state. The people may justly ask this at our hands.

2 Prof. Burrill asks renewal of appropriation for arboration, for seeds etc. and for lawn mowers,—they seem necessary. I believe all the requests of the horticultural department are reasonable and ought to be met, as far as your funds permit.

3. Prof. Taft asks the re-appropriation of so much of last year's appropriation as was not expended. It is to be hoped that the appropriation asked from the legislature for the natural history cabinets will be made, in which case this department will be provided for. If it is not made, then the request of Prof. Taft ought to be granted.

4. Prof. Robinson's report lays before you the wants of the machine shop, and the physical laboratory. He also calls attention to the charges made for work done ostensibly for him, but really for the

interest of the University. I recommend his requests and statements to your attention.

5. Prof. Webb's requests for his department are also recommended as far as funds available for that purpose can be had. The school of civil engineering is, and has been, one of our most useful and popular departments and ought to be maintained in full vigor.

6. Prof. Weber's paper asks for the usual appropriations for the current expenses of the laboratory, which need no further recommendation, as their necessity is well known.

7. Other appropriations will be needed as follows:

For library to pay for the periodicals of the year, $300, and for the purchase of a few books of immediate need or already ordered.

For several screens and curtains for the large drafting room of the school of industrial design, to shut off the cross lights, from the casts used in the study of light and shade. Four screens will cost $12. A curtain about 3 yds.x10 yds. $20. Several supports for casts.

CHANGES NEEDED IN THE LAW.

Some changes have been found desirable in the organic law of the University, and bills are either now pending, or have already passed, for two of these changes: one to enlarge the powers of the trustees in the investment of the funds, and the other relating to the power of conferring diplomas and degrees.

The movement made in the general assembly two years ago to procure an entire revision of the laws relating to the University and their re-enactment as one consistent statute, has been revived in the present general assembly and is now pending before the house of representatives. I have been consulted as to the changes proposed, and have expressed my opinion that some revision and amendments of the present laws are desirable and important. It is evident that such revision will be made at an early day, and I venture to suggest the propriety of the board's offering such recommendations as their practical experience of the working of the present laws will enable them to make, to aid in securing a more perfect and precise enactment. It has been customary for the boards of the state colleges and universities, within my observation to suggest to their several legislatures the changes which their experience had proved desirable. This has been counted as no infringement on the province of the law making power, but as affording to the legislature the benefit of that practical experience by whose aid proper amendments can alone be safely made.

I may remind those who were also members of the first board of trustees, that I seriously objected to some of the provisions of the original law, as likely to interfere with the safety and success of the institution, and only waived my objections and accepted the office tendered me on the assurance of prominent members of the board that an effort should be made to secure the proper amendments. Changes amounting to an entire reconstruction of the board have been made, but the objectional features still remain, and the new law introduced some others still more objectionable. The prudence and wise action of the successive boards have thus far prevented any of the evils anticipated, but it is not certain but that the university may be subjected to serious danger in the future, unless changes are made.

Modesty restrained me in earlier years from urging this matter on the attention of the trustees, but standing now at the close of my present term of service, and perhaps also at the close of my official connection with you, and the University, I owe it to the institution to which I have given so many years of labor and thought, to utter these my most earnest convictions. I have no longer any direct personal interest in the matter, even if I shall continue for a short time longer my service. But as a citizen like yourselves, of Illinois, I feel that I ought to use my influence for those who are to follow me.

I ought not to occupy your time with any long discussion of amendments needed, but will recommend the appointment of a committee to consider and propose any revision or amendments which may appear necessary. It is entirely fitting and in accordance with usage for the trustees to take the initiative in a matter so important to the University. I shall at any time be ready to submit to the board or its committee such changes as seem to me desirable.

CONCLUSION.

This closes the fifth biennial term of my service as regent of the University. Amidst my many difficulties, and with such light and strength as God has given me, I have tried to do my duty. I leave to posterity to judge of the wisdom of my administration of the affairs of the University. Removed, at an important juncture, from my seat in the board, I have owed to the courtesy of the trustees, the opportunities to mingle still in your counsels and to aid in shaping the policy of the institution. I hoped a year ago to be released from my labors, but yielded to the judgment of others in consenting to fill out my term of service. I find the desire for rest still haunting my mind, and while I do not absolutely decline a re-election, I do not ask it, and shall rejoice if another is chosen to the place. For the courtesy and confidence thus far extended to me, my thanks are herewith paid.

J. M. GREGORY.

Dr. Gregory laid before the board the plans, specifications, and estimates of the laboratory building and explained same.

The business agent made his report, submitting statement of expenditures and receipts for the past six months; also list of warrants Nos. 167 to 345, both inclusive. The report was received.

BUSINESS AGENT'S REPORT.

Hon. Emory Cobb, President Board of Trustees Illinois Industrial University:

SIR:—I have the honor to offer the following financial report for the six months ending February, 28th instant.

Paper "A" shows the appropriations and expenditures under the same for that time, also receipts passing through my hands.

Paper "B" is a list of warrants drawn since the last quarterly meeting.

Paper "C" is a communication in regard to gas burners. I believe the style of burner referred to is much better than the one we are now using and that an adoption of it to some extent would be a saving to the University.

Respectfully submitted,

S. W. SHATTUCK,
Business Agent.

"A."

STATEMENT *of current appropriations and receipts, February* 28, 1877.

ON ACCOUNT OF	APPROPRIATED.	RECEIPTS.	EXPENDED.	UNEXPENDED.
Salaries	$18,128 33	$270 00	$17,683 95	$714 38
Board expense	250 00		170 50	79 50
Buildings and grounds	400 00	41 00	637 62	196 62
Fuel and lights	2,500 00	348 68	2,271 18	577 50
Stationery and printing	300 00		218 51	81 49
Tools, repairs &c	55 00		63 55	
Mechanical department	120 00	1,366 84	1,689 50	211 21
Architectural "	666 62	656 63	1,371 59	48 34
Agricultural "	1,323 08	5,240 35	3,475 41	3,088 02
	88 00			
Horticultural "	70 68	295 34	347 30	6 72
Chemical "	92 11	145 25	244 59	7 23
Military " (band instruments)	95 51		97 71	2 20
Drawing models	40 00		34 92	
Library and apparatus	500 00	9 51	577 91	63 32
Incidental expense	300 00	29 35	208 94	120 41
State appropriation—veterinary department	796 94		9 01	787 93
" " —buildings and grounds	607 70		39 70	568 00
Special appropriation, eng. transit clock	570 00		19 30	550 70
" " bot. dept. microscopes	82 00	70 10	56 74	95 36
" " cabinet cases	200 00		50 00	150 00
" " physical laboratory	20 00		34 98	14 98
" " ladies' gymnasium	25 00		33 89	8 89
" " centennial exposition			24 05	24 05
" " preparatory dep't		18 46	675 00	1,171 00
Fixtures and furniture	100 00		152 93	52 93
Illinois Central Railroad—freights		1,216 35		
Fees and room rents		3,384 00		

"B"—LIST OF WARRANTS DRAWN.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
167	W. C. Flagg	Expense to meeting	17 00
168	A. B. Blackburn	" "	18 50
169	D. D. Sabin	" "	18 40
170	J. J. Bird	" "	21 70
171	R. B. Mason	" "	12 75
172	Mrs. Jennie Hollister	Rent of piano two terms	6 00
173	J. F. Moore	Work on drawings, chemical library	5 45
174	A. Snedeker	Castings	34 52
175	Walker Bros.	Mirror	7 50
176	J. Schroeder	Agricultural drawings &c.	105 00
177	Stearns & Co.	1 barrel stucco	3 00
178	Brown Bros.	Hardware	133 26
179	D. L. Risk	10 head stock cattle	245 45
180	J. M. Gregory	Salary December, 1876	333 33
181	L. W. Robinson	" "	166 66
182	L. W. Shattuck	" "	166 66
183	T. J. Burrill	" "	166 66
184	E. Snyder	" "	166 66
185	D. C. Taft	" "	166 66
186	J. B. Webb	" "	166 66
187	J. C. Pickard	" "	166 66
188	N. C. Ricker	" "	125 00
189	J. D. Crawford	" "	125 00
190	H. A. Weber	" "	150 00
191	E. L. Lawrence	" "	100 00
192	Lou. C. Allen	" "	120 00
193	F. W. Prentice	" "	100 00
194	A. C. Swartz	" "	75 00
195	I. O. Baker	" "	75 00
196	F. A. Parsons	" "	75 00
197	M. A. Scovell	" "	60 00

List of Warrants Drawn.—Continued.

No.	TO WHOM	FOR WHAT.	AMOUNT.
198	A. E. Barnes	Salary, December, 1876	60 00
199	J. Kenis	" "	75 00
200	P. Roos	" "	75 00
201	C. I. Hayes	" "	75 00
202	C. E. Pickard	" "	45 80
203	E. A. Robinson	" "	100 00
204	A. B. Baker	" "	100 00
205	H. Hanser	" "	20 00
206	W. S. Williams	" "	10 00
207	J. S. Jones	" "	35 00
208	H. Mulliker	Instructing Band	15 00
209	American Express Co.	Express charges	3 25
210	Springfield Daily Journal	Subscription January 1st to April 4th	2 50
211	T. B. & G. R. Armstead	Hardware	8 34
212	Crane, Breed & Co	2 boiler tubes	6 40
213	Brown Bros.	Hardware	12 98
214	Larrabee & North	"	10 63
215	Weeks Bros.	Drayage	3 49
216	Fuller & Fuller	Glass and chemicals	36 52
217	M. E. Lapham	Lumber	46 98
218	Riggs Bros.	Books	1 50
219	D. B. Gillham	Expense to meeting	10 50
220	Yale Lock Manufacturing Co.	Locks	13 27
221	A. Mass & Co	6 electrotypes	4 50
222	Lyon & Healy	Drum rods	4 00
223	T. Butterworth	Advertising	3 00
224	Locke & Saxton	Stationery	13 50
225	A. H. Andrews	6 gross crayons	4 00
226	Crane Bros. Manf'g Co	Hardware	34 77
227	Agricultural Dep't	Expense December, 1876	154 13
228	Enterprise Coal Co	10 cars coal	156 00
229	W. P. Ward	Painting	11 70
230	A. Hewes & Co	Drawing models	12 00
231	James Ralph	Repairing furnace	8 00
232	E. B. Benjamin	Filter paper and chemicals	11 00
233	H. D. Peters	Advertising	6 00
234	C. G. Carlton	Rubber gum etc	27 75
235	C. & U. Gas Co	Gas bill, November, 1876	43 20
236	Students' Pay Roll	December, 1876	309 09
237	J. M. Gregory	Salary, January, 1877	333 33
238	S. W. Robinson	" "	166 66
239	S. W. Shattuck	" "	166 66
240	T. J. Burrill	" "	166 66
241	E. Snyder	" "	166 66
242	D. C. Taft	" "	166 66
243	J. B. Webb	" "	166 66
244	J. C. Pickard	" "	166 66
245	N. C. Ricker	" "	125 00
246	J. D. Crawford	" "	120 00
247	H. A. Weber	" "	150 00
248	E. L. Lawrence	" "	83 33
249	L. C. Allen	" "	120 00
250	F. W. Prentice	" "	100 00
251	A. C. Swartz	" "	75 00
252	I. O. Baker	" "	75 00
253	F. A. Parsons	" "	75 00
254	M. A. Scovell	" "	60 00
255	A. E. Barnes	" "	60 00
256	J. Kenis	" "	75 00
257	P. Roos	" "	75 00
258	C. I. Hays	" "	75 00
259	C. E. Pickard	" "	45 00
260	E. A. Robinson	" "	100 00
261	A. B. Baker	" "	100 00
262	H. Hanser	" "	20 00
263	W. S. Williams	" "	10 00
264	G. E. Morrow	" "	166 66
265	Luddington, Wells & VanSch'k	Lumber	182 15
266	Agricultural Department	Expense January, 1877	158 97
267	E. N. McAllister	Postage "	18 80
268	S. W. Shattuck	Petty expense December and January	40 25
269	Student's pay roll	January, 1877	302 04
270	Subscription Agency	Periodicals, January, 1877	118 90
271	J. M. Gregory	Salary, February, 1877	333 33
272	S. W. Robinson	" "	166 66
273	S. W. Shattuck	" "	166 66
274	T. J. Burrill	" "	166 66

List of Warrants Drawn.—Concluded.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
275	E. Snyder	Salary, February, 1877	166 66
276	D. C. Taft	" "	166 66
277	J. B. Webb	" "	166 66
278	J. C. Pickard	" "	166 66
279	N. C. Ricker	" "	125 00
280	J. D. Crawford	" "	125 00
281	H. A. Weber	" "	150 00
282	G. E. Morrow	" "	166 66
283	E. L. Lawrence	" "	83 33
284	L. C. Allen	" "	120 00
285	F. W. Prentice	" "	100 00
286	A. C. Swartz	" "	75 00
287	I. O. Baker	" "	75 00
288	F. A. Parsons	" "	75 00
289	M. A. Scovell	" "	60 00
290	A. E. Barnes	" "	60 00
291	J. Kenis	" "	75 00
292	C. I. Hays	" "	75 00
293	C. E. Pickard	" "	45 00
294	E. A. Robinson	" "	100 00
295	Peter Roos	" "	75 00
296	A. B. Baker	" "	100 00
297	H. Hanser	" "	20 00
298	W. S. Williams	" "	10 00
299	H. B. Sparks	Salary winter term 1877	30 00
300	C. E. Patchin	" " "	25 00
301	J. W. Bunn	" to February 1877	250 00
302	S. W. Shattuck	Petty expenses February, 1877	29 70
303	Lyon & Healy	Repairs and exchange instruments	31 00
304	I. B. & W. R. W. Co	Freights	4 22
305	R. Blumne	Hardware	1 50
306	Davidson & Hodges	"	3 75
307	L. F. Allen	Volumes 14 and 15 of Herd book	15 00
308	F. E. Adams	1 dozen binders	2 00
309	Crane, Burd & Co	1 boiler tube	3 20
310	Charles Hendy	Painting cases	25 12
311	The Illini	Printing	6 50
312	Charles Parker & Co	4 vice slides	8 00
313	C. J. Sabin	Pump	7 00
314	Smith & Marrin	Brooms	4 50
315	Leggatt Bro's	Books	7 25
316	F. Spence	Painting 50 apple models	10 00
317	A. Snedeker	Castings	76 96
318	C. & U. Gas Co	Gas bill, December, 1876	69 40
319	C. L. Rice	Hardware	12 96
320	W. Morava	Cleaning guns and repairs	7 75
321	Trevett & Green	Hardware	32 60
322	Lou C. Allen	Music, washing, &c	3 22
323	C. & U. Gas Co	Gas bill for January, 1877	64 50
324	Enterprise Coal Co	Coal	301 40
325	U. S. Patent office	Patent office reports	13 00
326	W. T. Jefferson	Omnibus for trustees	4 00
327	George Scroggs	Letter heads and printing	39 75
328	Ill, Central R. R. Co	Freights, December, January & Feb'y.	689 55
329	Agricultural department	Farm expense, February, 1877	304 72
330	" "	Work for other departments	229 80
331	Mechanical "	" "	310 04
332	E. N. McAllister	Postage, February, 1877	20 84
333	Crane Bro's Manufacturing Co	Hardware	3 60
334	Students' Pay Roll	February, 1877	249 46
335	Chemical department	Alcohol and chemicals	21 95
336	G. Denerlick	Periodicals	52 76
337	Champaign County Gazette	Programmes, badges, and tickets	15 25
338	S. W. Robinson	Petty expenses physical laboratory	6 46
339	Nickel & Strassberger	Lenses	19 00
340	Trevett & Green	Hardware	20 66
341	Thomas Wright	Labor	3 00
342	E. V. Peterson	Stationery, frames &c	24 25
343	Architectural department	Work for other departments	197 36
344	H. Swannell	Chemicals	45 15
345	The Illini	Advertising and copies 6 months	25 00

The bills presented for payment were audited and allowed. Dr. Gregory's account of traveling expenses to Springfield, $13.15, was audited and allowed. Treasurer J. W. Bunn then read his report, which was received.

TREASURER'S REPORT.

John W. Bunn, Treasurer, in Acc't with Illinois Industrial University.

1876.		DR.		
Dec.	11	To balance		$13,287 32
1877.				
Jan'y	1	" interest on Illnois 6 per cent bonds	$ 930 00	
"	1	" " Chicago 7 per cent. bonds	875 00	1,805 00
Feb'y	28	" am't rec'd on acc't agricultural department	673 35	
"	28	" " " horticultural "	70 41	
"	28	" " " mechanical "	733 04	
"	28	" " " architectural "	248 51	
"	28	" " " chemical "	145 25	
"	28	" " " fuel and lights	249 76	
"	28	" " " buildings and grounds	20 00	
"	28	" " " library	2 00	
"	28	" " " incidentals	29 15	
"	28	" " " fees and room rents	1,571 00	
"	28	" " " tuition	976 00	
"	28	" " " Illinois Central R. R. donation	689 55	5,408 02
				$20,500 34

John W. Bunn, Treasurer, in Acc't with Illinois Industrial University.

1877.		CR.		
Feb'y	28	By am't paid board expense	$ 102 85	
"	28	" " on acc't salaries	9,047 10	
"	28	" " " buildings and grounds	175 06	
"	28	" " " fuel and lights	1,359 46	
"	28	" " " stationary and printing	153 29	
"	28	" " " mechanical department	1,087 77	
"	28	" " " architectural "	908 65	
"	28	" " " agricultural "	1,131 08	
"	28	" " " horticultural "	63 39	
"	28	" " " chemical "	67 75	
"	28	" " " military "	69 43	
"	28	" " " library and apparatus	357 43	
"	28	" " " incidentals	118 03	
"	28	" " " preparatory department	405 00	
"	28	" " " fixtures and furniture	50 03	
"	28	" " " physical laboratory	34 98	
"	28	" " " engineering department	19 30	
"	28	" " " microscopes	46 99	
"	28	" " " ladies' gymnasium	33 89	
"	28	" " " centennial expense	24 05	
		State appropriations am't paid on acc't buildings & grounds	19 70	
		" " " " veterinary dep't	6 26	15,281 49
		By balance		5,218 85
				$20,500 34

Urbana, March 13, 1877. JOHN W. BUNN, Treasurer.

The board then adjourned to meet at the Doane House in Champaign, at 7,30 P. M.

EVENING SESSION.

The board met at the Doane House by adjournment.

The regent's report was taken from the table, and it was decided to establish a school of design, and publish a course of studies for same in next catalogue, as recommended in the report. The reports of the regent and of the different departments of the University, prepared for its tenth anniversary, were ordered to be printed in the next biennial report.

The subject of engaging a janitor for old University building was referred to Mr. Gardner and the regent.

The faculty were authorized to designate one or more high schools in each county of the state, of sufficiently high grade and good reputation, whose certificates of examinations shall be received in lieu of examinations for entering the University, in accordance with the report of the regent. The committee on by-laws for the faculty, on the sale of thermometer graduating machine, also on purchase of model of horse, were granted further time.

Mr Gardner, chairman of a committee, appointed to investigate certain charges of custom house duties at New York, by Oehlrichs & Co., reported that in the opinion of the committee such charges were just and the amount due to the parties. The report was received, and the amount of $158.84 appropriated for the purpose.

Mr, Cobb, chairman of the board, then announced that the annual election of officers was in order, and expressed his thanks to the members of the board for their kindness and courtesy.

Mr. Blackburn moved that the thanks of the board be voted to the retiring chairman, regent and treasurer. Carried.

On nomination, Hon. Emory Cobb was unanimously elected president of the board.

Mr. Sabin then nominated Dr. J. M. Gregory as regent for the ensuing two years, and he was unanimously elected.

Mr. J. W. Bunn was unanimously reelected treasurer, and accepted, the positiou stating that he should positively decline to receive any salary for his services.

The executive committee, Messrs. Cobb, Gardner and Pickrell were reelected.

It was resolved that the thanks of the board be tendered to Colonel E. Snyder, the recording secretary, and Prof. E. Shattuck, the business agent, for the faithful and efficient performance of their duties in those capacities.

The matter of sale of the remaining 160 acres of the Driggs farm was referred to Mr. Gardner with instructions to negotiate a sale.

Mr. Pickrell offered the following preamble and resolution.

Whereas, There is now a bill before the legislature for repealing the law restricting the board of trustees to a certain class of bonds,

Resolved, That Mr. Gardner and the treasurer be authorized to exchange the bonds of Champaign County, falling due on the first of May next, for same amount of Champaign County bonds bearing eight per cent interest, that have been issued to replace the 10 per cent bonds

Carried.

The treasurer and secretary then reported the estimates of receipts and current appropriations for the next six months ending September 1st, 1877, which were received and adopted.

APPROPRIATIONS

For the six months ending September 1st, 1877.

FOR WHAT PURPOSE.			AMOUNT.
Board Expense			$200 00
Salaries	Regent	$2,000 00	
	8 professors	8,000 00	
	1 "	900 00	
	2 "	1,500 00	
	Prentice—$400, Allen—480	880 00	
	Kenis—$200, Swartz—300, Baker—$300. Parsons—300, Roos—450, Hays—$450	2,100 00	
	Scovell—$240, Barnes—240	480 00	
	Robinson	150 00	
	Library—$40, military—30, chores—25	95 00	
	Janitors	500 00	
			$16,605 00
Fuel and Light			300 00
Stationery and printing			300 00
Buildings and grounds			200 00
Incidental expense			200 00
Library			300 00
Mechanical department			60 00
Architectural "			60 00
Horticultural "	(earnings)		6 72
Chemical "	"		.. ..
Military "			50 00
Agricultural "	(balance)		2,988 57
State appropriations	Veterinary department		787 93
	Buildings and grounds		568 00
Specials	Engineering transit	$550 00	
	Microscopes (botanical department)	95 36	
	Cabinet	150 00	
	Dr. Gregory—expense to Springfield	13 15	
	Duties in Custom house, N. Y	158 84	
	Civil engineering	28 50	
	Mechanical department, (tools and shop)	50 00	
	Physical laboratory	15 00	
	Screens and curtains in drawing room	30 00	
			1,090 95
Total			$23,717 01

The board then adjourned, to meet at the Doane House at 8 o'clock A. M.

SECOND DAY'S SESSION.

The board met as per adjournment.

Present, Messrs Cobb, Blackburn, Flagg, Gardner, Gillham, Mason, Pickrell and Sabin.

Upon recommendations from the executive committee Mr. Gardner moved to reduce Mr. Lawrence's salary to $1,000 per annum. Mr. Blackburn moved to amend by referring the whole matter of salaries to a committee. Amendment lost. Original motion carried.

Mr. Blackburn made the following motion.

Resolved, That the vote of this board at the June meeting 1877, forbidding the appointment of any member of the faculty to any office of the institution, or the board, is hereby repealed.

Resolved, That Prof. E. Snyder is hereby appointed recording secretary, Prof. T. J. Burrill, corresponding secretary, and Prof. S. W. Shattuck, business agent for the respective term of these offices, without compensation.

On motion, the resolutions were laid over till the next meeting of the board.

Mr. Blackburn offered the following resolution.

Resolved, That a committee of three be appointed to consider and act in the matter of obtaining further legislation in regard to the University, as by reccommendation in regent's report.

Carried.

Messrs. Sabin, Pickrell and Gardner, were appointed such committee.

On motion, Messrs. Flagg, Blackburn and Gardner were appointed a committee on the reduction of salaries, with instructions to report at the next meeting.

Mr. Sabin moved to refer the stock farm to the executive committee, to rent, lease or sell the same, was lost.

The reports of Prof. Morrow and head-farmer Lawrence were now taken up.

There were appropriated $25 for the purchase of seeds and tubes, also $25 for fertilizers in agricultural experiments. The purchase of a cornplanter was authorized, and the subject of drainage referred to Messrs. Gardner and Flagg. The purchase of short horn bull and heifer or cow, Jersey bull and six sheep, was authorized, subject to approval of executive committee in each case. The proposed fitting up of a dairy aud purchase of milch cows was referred to Messrs. Gardner and Flagg.

The following appropriations were made upon request from Prof. Webb, for the department of civil engineering, $17.00; for tools, box and bulletin board, $11.00. For the purchase of chemicals $60.00 were appropriated.

Prof. Burrill's report from the horticultural department was then taken up.

Head farmer Lawrence was directed to sell surplus stock from nurseries; the purchase of apple seed and cherry stock was authorized.

The qnestion of planting additional shade trees and purchase of lawn mower were referred to Mr. Gardner.

The regent and Professors Burrill and Morrow were instructed to take action and prosecute parties in order to protect the university buildings and grounds from petty thieving.

Prof. Robinson's report from mechanical department was taken up, and $50 granted for tools and shops, also $15 for current expense in physical laboratory.

The report of the treasurer was referred to Dr. Gregory and Mr. Gardner. Paper etc. of the report of business agent in regard to gas burners was referred to Messrs. Gardner and business agent with power to act.

On motion, Mr. Blackburn, the matter of reduction of prices for certain work for Prof. Robinson was referred to a committee consisting of Mr. Gardner, business agent, and foreman of shop.

The following report of the auditing committee was received and adopted.

To the honorable board of trustees:

Your committee to whom was referred the treasurer's report, have examined his vouchers from 369 to 719 inclusive, and from 1 to 345 inclusive, and find them correct.

J. M. GREGORY.
D. GARDNER.

Adjourned.

The board met in the secretary's office at 3 P. M. Present Messrs. Gardner, McLean and Sabin. Mr. Gardner was elected chairman. No quorum being present, the board, on motion, adjourned to meet at 9 o'clock, A. M.

SECOND DAY'S SESSION.

The board met as per adjournment and took a recess until 2.30 P. M. for the review of the University battalion and the commencement exercises.

The board assembled at 2.30 o'clock, P. M.

Present Messrs. Cobb, Gardner, Flagg, McLean, Pickrell and Sabin. Absent Gov. S. M. Cullom, Messrs. Bird, Brown, Gillham and Mason.

Messrs. Flagg and McLean presented their commissions and took the oath of office. A letter from Col. Mason was read, regretting his inability to be present at the meeting.

The regent then made an oral report on a bill from the faculty in reference to conferring degrees, which was referred to a committee consisting of Messrs. Flagg, McLean and Pickrell.

The regent reported the names of persons recommended by the faculty to receive such certificates, as they may be entitled to, and the certificates were granted to the following students:

FULL CERTIFICATES.

GENTLEMEN.

NAME.	COURSE.	RESIDENCE.
Abbott, Theodore Sperry	Min. E	Union Grove,
Allen, Charles Wesley	L. & S	Harristown.
Barry, Charles Hart	L. & S. & Mil	Alton.
Barry, Frank	L. & S. & Mil	St. Louis, Mo.
Blackall, Clarence H	Arch. & Mil	Chicago.
Brush, Charles E	Arch	Carbondale.
Buckingham, William	M. E. & Mil	Chicago.
Bumstead, James E	L. & S	Marengo.
Clay, Luther G	Hort, & Mil	Cobden.
Crow, B. F	Arch	Woodbine, Iowa.
Elliott, Charles Gleason	C. E	Tonica.
Faulkner, Richard D	L. & S	Clement.
Gibson, Charles Brockway	Chem. & Mil	Springfield, Vt.
Gilkerson, Hiram	Ag'l & Mil	Ney.
Gilkerson, John	L. & S	"
Kennedy, Allen G	C. E. & Mil	Eau Claire, Wis.
Lewellen, Joseph C	Arch	Sterling.
Lewis, Edward V	Ag'l & Mil	Chatham.
McPherson, John Jr	C. E	Rockford.
Moore, John Fremont	Arch	Davenport, Iowa.
Rice, George Clark	L. & S	Fithian.
Seymour, John James	C. E. & Mil	Seymour.
Sim, Coler Lindley	Chem. & Mil	Urbana.
Spence, Franklin	Arch	Hamilton.
Stayman, John Mather	M. & E	Champaign.
Stoddard, Ira J. Jr	C. E & Mil	Pella, Iowa.
Ward, Walter P	L. & S	Terre Haute.
Whitham, Robert F	C. E. & Mil	Fairfax, Iowa.
Wright, Myron Jerome	Ag'l	Woodstock.

FULL CERTIFICATES—Concluded.

LADIES.

NAME.	COURSE.	RESIDENCE.
Adams, Nettie	L. & S.	Urbana,
Bogardus, Eva	D. S.	Champaign.
Broshar, Cornelia	L. & S.	"
Conn, Emma	L. & S.	"
Falls, Ida Bell	L. & S.	"
Gregory, Helen B.	L. & S.	"
Maxwell, Emily C.	S. & S.	"
Page, Martha Ellen	L. & S.	"
Platt, Emma C.	D. S.	Monticello.
Skinner, Velm Elethea	L. & e.	Champaign.
Smith, Avice E.	L. & S.	Union.
Switzer, Gertrude	L. & S.	Champaign.
Victor, Carrie	L & S.	Champaign.

PARTIAL CERTIFICATES.

William H. Crayne	L. & S.	Urbana, Ill.
Linn C. Bennett	L. & S.	Pontiac, Ill.
Robert E. Worrell	L. & S.	Bowen, Ill.
Charles B. Taylor	L. & S.	Urbana, Ill.
Edward B. Perry	L. & S.	Beaufort, S. C.
James W. Wilson	L. & S.	Riverton, Ill.

The committee on janiters were granted further time; also to committee on by-laws.

The committee on selling graduating machine reported no sale.

The committee on model of horse reported that the order was made, but the model could not be obtained before next year.

Mr. Gardner, to whom was referred the sale of Griggs's farm, has not been been able to sell the same. Continued.

Mr. Gardner, chairman of committee on exchange of bonds, made the following report:

Your committee to whom was referred the investing of the proceeds of the $115,000.00 Champaign county bonds, due May 1, 1877, beg leave to report that they exchanged $100,000.00 at par for same amount of Champaign county 8 per cent. bonds, due in five years with privilege of ten years, and purchased $15,000 Champaign 8 per cent. bonds, for which we paid a premium of $325.

D. GARDNER,
JOHN W. BUNN.

Urbana, June 6, 1877.

The report was received, and the committee discharged.

Mr. Blackburn's resolution from March meeting, in regard to secretaries and business agent, was taken up.

The following motion of Mr. Pickrell was carried:

Whereas, there is barely a quorum present, therefore be it resolved that the whole matter be postponed till the September meeting.

The committee on legislation made the following report:

URBANA, June 6th, 1877.

To the Honorable Board of Trustees, Illinois Industrial University:

MESSRS: Your committee upon legislation beg leave to report as follows. Three bills were passed, viz.:

Senate bill 81—amending the law in regard to investments.
Senate bill 84—making appropriations to the University.
Senate bill 223—giving authority to the trustees to grant diplomas.

Copies of the above three named bills are inclosed herewith.

D. D. SABIN,
J. H. PICKRELL,
D. GARDNER. } Committee.

Mr Sabin moved that a committee of two, consisting of Mr. Gardner and Dr. Gregory be appointed to arrange salary and title of Mr. P. Roos. Carried.

The committee on dairy farm asked further time, which was granted. Mr. Gardner, to whom was referred the question of purchase of gas burners, reported, that one gross of same had been purchased.

Mr. Pickrell moved that the president be authorized to draw an order on the auditor of state in favor of Mr. Bunn for appropriations due this year. Carried.

On motion of Mr. Sabin, a report from Prof. Robinson on heating apparatus was referred to the executive committee with instructions to procure an examination of the apparatus by the persons furnishing it.

Mr. J. M. VanOsdel presented his bill for services as architect; action on same was postponed until next meeting.

Mr. Gardner from the committee appointed to confer with Mr. Roos reported that a salary of $ 1.500 had been offered to Mr. Roos, which was not accepted. The report was received and approved.

The board adjourned until 8.30 P. M.

EVENING SESSION.

The board assembled at the hour appointed.

The regent made an oral report and presented plans for needed additional cases in library. The subject was referred to a committee of three, Messrs. Gardner, Pickrell and McLean.

Treasurer J. W. Bunn then read his report:

TREASURER'S REPORT.

John W. Bunn, Treasurer, in Acc't with Illinois Industrial University.

1877.		DR.	
March	13	To balance	$ 5,218 85
April	2	" interest on Sangamon county bonds	1,125 00
"	2	" " $25,000 received for Sangamon county bonds	1,500 00
"	2	" " Putnam county bonds	1,300 00
May	1	" " Champaign county bonds	11,500 00
"	31	" am't rec'd on acc't agricultural department	3,124 07
"	31	" " " horticultural "	546 54
"	31	" " " architectural "	722 54
"	31	" " " mechanical "	624 69
"	31	" " " chemical "	201 80
"	31	" " " fees and room rents	1,622 50
"	31	" " " tuition	820 00
"	31	" " " fuel and light	48 62
"	31	" " " building and grounds	21 70
"	31	" " " incidentals	4 50
"	31	" " " physical laboratory	2 15
"	31	" " " Illinois Central railroad donation	140 15
			$28,523 11

Urbana, June 5th, 1877. JOHN W. BUNN, Treasurer.

John W. Bunn, Treasurer, in Acc't with Illinois Industrial University.

CR.

May	31	By	amount	paid	for board expense	$ 112 95
"	31	"	"	"	salaries	8,886 14
"	31	"	"	"	fuel and lights	230 13
"	31	"	"	"	stationary and printing	239 12
"	31	"	"	"	building and grounds	212 87
"	31	"	"	"	incidental expenses	156 90
"	31	"	"	"	library and apparatus	141 31
"	31	"	"	"	cabinet	610 91
"	31	"	"	"	microscopes	69 71
"	31	"	"	"	civil engineering	16 96
"	31	"	"	"	physical laboratory	8 96
"	31	"	"	"	tuition in preparatory department	405 00
"	31	"	"	"	taxes on land in Nebraska and Minnesota	2,194 24
"	31	"	"	"	agricultural department	2,453 89
"	31	"	"	"	mechanical "	672 47
"	31	"	"	"	horticultural "	367 28
"	31	"	"	"	architectural "	341 81
"	31	"	"	"	chemical "	261 98
"	31	"	"	"	military "	26 60
"	31	"	"	"	veterinary "	1 50
"	31	"	balance			11,112 38
						$28,523 11

The report was received and approved.

Prof. Burrill's report, with plans of greenhouse, was referred to a committee consisting of Messrs. Flagg, Pickrell and Gardner.

The treasurer was instructed to invest a certain amount of funds in accordance with the new law, subject to the approval of the president.

The report of the librarian, in regard to binding, was referred to Mr. Gardner and Prof. Crawford, with power to act.

The question of division of funds from the state appropriations between the mechanical shops was laid over to next meeting.

The following preamble and resolution was adopted:

Whereas, the plans and specifications for a laboratory, prepared by Prof. N. C. Ricker, have been approved by John M. Van Osdel, consulting architect, and found feasible and good.

Resolved, that the said plans are hereby adopted, and the chairman of the board be instructed to advertise for proposals for the construction of the said laboratory.

Prof. Ricker was instructed to have the specifications re-written.

It was moved that the chemical laboratory be located on the south east quarter of the arboretum, near Green street. Action postponed until next meeting.

The corresponding secretary was instructed to at once forward the biennial report to the governor.

The motion was carried then, to adjourn till to-morrow morning, 8 o'clock, and meet at the Doane House.

THIRD DAY'S SESSION.

The board assembled at the hour appointed.

The record of the meeting was read and approved.

The question of salaries was taken up then, and Dr. Gregory spoke at length upon the subject.

On motion of Mr. Gardner, the subject was postponed until the next meeting.

An application of F. M. Van Osdel was referred to the committee on janitors.

The executive committee was directed to arrange for the running of the mechanical shops during vacation, if found desirable.

The report of the business agent was read and accepted, and the bills presented for audit were allowed.

BUSINESS AGENT'S REPORT.

CHAMPAIGN, ILLS., June 1ST, 1877.

Hon. Emory Cobb, President Board of Trustees, Ills. Industrial University.

SIR: I have the honor to offer the following financial statement of the University for the three months ending June 1st, 1877.

Paper A is a statement of the appropriations for six months ending Sept. 1st, next, and the expenditures and receipts under them.

Paper B is a list of warrants drawn under the appropriations.

Vouchers for warrants from 486 to 511 inclusive are presented for auditing.

Respectfully submitted,

S. W. SHATTUCK,
Business agent.

"A."

STATEMENT *of current appropriations and receipts, June* 1, 1877.

ON ACCOUNT OF	APPRO-PRIATED.	RECEIPTS.	EXPENDED	BALANCE.
Board expense	$200 00		$112 95	$87 05
Salaries	16,605 00		8,886 14	7,718 86
Fuel and lights	300 00	$48 62	230 13	118 49
Stationery and printing	300 00		239 12	60 88
Buildings and grounds	200 00	21 70	212 87	576 83
Incidental expense	200 00	4 50	121 09	83 41
Library and apparatus	300 00		141 31	258 69
Mechanical department	60 00	624 69	672 47	62 22
Architectural "	60 00	722 54	341 81	440 73
Horticultural "	6 72	546 54	367 28	185 98
Chemical "		201 80	103 14	98 66
Agricultural "	2,988 51	2,124 06	2,453 89	3,658 69
Military "	50		26 60	23 40
Special—Eng. transit	$550.00			
Microscopes	95.36		69 71	25 65
Cabinet	150.00		610 91	460 91
Dr. Gregory's expenses	13.15			
Custom house duties	158.84		158 84	
Civil eng. Department	28.50		16 96	11 54
Phys. laboratory	15.00	2 15	8 96	8 19
Screens and curtains for draw'g room	30.00		35 81	5 81
State approp'n veterinary department	1,090 85		1 50	786 43
Tuition, preparatory department	787 93	820 00	405 00	415 00
Fees and room rents		1,622 50		1,622 50
Illinois Cent. freight donation		140 15		140 15
State appropriation—taxes			2,194 24	2,194 24

"B"—List of Warrants Drawn.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
346	J. M. Gregory	Expense to Springfield	$ 13 15
347	A. Blackburn	Expense to meeting	18 00
348	W. C. Flagg	" "	15 50
349	D. D. Sabin	" "	23 90
350	R. B. Mason	" "	12 00
351	J. H. Pickrell	" "	17 85
352	D. B. Gillham	" "	9 55
353	Henry P. Ward	Cabinet Specimens	47 65
354	A. S. Barnes & Co.	Subscription for American Naturalist	5 00
355	W. B. Keener	Books	19 20
356	J. M. Gregory	Salary, March, 1876	333 33
357	S. W. Robinson	" "	166 66
358	S. W. Shattuck	" "	166 66
359	T. J. Burrill	" "	166 66
360	E. Snyder	" "	166 66
361	D. C. Taft	" "	166 66
362	J. B. Webb	" "	166 66
363	J. C. Pickard	" "	166 66
364	N. C. Ricker	" "	125 00
365	H. A. Weber	" "	150 00
366	J. D. Crawford	" "	125 00
367	G. E. Morrow	" "	1 66
368	E. L. Lawrence	" "	83 33
369	S. C. Allen	" "	120 00
370	T. W. Prentice	" "	100 00
371	A. C. Swartz	" "	75 00
372	J. O. Baker	" "	75 00
373	F. A. Parsons	" "	75 00
374	M. A. Scovell	" "	60 00
375	A. E. Barnes	" "	60 00
376	J. Kenis	" "	75 00
377	Peter Roos	" "	75 00
378	C. I. Hays	" "	75 00
379	E. A. Robinson	" "	100 00
380	A. B. Baker	" "	100 00
381	H. Hanser	" "	20 00
382	W. L. Williams	" "	10 00
383	C. Pickard	" "	45 00
384	H. W. Williams & Son	½ Bushel Potatoes	1 80
385	H. B. Carrington	Books	6 00
386	Fuller & Fuller	Chemicals and glass	46 97
387	A. H. Andrews	2 gross steatite	2 00
388	Goodnow & Wightman	Hardware	4 32
389	I. B. & W. R. R. Co.	Freight	3 76
390	D. W. Deever	12 Doz. gas burners	48 00
391	Ill. Museum Natural History	Zoological Specimens	30 00
392	McCorkle & Moore	Hardware	9 19
393	E. N. McAllister	Postage	8 62
394	S. W. Shattuck	Petty expense	9 73
395	E. B. Benjamin	Chemicals	36 07
396	A. Campbell	Teaming	3 00
397	L. W. Morris	Duties and charges	5 73
398	W. J. Mahar	1 bbl. clay	9 00
399	Elverson & Sherwood	Flower pots	7 00
400	American Mer. Union Exp. Co.	Charges	2 75
401	Hortsman & Brothers	Trimmings for flag	18 50
402	Olrichs & Co.	Duties	158 84
403	D. VanNostrand	Books	2 11
404	Agricultural Department	Farm expenses	191 63
405	Jones & Laughlins	Hardware	9 07
406	Crane Bros. Mfg. Co.	"	18 74
407	O. & U. Gas Co	Bill for March, 1877	111 60
408	Students' pay roll	March, 1877	224 15
409	J. M. Gregory	Salary, April, 1877	333 33
410	S. W. Robinson	" "	166 66
411	S. W. Shattuck	" "	166 66
412	T. J. Burrill	" "	166 66
413	E. Snyder	" "	166 66
414	J. B. Webb	" "	166 66
415	J. C. Pickard	" "	166 66
416	N. C. Ricker	" "	125 00
417	H. A. Weber	" "	150 00
418	J. D. Crawford	" "	125 00
419	G. E. Morrow	" "	166 66
420	E. L. Lawrence	" "	83 33
421	D. C. Taft	" "	166 66

List of Warrants Drawn.—Continued.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
422	L. C. Allen	" "	120 00
423	F. W. Prentice	" "	100 00
424	A. C. Swartz	" "	75 00
425	I. O. Baker	" "	75 00
426	F. A. Parsons	" "	75 00
427	M. A. Schovell	" "	60 00
428	A. E. Barnes	" "	60 00
429	J. Kenis	" "	75 00
430	Peter Roos	" "	75 00
431	C. I. Hays	" "	75 00
432	E. A. Robinson	" "	100 00
433	A. B. Baker	" "	75 00
434	H. Hanser	" "	20 00
435	W. L. Williams	" "	10 00
436	C. E. Pickard	" "	45 00
437	Chas. E. Lippincott	Cow "Dutchess"	365 75
438	Geo. Hawk	Teaming	3 50
439	Crane Bros. Mfg. Co.	Hardware	25 66
440	C. H. Cady	"	3 75
441	Nickel & Strassberger	Two Levels	8 00
442	Morse Twist Drill Co.	Hardware	46 31
443	Bennerman & Wilson	Photographic apparatus	7 13
444	C. & U. Gas Co.	Gas bill, April	44 40
445	Schoff & Moore	Printing	7 50
446	Locke & Saxton	Stationery	6 25
447	W. Price	Paints, Glue, etc	4 48
448	Enterprise Coal Co	Coal	69 60
449	W. F. Morgan	Expense	5 75
450	Brown & Holdaway	Books	5 50
451	Walter P. Ward	Glazing	5 00
452	A. Barr	Lumber	73 35
453	Smith & Moran	1 Doz. brooms	7 00
454	Agricultural Department	Expense, April, 1877	893 33
455	Students' pay roll	April 1877	192 23
456	J. M. Gregory	Salary, May, 1877	333 33
457	S. W. Robinson	" "	166 66
458	S. W. Shattuck	" "	166 66
459	T. J. Burrill	" "	166 66
460	E. Snyder	" "	166 66
461	D. C. Taft	" "	166 66
462	J. B. Webb	" "	166 66
463	J. C. Pickard	" "	166 66
464	N. C. Ricker	" "	125 00
465	H. A. Weber	" "	150 00
466	J. D. Crawford	" "	125 00
467	G. E. Morrow	" "	166 66
468	E. L. Lawrence	" "	83 33
469	Lou. C. Allen	" "	120 00
470	F. W. Prentice	" "	100 00
471	A. C. Swartz	" "	75 00
472	I. O. Baker	" "	75 00
473	F. A. Parsons	" "	75 00
474	M. A. Scovell	" "	60 00
475	A. E. Barnes	" "	60 00
476	T. Kenis	" "	75 00
477	Peter Roos	" "	75 00
478	C. I. Hays	" "	75 00
479	E. A. Robinson	" "	100 00
480	A. B. Baker	" "	75 00
481	H. Hanser	" "	20 00
482	W. L. Williams	" "	10 00
483	C. E. Pickard	" "	45 00
484	Charlotte E. Patchin	Salary, Winter term	25 00
485	Chas. B. Gibson	" Spring "	30 00
486	G. C. Willis	74 yds. duck and ribbon	16 20
487	Frank Jewell	Tuning piano	3 00
488	Agricultural Department	Farm expenses, May	690 84
489	Lou. C. Allen	Music for calisthenics	5 00
490	James W. Queen	1 Lens	4 50
491	Brown Bros.	Hardware	2 17
492	M. E. Lapham	Lumber	15 25
493	F. W. Christern	Periodicals	88 10
494	I. B. & W. R. R. Co.	Freight	23 69
495	Treavitt & Green	Rope, etc.	3 20
496	Tyra Montgomery	Plants	6 50
497	Crane Bros. Mfg. Co	Hardware	3 55
498	U. S. Express Co.	Charges	1 15

LIST OF WARRANTS DRAWN.—Concluded.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
499	Mechanical Department	Work for other departments	83 74
500	Mechanical Department	Power for carpenter shop	38 22
501	Architectural "	Work for other departments	614 81
502	Horticultural "	Trees	13 50
503	Agricultural "	Work for departments	292 40
504	Ill. Cent. R. R. Co.	Freight	140 15
505	Horticultural Department	Work on grounds	33 09
506	C. W. Butler	Mounting specimens	12 15
507	E. N. McAllister	Postage	19 62
508	Schoff & Moore	2000 catalogues	190 00
509	S. W. Shattuck	Petty expense	67 63
510	Student's Pay Roll	May, 1877	276 34
511	J. W. Bunn	Taxes on lands	2194 24

The business agent and Mr. E. L. Lawrence were instructed to arrange their accounts so as to show the exact amount of student's labor done in agricultural department.

The board then adjourned to meet again on Tuesday July 10th, 1877, at 3 o'clock P. M.

MEETING OF THE EXECUTIVE COMMITTEE, JUNE 7, 1877.

The executive committee met at the Doane House in Champaign, Ills., at 10 o'clock, A. M.

The subject of keeping the machine shops running during vacation was taken into consideration.

Prof. Robinson was requested to superintend the machine shops until further arrangements are made, Prof. Ricker to take charge of the carpenter shop.

The business agent was directed to buy 3.000 ft. of seasoned black walnut, also required amount of pine lumber. Prof. Ricker was instructed to at once begin work on the east case in museum.

The business agent was directed to settle with Mr. E. A. Robinson for the month of June to date, also to obtain an inspection of the heating apparatus by some expert. The east fence of arboretum was ordered to be repaired.

Adjourned.

BOARD MEETING SEPTEMBER 11, 1877.

The board assembled in the University parlor at 3.30 P. M.

Present Messrs. Brown, Cobb, Flagg, Gardner, McLean, Mason, Pickrell and Sabin.

Absent Gov. Cullom, Messrs. Gillham and Byrd.

Letters were received from Messrs. Gillham and Byrd expressing their regret not to be able to attend this meeting.

The minutes of the last meeting, also those of the meeting of the executive committee held since, were read and approved. It was moved that the question of location of the chemical laboratory be taken from the table. Carried.

Remarks on the subject were made by Dr. Gregory, Messrs. Brown, Gardner, Flagg and Pickrell. Afterwards a recess was taken to examine the grounds and locations proposed.

Adjourned to meet at 7:30, in Doane house.

EVENING SESSION.

Board assembled at the hour appointed.

Mr. Flagg, chairman from committee on green house, made the following report:

THE REPORT OF COMMITTEE ON THE GREEN HOUSE.

Your committee respectfully report that having examined the old green house, and the plans and estimates furnished by Prof. Burrill, we came to the conclusion that the only practicable thing to be done, in consideration of the small appropriation, is to remove the old green house to such site as may be selected by the full board, and to improve and repair it. In making such removal we recommend that it be done by day labor, under the immediate direction of Prof. Burrill or Mr. Hays, that the rafters be replaced with stronger and more durable timber, that the base wall be built lower and that propagating houses be added on the side opposite the brick front. In making these the sash now on hand can be used: and the whole green house made good as new within the appropriation.

Did our means permit, a larger and more handsome structure would be preferred. We recommend that so far as practicable the present structure be remodeled with reference to producing a better architectural effect, both immediately and when additions become necessary. Also that if practicable, the rooms used for a laboratory and potting room, be enlarged.

W. C. FLAGG,
J. H. PICKRELL,
D. GARDNER.

The report was received and the recommendations concurred in.

Mr. Flagg, from committee on degrees, made the following report:

REPORT OF COMMITTEE ON DEGREES.

Your committee respectfully report that the change in the organic law in reference to the granting of degrees by the trustees of this institution, having been procured on the petition of the alumni, it seems proper to give the subject matter due examination, and report accordingly.

It was evidently the intention of the law of 1867, which, in its regulatory features, is substantially the bill presented by the Illinois state agricultural society for the consideration of the legislature in 1865, to abolish so far as this institution was concerned, the practice then and now much abused, of granting degrees to ignorant persons, and to substitute a certificate of the actual attainments of the pupil. We are not informed as to all the reasons that led to this action: but then and now we find that the practice of giving degrees grows more and more a matter of indifference, if not dislike, to the large majority of our people.

Up to the present time the board, in accordance with an organic law, have granted certificates showing the number of terms devoted by the student to any study, and his standing as estimated by his teachers in each of the studies pursued. The certificate, if accurate, gives his precise standing as a student. We have therefore thought it well to

ask the question: Why change? The strongest reason urged is that similar institutions grant degrees: and that the position of our graduates seeking employment as teachers, and perhaps in other capacities, is not one of equality in competition with the graduates of other institutions who have received degrees.

Our attention has thus been called to the practice of other institutions: We find in the report of the commissioner of education for 1864 that 18 of the institutions founded on the national grant of lands, are reported as granting degrees. Nearly as many more received students, but from the short time since their foundation or other causes, had no graduates. We may assume that a considerable majority of these colleges have granted or will grant degrees. Where the grant has been given to old institutions the prevailing degree is that of B. A.: in the newly organized institutions that of B. S.

Is it best then to confer degrees on our graduates, and if so what degrees? We must confess that we cannot approve the practice of granting degrees at all. Degrees are of little value in themselves and have become to be conferred with such facility as to no longer distinguish the scholar from the charlatan. Unless the convictions and wishes of a majority of the alumni require it we cannot recommend the granting of them.

In case it is found the demand for degrees is pretty general, we may recommend a recession from this position, but only as a concession to a prejudice which should be gratified perhaps, but can hardly be approved. In that case we may be called upon to determine what degrees shall be conferred. This we recommend should be done by granting a specific degree according to the college or school attended by the pupil.

We would recommend for students in the college of agriculture, the degree of Bachelor of agriculture; in the college of engineering, the degree of Bachelor of engineering; in the college of natural science the degree of Bachelor of natural science; in the college of literature and science, the degree of Bachelor of letters.

This is what we would recommend if forced to take action now, but we conclude and recommend that correspondence be had with other institutions on the same foundation, with a view to securing some uniformity of practice and requirements in the conferring of degrees, or of securing their abolition entirely, as may be found most expedient after due examination.

W. C. FLAGG,
J. H. PICKRELL,
ALEX. McLEAN.

The report was received and adopted.

Dr. Gregory was requested to send copies of the above report to the industrial colleges of this country, and invite correspondence with a view toward uniform action in the matter of degrees. Dr. Gregory submitted recommendations, which were acted upon as follows:

Voted to authorize Dr. Gregory to have the woodwork in the first and second stories of the main building grained, expense not to exceed $125, chargeable to state appropriation; to allow $25 to repair coal shed and move privy at mechanical building, to be charged to the same appropriation.

Cases in library and museum, not needed in those rooms hereafter, were ordered to be distributed under the direction of the regent and faculty in other rooms, as may be found necessary.

The regent was authorized to expend the state appropriation of $1,000 for library, in the purchase of such books as he and the faculty may select.

Voted that the regent and Prof. Taft be authorized to make the necessary purchases for the mineralogical, geological and cabinet of natural history within the amount of the state appropriation, and to employ a taxidermist at a cost not to exceed $150 for the year.

A committee of three was appointed, to consist of Messrs. Sabin, Brown and Pickrell, to report resolutions of thanks for various donations received for the cabinets, in accordance with Prof. Taft's recommendation.

On motion, the bids received for new laboratory (nine in number) were opened by the chairman.

S. M. Walker, of Champaign, Ill	$29,500 00
Geo. Besore, of Urbana, Ill	28,500 00
M. W. Kaucher, Z. E. Gill, of Urbana, Ill	28,500 .00

B. F. Miller, Seeley Brown,	of Champaign, Ill	$27,368 00
Richard Young,	of Springfield, Ill	26,825 00
E. V. Codington,	of Champaign, Ill	26,756 00
Mateer & Scovell,	of Kankakee, Ill	23,900 00
G. G. Campfield,	of Winchester, Ind	19,900 00
D. P. Hopping & Co.,	of Springfield, Ill	19,742 40

Moved to adjourn till 8 a. m., making the further consideration of bids the order for 8:30 a. m.

SECOND DAY'S SESSION.

The board met as per adjournment.

Minutes of yesterday's meeting were read and approved.

The following resolutions were reported by Mr. Sabin, chairman of a committee to draw up resolutions of thanks.

To the Board of Trustees of the Illinois Industrial University:

Your committee would respectfully recommend that the following resolutions be adopted.

Resolved, that the trustees of the Illinois Industrial University recognize in the donation of leads and associated minerals, collected in Jo Davess county, by Gen. J. C. Smith, of Galena, for an exhibit at the Centennial, and by him presented to the cabinet of this institution, a valuable and much needed series of specimens; and in acknowledgement of this generous act they cordially extend to him their hearty thanks.

Resolved, that the trustees of the Illinois Industrial University recognize in the donation, consisting of rare and valuable birds, eggs, woods, notes, etc., presented to the cabinet of the institution by Lieut. Geo. R. Bacon, (1st Cavalry U. S. A.) also in the valuable material added by Capt. Chas. Bendire, (1st Cavalry U. S. A.) a substantial and desirable benefit; and they extend to these gentlemen, in acknowledgement their cordial thanks.

Resolved, that in view of the disinterested services and effectual assistance in procuring many and valuable specimens for this cabinet of the Illinois Industrial University, the trustees hereby acknowledge their sense of obligation to Mr. Chas. R. Webb, of the city of Philadelphia, and extend to him their cordial thanks.

Resolved, that the trustees of the Illinois Industrial University acknowlege the receipt of a can of fishes (73 specimens) from the Smithsonian Institute, and return their thanks for the same.

Resolved, that the secretary be instructed to transmit copies of the foregoing resolutions to the gentlemen named.

D. D. SABIN,
J. M. BROWN,
J. H. PICKRELL.

A bill of $148 07 from Trevill & Green, for repair of roof in west wing of main building, (blown off by the storm on June 24th) was audited and allowed.

A report from Mr. H. G. Crane, of the firm of Crane, Breed & Co., on the needed repairs of boilers in the heating apparatus was read, received and laid on the table for further consideration.

The question of location of the chemical laboratory was then taken up.

The vote for the location on southeast corner of arboretum, ayes and noes being called for, resulted as follows: Ayes—Messrs. Pickrell, Cobb, Gardner and McLean; noes—Brown, Flagg, Mason and Sabin. Motion lost.

Judge Brown moved, that the laboratory be located east of main building. Ayes—Brown, Flagg, Mason, McLean and Sabin; noes—Cobb, Gardner and Pickrell. Motion carried.

It was moved and seconded, that all the bids received be rejected. Carried.

On motion of Mr. McLean, a committee of three was appointed to

consult with architect on amendments of specification, consisting of Messrs. McLean, Mason and Brown.

The following resolutions offered by Mr. Flagg, were adopted:

Resolved, That the regent be requested to have immediately prepared, a circular containing the substance of the present catalogue, and to cause copies of the same to be sent to every postoffice in the state. Also that he be empowered to have prepared a poster advertising the University, to be circulated in like manner. Provided that the cost of preparing such circulars and posters shall not exceed $75.

Resolved, That the professor of agriculture be authorized to have printed, with the approval of the regent, a special circular in relation to the agricultural department, and to advertise the department in the leading agricultural papers of the state. The expense of said circulars not to exceed $10, and the advertising not to exceed $100 in the aggregate.

Resolved, that the regent and the professors of agriculture and horticulture be authorized to organize and hold a farmer's meeting of about two weeks in duration, in December or January next at the University. Provided that the same be done without extra cost to the University, excepting for the printing and circulation of circulars.

It was decided that the green house, when moved, be located west of the main building and south of the path leading to the gate on Wright street.

Mr. McLean, chairman of a committee to confer with the architect on specifications, made the following report:

CHAMPAIGN, July 11, 1877.

To the chairman and trustees of Illinois Industrial University, the undersigned, a special committee appointed to examine plans and specifications of laboratory building, would respectfully report the following alterations, additions and amendments to plans and specifications already submitted, to-wit:

1st. We recommend that the basement, together with door entrances and stoops, be built of stone of same quality and general appearance as the main building.

2nd. That the windows and door caps of entire building also be of stone and like form, as on main building.

3d. That so much of the pipes and tanks for gas and water, and for the drainage of the building as can be most conveniently put in proper position, in the progress of the construction, should be included in the specifications and made a part of the work to be contracted for.

4th. That the columns in first and second stories, be of iron of suitable size, instead of wood, as in present plan, and that fourteen additional windows be placed in attic, in such places as the architect may deem best; also recommend that attic room be furnished so as to be utilized to best advantage.

ALEX. McLEAN,
R. B. MASON,
A. M. BROWN. } Committee.

The report was received and all the recommendations except the 3d, were approved.

Mr. McLean moved that the architect be requested to prepare in detail specifications according to the recommendations of the committee, as approved above, and that he provide in his specification, that the building shall be inclosed by the 15th of November, sufficiently to protect it from the weather. Carried.

Adjourned till 2 o'clock, P. M.

AFTERNOON SESSION.

The board assembled as per adjournment.

Mr. Flagg from committee on by-laws for faculty, submitted the following:

BY-LAWS FOR THE FACULTY OF THE ILLINOIS INDUSTRIAL UNIVERSITY.

1. The faculty of the University shall consist of the regent and all the resident professors, and of such assistants as have the chief charge of distinct schools. Its officers shall

consist of the regent as president *ex-officio*, and a vice-president and secretary; to be chosen annually, by ballot, at the first regular meeting in September.

2. The faculty of the University, subject to the direction of the board of trustees, shall have general control of the discipline and studies of the University, and shall make in that behalf, from time to time such regulations as they may deem expedient.

3. The faculty of the University shall meet on a fixed day of each week during term time, and at such other times as the regent may deem it necessary to call a special meeting. The order of business at each meeting shall be:

1. Calling the roll of members.
2. Reading the minutes of last meeting.
3. Reports of officers.
4. Reports of committees.
5. Reports from the several colleges.
6. Unfinished business.
7. New and miscellaneous business.

4. The president, vice-president and secretary shall have the powers and perform the duties usually devolving upon such officers.

5. The faculty of each of the several colleges shall consist of the regent and the several professors, assistants and instructors in charge. These colleges, until further ordered, shall consist of the college of agriculture, the college of engineering, the college of natural science, the college of literature and science: to which are attached also the school of military science, the school of commerce, and the school of domestic science and art.

6. The officers of the faculty of each college shall consist of the regent as president *ex-officio*, and of a dean, who shall be the senior professor of those in charge of said college, unless otherwise ordered by the faculty of the University; and in the absence of the regent shall be the presiding officer of its faculty.

7. The faculty of each college shall be charged with the immediate control of the discipline and studies within and pertaining exclusively to that college; subject to the faculty of the University and of the board of trustees.

8. The faculty of each college shall meet once each month during term time, and at such other times as the regent may deem necessary. It shall be their duty to report and recommend to the faculty of the University such changes in the course of study, or other policies, as they may from time to time deem for the good of their college, and to enforce such rules of order, studies, etc., as may be recommended and required by the faculty of the University.

On motion of Mr. McLean, the by-laws were adopted and the committee discharged.

Mr. Flagg chair man of committee on salaries, submitted the following report :

REPORT OF COMMITTEE ON SALARIES.

Your committee to whom was referred the subject of the reduction of salaries, respectfully report, that we find under the present condition of income and expenditure, the income, for the coming year will be about $35,500 while the expenditure promises to be about $39,000, or about $3,500 in excess of our income. We do not find any surplus funds on hand that can properly be applied towards making up this deficiency. Nor is there any immediate prospect of increasing our revenue, either by obtaining a higher rate of interest on our endowment funds nor increasing these funds by the sale of the Minnesota and Nebraska lands. Both these policies can perhaps be carried out at no very remote period, but not in time to meet our present wants.

A large number of students, if the increase were large for the coming year, could meet the deficit, but this is too uncertain to be taken into our estimates. An increase in the change for tuition has been suggested, but we regard this as a policy which should only be adopted after all other measures of balancing income and expenditure have been found impracticable. This board, it will be remembered, adopted even the present moderate scale of charges with some unwillingness, and a further advance in the same direction will still less meet the views of those who opposed the idea of making any change.

We think the increase, however gradual, of tuition fees and other charges has the tendency to keep away a smaller or larger number of the very class of students whom it is a prime object of this university to reach. We believe observation of older institutions, where the rates have been increased, bear out this belief. We think it will also justly be expected that an institution endowed with public lands and aided by state appropriations should be kept as nearly as possible a free school, in accord with the system of free schools upon which it rests.

Our conclusion is, that we must at least for the coming year, cut down our expenditure.

This may be done by discharging some of the teaching force or diminishing the amount paid the several persons engaged in teaching. Either of these is difficult. We need our present force, and do not feel that it is overpaid, as compared with those of similar institutions. But, upon the whole, it seems best to reduce expenses by deducting something from the several salaries of those receiving the largest amounts. This reduction we would consider temporary, and not to be continued another year, unless the continued deficiency in receipts seems to demand it. Meanwhile, as an immediate effort to increase receipts, we would recommend the preparation and circulation, through every

post office of the state, of circulars, posters, or such other advertisements of the institution as may be thought best fitted to call the attention of our people to the university and its advantages.

We recommend, finally, as a means of carrying out the policy aforesaid, that salaries be reduced for the coming year as follows:

That the salary of regent be reduced, as he requests, the sum of	$400 00
That the salary of each of the professors, receiving $2,000 per annum, be reduced $100, or an aggregate of	800 00
That the salary of the superintendent of the machine shop be reduced $200, and one-half of the remaining $1,000 paid from state appropriation for building, saving	700 00
That the employment of an assistant in architecture and mathematics be discontinued, saving	750 00
That there be taken from amounts paid to subordinate assistants and employees, by employing new men or otherwise	200 00
That, in case Mr. Roos cannot be engaged, the amount now expended for the salaries of instructors in clay modeling and in industrial arts, be reduced the sum of	650 00
Reduction in the aggregate	$3,500 00

All of which is respectfully submitted,

W. C. FLAGG.
D. GARDNER.
ALEX. McLEAN.

On motion of Mr. Sabin, the report was received and the committee discharged.

On motion of Mr. Pickrell, it was voted that the salary of the regent and full professors (receiving $2,000 per annum) be reduced 10 per cent. Carried.

The following assistants and instructors were then nominated by Dr. Gregory, and appointed for the ensuing year:

Mr. I. O. Baker,
Mr. F. A. Parsons, } positions and salary same as last year.
Mr. C. I. Hays,
Mr. M. A. Scovill, position as last year, salary $65 per month.
Mr. C. E. Pickard, " " " 45 per month.

The regent nominated Mr. E. A. Robinson for foreman of mechanical shops. Laid on the table.

On motion of Mr. Flagg, the salary for foreman of mechanical shop was fixed at $1,000 per annum.

The regent's recommendation, that an additional coal shed be built, and the necessary coal purchased now, was concurred in.

Mr. Gardner, chairman from committee on additional library cases, submitted the following report and estimates:

The committee on the further completing and furnishing the library room, have examined same, and beg leave to submit the following report.

We recommend the cases now in the corners of the south end of the room be arranged by moving one case, or section, and to form an L of the remaining ones, as recommended and shown by diagram in possession of librarian. We make no change on west side of the room. We recommend that a case be placed against the wall on the east side of the room, from the corner or L cases to the door on the east side, and thence to continue to the corner of the room. We further recommend that a gallery be constructed over wall or side cases on the side, with stairs constructed at the north end to reach same. The case in the gallery to stand against the wall, and continue the entire length of the room. We recommend that the style and finish of the new cases be the same as the last cases built, or the work done in the room that is intended to be permanent.

Your committee think that the enlargement and provisions recommended will be sufficient to meet the wants, and accommodate the books of the library for the present.

And to meet further wants and room in the future, we suggest that a gallery be placed across the north end of the room, over the doors, that being a blank wall, and a great amount of room can there be obtained with little expense.

Your committee did not agree upon any particular style of finish for the gallery, but recommend that they be neat and light as possible, and submitted same to Prof. Ricker, to present a plan and style which will be furnished at our next meeting.

All of which is respectfully submitted.

D. GARDNER,
J. H. PICKRELL,
ALEX. McLEAN,
} Committee.

To the Committee on Library, of the Hon. Board of Trustees, Illinois Industrial University:

GENTLEMEN: In accordance with your directions, I have prepared the accompanying drawings showing the proposed improvements in library, and the following estimate of their cost:

East Side.

58	lineal ft.	floor case @ $6 50	$ 377 00
29	"	new railing (on floor) @ $2 50	72 50
77	"	gallery @ $2 25	173 50
77	"	case @ $5 00	385 00
77	"	railing, design No. 1 @ $1 20	92 40
Stairs with two rails complete			100 00
Total for east side complete			$1,201 10

North Side.

60	lineal ft.	gallery @ 2 75	$ 165 00
60	"	railing No. 1 @ $1 20	72 00
60	"	case @ $5 00	300 00
Total for north side complete			$ 537 00

East side	$1,201 10
North side	537 00
Total	$1,738 10

A style of finish similar to that of the present cases is employed.

Very respectfully submitted.

N. CLIFFORD RICKER.

On motion of Col. Mason, the report of the committee was accepted and its recommendations adopted, provided they can be carried out with the amount of the appropriation.

Adjourned to meet at 7:30 p. m.

EVENING SESSION.

The board assembled at the hour appointed.

The committee on janitors made a partial report, and was granted further time.

Prof. Ricker submitted a report in regard to needed repairs on east tower and main stair case in University building. The recommendations of the report were accepted, the repairs ordered done, and $55 appropriated for same (state appropriation).

Mr. E. S. Lawrence, head farmer, was appointed superintendent of horticultural grounds, and it was ordered that $200 of his salary be charged to horticultural department.

The painting of the farm house, southwest of main building, was referred to a committee, consisting of Mr. Gardner and the regent.

The business agent was directed to purchase one barrel of machine oil.

The request of Prof. Webb, for a plain table costing $350, was referred to Col. Mason. $10 were appropriated for repairing of surveying instruments.

The manufacturing of library cases in the carpenter shop, was refer-

red to a committee, consisting of the regent, Mr. Gardner and Prof. Ricker.

Under the accepted report from the committee, Prof. Ricker presented the additional specifications for new chemical laboratory, which, on motion of Mr. Sabin, were approved and the Professor instructed to modify the specifications accordingly.

The chairman was requested to advertise for proposals in the Champaign County Gazette, the bids to be received Tuesday, July 24th, 1877, until 3 o'clock p. m., at the University building.

$35 for the purchase of a papyrograph for Dr. Gregory's office, were granted.

The report of Mr. Crane on heating apparatus, also a communication from Mr. A. B. Baker, in regard to sundry repairs on building, were referred to Prof. Robinson, with request to report at the next meeting.

Mr. Gardner, from committee on binding for library, reported that the job was given to Mr. G. Scroggs, of Champaign.

Report received and action approved.

On motion the board adjourned to meet again on Tuesday, July 24th, 1877, at 3 o'clock p. m.

The board met at the University parlor at 3 p. m.

Present Messrs. Cobb, Gardner, McLean, Mason and Pickrell.

Absent Gov. Cullom, Messrs. Byrd, Brown, Flagg, Gillham and Sabin.

The record of last meeting was read and adopted.

The regent submitted the report of Prof. Robinson in regard to heating apparatus, which was laid on the table.

On motion of Col. Mason the bids for construction of chemical laboratory were opened by the chairman.

S. M. Walker, Champaign, Ill.	$30,000
Brown & Miller "	29,498
Richard Young, Springfield, Ill.	27,950
A. G. Campfield, Winchester, Ind.	25,750
D. P. Hopping, Springfield	25,750
Mateer & Scoville, Kankakee	24,900
Terrell & Knight, "	23,896

On motion of Mr. Gardner, seconded by Mr. Mason, Messrs. Terrell and Knight of Kankakee, Ill. were awarded the contract, they being the lowest bidders.

On motion of Mr. Pickrell, Messrs. Terrell & Knight are required to give a good and sufficient bond for $15,000 to fulfill said contract.

Mr. Pickrell moved that in case said Terrell & Knight fail to comply, in giving bond to complete said building, the chairman shall award the contract to the next lowest bidders, Messrs. Mateer & Scoville,—their bid being $24,900. Carried.

Mr. Gardner moved that a building committee of three be appointed by the chair.

Pres. Cobb, appointed Messrs. McLean, Mason and Gardner, such committee.

The following resolution offered by Mr. Pickrell was carried.

Resolved, That the building committee have full power and authority to engage the services of a competent person to superintend the building of the laboratory during pro-

cess of erection, and to pay such salary to said person as they may deem just and right. And further, they shall have full power and control in all matters pertaining to the erection of the building and disposition of material on the grounds, in view of protecting same from injury, and generally to act under authority of the board of trustees.

The building committee were given authority to take measures for the drainage of the main buildings and grounds, in connection with the drainage of the new laboratory building.

Recess till 7.30 P. M.

EVENING SESSION.

The board assembled at the hour appointed.

The regent made the following report, as chairman of committee on janitors of dormitory and main building, which was adopted:

The committee on janitors have not as yet employed any janitor for the main building, but have several acceptable candidates before them out of whom to select. They recommend that the pay for such janitor be fixed at $40 the month, as good, well qualified men can be had for that sum or even less. It is understood that the janitor shall still continue to have house room, fuel and lights provided as heretofore. It is also understood that he shall continue to be charged with the care of the entire building, and of the heating apparatus, as before; but that in place of employing his own assistants as heretofore, such assistants as may be needed from time to time, shall be furnished by the trustees.

D. GARDNER,
J. M. GREGORY.

The committee to whom was referred the employment of janitors, respectfully report that they have employed for the dormitory building, Mr. C. W. Williams, at the rate of thirty dollars a month, with the right reserved of discharging him at the end of any month, whenever he ceases to give satisfaction. It is agreed also, that he shall have the use for himself and family, of room No. 1 and the two rooms adjoining it, also, of such rooms as he may need in the basement. He is also to have fuel for the ordinary use of himself and family, in sitting and dining rooms and kitchen, and gas for sitting room. He is to take charge of the entire building and out buildings, of the coal sheds and coal, and to see that all are kept clean and in good order. He is also to look after fences and plank walks, and keep the same in repair as far as his time will permit. And he will thoroughly clean the entire building, and put the same in order before the opening of the term, and make such repairs and do such other work pertaining to the janitor as the trustees or regent may at any time require. During term time he shall keep all halls and public rooms and unoccupied rooms in good order, weigh out coal to students, and preserve as far as possible good order in all the buildings under his charge and report to the regent all cases of gross disorder, or of damage done by students or others.

Respectfully submitted,

D. GARDNER,
J. M. GREGORY.

On motion the regent and Mr. Gardner were authorized to have two patent gates put up.

The regent and Prof. Ricker were authorized to employ an assistant in architecture and shop practice, at a salary not exceeding $400 per annum.

The regent and Prof. Weber were authorized to employ an assistant in the chemical laboratory, the salary not to exceed $300 per annum.

On motion the regent and Prof. Snyder were authorized to correspond and apply for the detail of an army officer from the war department for an assistant military instructor.

On motion the regent was authorized to get the wainscoting and doors of the first and second floors of main building, grained, the cost not to exceed $200.

The recommendations of Prof. Robinson in regard to the heating apparatus were referred to the building committee with power to act.

Adjourned.

SEPTEMBER MEETING.

The board assembled on the 11th September, 1877, at 4 o'clock, p. m. and was called to order by the chairman.

Present Messrs. Cobb, Gardner, Mason, McLean and Sabin.

Absent Governor Cullom, Hon. Gillham, Messrs. Brown, Byrd, Pickrell and Flagg.

The minutes of the last meeting were read and approved.

Upon report of recording secretary, certain bills for costs in county and supreme courts were audited, amounting together to $11.55.

The matter of foreclosure of mortgage against Mr. Miller was referred to Mr. Gardner, with power to act.

The report of the business agent was then read and received and the warrants audited.

ILLINOIS INDUSTRIAL UNIVERSITY.

CHAMPAIGN, Ill., Sept. 11th, 1877.

Hon. Emory Cobb, Prest. Board of Trustees, Illinois Industrial University:

SIR:

I have the honor to make herewith a financial statement as business agent, for the six months ending Sept. 1st, 1877. Paper A gives the current appropriations with the expenditures and receipts under the same vouchers. Also paper B shows the condition of the state appropriations.

Your attention is also called to the papers marked C, as requiring the action of the board. Paper D. Also to several bills on which warrants have not been drawn.

Truly Yours,

S. W. SHATTUCK, Business Agent.

STATEMENT *of current appropriations and receipts, August* 31, 1877.

ON ACCOUNT OF	APPROPRIATED.	RECEIPTS.	EXPENDED.	UNEXPENDED.
Dr. Gregory's expenses	$13 15			
Board expenses	200 00		392 32	179 17
Salaries	16,605 00		16,237 99	367 01
Fuel and lights	300 00	86 58	527 13	140 55
Advertising	185 00			
Stationery and printing	300 00		507 46	23 46
Bal. st	568 00			
Buildings and grounds	200 00	57 70	155 15	670 55
Mr. Roos' drawing room	30 00			
Incidental expense	200 00	4 50	238 29	3 79
Library and apparatus	300 00		58 85	241 15
Tools	50 00			
Mechanical department	60 00	1,935 49	1,837 71	207 78
Architectural "	60 00	1,859 28	1,517 00	402 28
Horticultural "	6 72	634 73	427 61	213 84
Duties	158 84			
Chemical department		303 14	310 03	151 95
Agricultural "	2,988 51	3,679 10	4,356 28	2,331 33
Military and gymnasium	50 00		50 53	53
Special—Eng. transit	550 00			5 50
Botanical dep't, microscope	95 36	32 54	110 33	17 57
Cabinet	150 00		95 04	54 96
Additional	10 00			
Eng. dep't	28 50		45 15	6 65
Physical laboratory	15 00	2 15	9 96	7 19
Veterinary department	787 93		1 50	786 43
Dr. Gregory's office	35 00			35 00
Pup. department		840 00	495 00	345 00
Fees and rents		2,019 50		
Ill. Cent. R. R. Freights		393 60		

STATEMENT *of state appropriations, August* 31, 1877.

ON ACCOUNT OF	APPROPRIATED.	EXPENDED.	UNEXPENDED.
Taxes for 1876 and 1877	6,000 00	2,194 24	3,805 76
Repairs and improvements of buildings and grounds for 1877 and 1878	5,000 00	1,396 85	3,603 15
Current expense, chemical and physical laboratories for 1877 and 1878	2,000 00	315 36	1,748 54
Current expense and practical instruction in mechanical shops, 1877 and 1878	3,000 00	74 78	2,925 22
Library cases, 1877 and 1878	2,000 00	346 57	1,653 43
Books and publications, 1877 and 1878	3,000 00	251 10	2,748 90
Cases for cabinets, 1877 and 1878	4,500 00	974 47	3,525 53
Cabinets, 1877 and 1878	2,000 00	185 43	1,814 57
Chemical laboratory, 1877 and 1878	40,000 00	1,957 48	37,978 62
Green house, 1877	2,500 00	654 76	1,845 24

"B"—LIST OF WARRANTS DRAWN.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
512	Thos. Wright	Castings	29 20
513	Walter P. Ward	Painting and glazing	13 80
514	Emory Cobb	Expense to meeting	36 57
515	D. Gardner	" "	30 90
516	W. C. Flagg	" "	20 50
517	A. McLean	" "	19 80
518	D. D. Sabin	" "	22 90
519	J. M. Gregory	Salary, June	333 33
520	S. W. Robinson	" "	166 66
521	S. W. Shattuck	" "	166 66
522	T. J. Burrill	" "	166 66
523	E. Snyder	" "	166 66
524	D. C. Taft	" "	166 66
525	J. B. Webb	" "	166 66
526	J. C. Pickard	" "	166 66
527	N. C. Ricker	" "	125 06
528	H. A. Weber	" "	150 00
529	J. D. Crawford	" "	125 00
530	G. E. Morrow	" "	166 60
531	E. L. Lawrence	" "	83 36
532	L. C. Allen	" "	120 03
533	F. W. Prentice	" "	100 00
534	A. C. Swartz	" "	75 00
535	I. O. Baker	" "	75 00
536	F. A. Parsons	" "	75 00
537	M. A. Scovell	" "	60 00
538	A. E. Barnes	" "	60 00
539	J. Kenis	" "	75 00
540	P. Roos	" "	75 00
541	C. I. Hays	" "	75 00
542	E. A. Robinson	" "	23 10
543	A. B. Baker	" "	50 00
544	H. Hanser	" "	5 00
545	W. S. Williams	" "	3 00
546	I. B. & W. R. W. Co	Freight	4 97
547	Thos. Wright	Castings	73 00
548	A. Beard	Forging and Material	5 10
549	Agricultural Dep't	Farm expense June	443 99
550	S. J. Surdham	Hardware	8 32
551	Tribune Company	Advertising	25 95
552	G. C. Willis	3 packages rubber	1 91
553	J. R. Scott	Stationery	16 65
554	American Express Co.	Express on specimens	3 60
555	A. Beard	Forging	6 00
556	Locke & Saxton	2,000 envelopes	10 07
557	Luddington Wells & VanSchaik	Lumber	183 18
558	Hubbard & Son	Hardware	6 10
559	Schoffe & Moore	Printing catalogue-Additional charges	29 40
560	William Ayres	Hauling	6 00
561	James Rolph	Mason work on furnace	4 50
562	A. B. Baker	Piano for Commencement	5 00
563	C. & U. Gas Co	Gas for May	36 60
564	Jos. C. Lewellin	Work on plans	10 65
565	J. F. Moore	" "	5 00

List of Warrants Drawn.—Continued.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
566	C. G. Carlton	Files and tubing	$25 53
567	The Illini	Advertising and Printing	39 60
568	Larrabee & North	Hardware	28 96
569	Crane Bros. Manf'g Co	Hardware	5 47
570	Fuller & Fuller	Plaster and glass	4 48
571	R. S. Wilber	Hauling	11 90
572	Chas. R. Webb	Collections for cabinet	30 61
573	Champaign County Gazette	Printing and advertising	30 63
574	H. R. Buckles	Gas-pipes, repairs etc.	4 15
575	E. N. McAllister	Postage	38 52
576	Student's pay roll	June, 1877	358 14
577	Trevitt & Green	Hardware	13 08
578	Trevitt & Green	13,6-10 square tin roof and repairs	148 07
579	A. M. Brown	Expense to meeting	23 50
580	W. C. Flagg	" "	29 10
581	D. D. Sabin	" "	22 00
582	R. B. Mason	" "	7 50
583	J. S. Pickrell	" "	19 15
584	A. McLean	" "	34 20
585	G. E. Morrow	Purchase of seeds	8 95
586	C. & U. Gas Co	Gas for June	16 20
587	American Mer. Union Ex. Co.	Charges	2 50
588	Trevitt & Green	Hardware	5 75
589	Crane Bro's Manufacturing Co	Pipe and iron	7 91
590	J. M. Gregory	Salary July, 1877	333 33
591	L. W. Robinson	" "	166 66
592	L. W. Shattuck	" "	166 66
593	T. J. Burrill	" "	166 66
594	E. Snyder	" "	166 66
595	D. C. Taft	" "	166 66
596	J. B. Webb	" "	166 66
597	J. C. Pickard	" "	166 66
598	N. C. Ricker	" "	125 00
599	H. A. Weber	" "	150 00
600	J. D. Crawford	" "	125 00
601	G. E. Morrow	" "	166 66
602	E. L. Lawrence	" "	83 33
603	P. Roos	" "	75 00
604	C. I. Haves	" "	75 00
605	I. B. & W. R. W. Co	Freight	4 44
606	E. A. Robinson	Mitre-box saw	8 05
607	Fuller & Fuller	Glass	17 84
608	W. F. Pratt	Repairs on roof of drill hall	18 69
609	S. W. Shattuck	Petty expense June	27 22
610	A. Barr	Lumber	175 50
611	Emory Cobb	Expense to 3 meetings	13 25
612	Fuller & Fuller	Chemicals	63 90
613	Architectural department	Pay roll of workmen	68 70
614	Henry Dunn	Cleaning and repairs, drill hall	13 80
615	Fuller & Fuller	Glass and paints	47 49
616	W. P. Ward	Glazing and painting	4 77
617	Thos. Wright	1,061 lbs. castings	58 95
618	A. B. Baker	Salary July, 1877	40 00
619	T. Parks	Digging well	17 00
620	Agricultural Department	Farm expense	517 04
621	C. B. Dickens	32 loads manure	16 00
622	C. S. Kingsbury	2½ do work	3 12
623	C. S. Kingsbury	Work on grounds	14 87
624	C. D. Webster	Lumber	38 57
625	Enterprise Coal Co	6 cars coal	65 60
626	M. E. Lapham	750 shingles	2 35
627	Fuller & Fuller	Glass	20 47
628	Hurd & Houghton	Books	10 00
629	Covert & Greenwood	1 yale lock	1 02
630	A. J. Wilkinson	Hardware and tools	19 90
631	James Kenis	Books	10 50
632	D. C. Taft	Expenses collecting specimens	17 00
633	Pay roll of workmen	Cleaning main building	124 00
634	Students' pay roll	Work in July, 1877	261 54
635	New England Glass Co	Jars and phials for museum	99 30
636	N. C. Terrell & Co	On estimates acc. chemical laboratory	1,909 91
637	Samuel McKenzie	" " brick work G. H.	185 96
638	E. A. Robinson	25 days work in shops	62 50
639	C. W. Williams	Cleaning and repairing dormitory	42 00
640	Enterprise Coal Co	5 cars coal	52 00
641	J. M. Gregory	Salary August 1877	333 33
642	S. W. Robinson	" "	166 66

List of Warrants Drawn.—Concluded.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
643	T. J. Burrill	Salary, August, 1877	$166 66
644	S. W. Shattuck	" "	166 66
645	E. Snyder	" "	166 66
646	D. C. Taft	" "	166 66
647	J. B. Webb	" "	166 66
648	J. C. Pickard	" "	166 66
649	N. C. Ricker	" "	125 00
650	H. A. Weber	" "	150 00
651	J. D. Crawford	" "	125 00
652	G. E. Morrow	" "	166 66
653	E. L. Lawrence	" "	83 33
654	P. Roos	" "	75 00
655	C. I. Hays	" "	75 00
656	A. B. Baker	" "	40 00
657	Champaign Co. Gazette	Advertising	7 00
658	" "	Printing circulars	27 00
659	T. Butterworth	Advertising	12 50
660	Prairie Farmer Co.	"	25 00
661	Western Rural "	"	25 00
662	E. B. Benjamin	Chemical apparatus	251 46
663	Fuller & Fuller	Chemicals and ink	6 33
664	Larrabee & North	Hardware	19 03
665	Hubbard & Son	"	10 21
666	R. S. Wilber	Hauling coal	28 80
667	Larrabee & North	Hardware	8 91
668	Jones & Laughlins	"	9 61
669	Covert & Greenhood	1 yale lock	2 33
670	Trevett & Green	Hardware	21 37
671	A. Beard	"	4 75
672	Crane Bros. Manufacturing Co.	"	7 03
973	C. H. Cady	1 doz. door knobs	2 00
674	A. F. Hall	Fruit boxes, crates etc,	12 40
675	Thos. Wright	Castings	64 92
676	Fuller & Fuller	Glass and putty	103 82
677	August Sturm	Lumber	34 38
678	M. E. Lapham	"	5 40
679	N. A. Williams	3 bbls. cement	8 50
680	Jno. S. Scott	Stationery	20 90
681	I. B. & W. R. W.	Freight	3 13
682	A. H. Andrews & Co.	Crayons	4 80
683	Abindroth & Root	200 caskets	12 50
684	Agricultural department	Farm expenses, Aug	643 61
685	" "	Work done on green house	24 77
686	" "	Team work on grounds	15 80
687	Ill, Central R. R. Co	Freight, June, July and August	253 45
688	I. I. McAllister	Hauling 175 loads manure	70 00
689	H. Swannell	Chemicals and paint	32 30
690	Samuel Mckenzie	Sand and mortar	1 25
691	William Sim	25 lb lead	2 75
692	C. D. Webster	192 ft. poplar	5 76
693	Chas. Hendey	Painting and graining new building	196 00
694	I. B. & W. R. W.	Freight	5 90
695	Chas. Hendey	Painting and glazing cabinet	47 33
696	C. D. Webster	Lumber	92 87
697	J. W. Wollensak	Hardware	8 93
698	A. Brown	Plastering	51 50
699	Ill. Central R. R. Company	Freight	5 95
700	Wensel Morara	Cleaning and repairs on muskets	17 95
701	C. D. Webster	Lumber	38 74
702	J. W. Shuck	Hardware	11 41
703	Andrew Barr	Green house sash, paint etc	67 84
704	S. W. Shattuck	Pay roll of green house laborers	82 50
705	A. B. Baker	Brush, soap and soda	3 50
706	Mechanical Department	Work for other departments	149 42
707	" "	" and material for B. and G.	136 75
708	" "	" " green house	7 89
709	Architectural "	" " other departments.	56 26
710	" "	" " green house	15 09
711	" "	" " B. and G.	202 76
712	" "	Work and material for cab. cases	432 09
713	" "	" " " library cases	346 57
714	Mechanical "	Material for furnace	75 53
715	E. N. McAllister	Postage	23 98
716	Students' Pay Roll	August, 1877	428 57
717	Pay roll of laborers	" "	28 00
718	S. W. Shattuck	Petty expenses July and August	66 12
719	E. A. Robinson	Service as foreman 27 days	72 50
720	E. A. Pratt	Painting, glazing etc	44 18
721	Geo. Scroggs	Binding for library	141 00

On motion of Colonel Mason, it was voted that a committee, composed of Messrs. Sabin, McLean and J. W. Bunn, be and is appointed to report at the December meeting, upon the financial condition of the farms, and recommendations as to the future plans for conducting same.

$20.64 were allowed to Mr. I. O. Baker, for expenses to ship and arrange exhibit at the Chicago Exposition.

The board took a recess till 8 p. m., to assemble at Doane house.

EVENING SESSION.

The board reassembled at the hour designated.

The regent, Dr. Gregory, then read the following report, which was received.

REPORT ON REGENT.

To the Trustees of the Illinois Industrial University:

GENTLEMEN: During the summer, since your last meeting, the several measures directed by you for the improvement of the University buildings, have been carried out with success. The wood work of the corridors of the first two floors of the main building have been grained and varnished, as also the regent's office and lecture room adjoining, the whole expense being less than the appropriation made by you for this purpose. The floors of these two corridors have been oiled. The dormitory building has been put in much better repair than usual, under the care of Mr. Williams, the new janitor, who has taken up his residence with his family in the building. The repairs ordered for the sheds at the shop, have also been made. The main staircase at the main building has been thoroughly supported by columns, in a way to remove all danger of a downfall. The entire expenditure from the state appropriation for repairs &c., is thus far only $1,395 85. The completion of the repairs on the boiler will increase this amount to $1,500, leaving $1,000 for the further expenditures of the year.

The chapel very much needs a coat of calcimining, and should have the walls painted to the bottom of the windows. The registers in the platform should also be moved to the front to prevent the blackening of the walls. I recommend also the calcimining of the two corridors already grained. Also the laying of a hard wood floor in the halls of the second story of the dormitory building. The present floor is so much worn, and so rough that it cannot be kept clean; the old floor is also so broken that it will scarcely last through the year without repairs. The expense of a new floor will not exceed $—

CABINET AND LIBRARY CASES.

The work on the cabinet and library cases is going on satisfactorily, and will come quite within the appropriations made for them. It is desirable that authority be given to go on with the work, so that the shops may not pause when the work already ordered is finished.

I communicate herewith the reports of Professors Burrill, Robinson and Morrow, and cordially second their recommendations, as far as the funds at your disposal will allow the expenditures required.

I communicate the following appointments made by the executive and other committees and ask their confirmation by the board:

Peter Baumgras, instructor in charge of the school of art and design.

E. A. Kimball, foreman of machine shop.

J. C. Lewellin, assistant in architecture, and foreman in wood working shop.

J. E. Gregory, second assistant in chemistry and laboratory.

I ask also authority for faculty to employ, when needed, an instructor in elocution, to be paid by fees, approved by the faculty, such fees to be reported. One of our own former students, who has taken a full course at a reputable institute, can now be had on these terms.

The committee on janitors made the following report, which was adopted and approved:

The committee on janitors respectfully report that they have employed Mr. A. B. Baker, as janitor of the main University building, for the year ending June 30th, 1878, at a salary of forty dollars a month, with the right reserved of discharging him at the end of any month, whenever he fails to give satisfaction. It is agreed that he shall have the use of the rooms now occupied by himself and family, together with his fuel and lights,

as heretofore. He is to take and have the care of the entire building and heating apparatus, and is to give his time faithfully to the duties of the janitor, or to such part of the same as the trustees, or the regent, in their absence, may direct. It shall be his duty also to direct and superintend, when required, such persons or assistants as may be employed to aid in sweeping or cleaning the building, or any part thereof, or running the heating apparatus; and he shall do such other work pertaining to the janitorship, as may, from time to time, be required of him.

Respectfully submitted,

J. M. GREGORY,
D. GARDNER.

July 25, 1877.

Prof. Burrill made a report in regard to progress of construction of the new green house; also several recommendations in regard to matters pertaining to horticultural department.

The report was received, and the following action taken in regard to recommendations:

1st. Forest plantation to be thinned out in alternate rows.

2nd. Apple orchard, south half, to be prepared for clover next spring.

3d. $50 appropriated for seeds and plants for green house.

4th. One acre of ground south of new green house assigned as experimental garden.

The board adjourned to 8 o'clock a. m., next day.

SECOND DAY'S SESSION.

Board reassembled at 8 o'clock a. m.

On motion, the completion of green house was put into the hands of the building committee.

On motion of Mr. Sabin, the appointments reported by Dr. Gregory, were confirmed as follows:

Mr. Peter Baumgras, instructor in drawing, at $1,200 per annum.

Mr. E. A. Kimball, foreman of machine shop, at $1,000 per annum.

Mr. J. E. Lewellin, foreman in arch. shop, at $40 per month.

Mr. J. E. Gregory, assistant chemical laboratory, at $25 per month.

The faculty was authorized to employ a teacher of elocution, to be under their direction, and to be paid by fees; all fees, however, to be reported to this board.

Dr. Gregory's recommendation in regard to painting and calcimining was referred to Mr. Gardner and business agent, with power to act.

On motion of Mr. Sabin, it was decided to continue the work on cabinet cases, upon the west side.

It was decided that special art students be received into the University, and the fees be the same as for other special students and preliminary departments.

On request of Prof. Ricker, $10 were appropriated for whitewashing carpenter shop.

Prof. Robinson's request for a set of model tools costing $25, (from state app.) was granted; also $12 for waste, ceiling, office, etc.

On motion of Mr. Sabin, the ordinary appropriation of earnings was granted to each department.

Prof. Robinson's application for an appropriation to repair and re-wind the Rumkorff coil, was referred to Colonel Mason, with power to act.

On motion of Mr. Sabin, the recommendation of Prof. Morrow, to

purchase short horn and graded cattle, was referred to Messrs. Gardner, Cobb and Prof. Morrow, as a committee, with power to act.

The request of Prof. Morrow, for erecting sheds for cattle, was granted, expenses not to exceed $100; the question of exchanging span of horses, was referred to Mr. Gardner.

The following report from building committee was read—on motion of Mr. Sabin, it was accepted, the recommendation contained therein approved, and the amounts of payments named allowed:

REPORT OF BUILDING COMMITTEE.

To the Trustees of the Illinois Industrial University:

The undersigned, your committee on laboratory building, would beg leave to report as follows:

1. The proposed building was formally begun on the 2d day of August, 1877, the ground properly graded according to plan and foundation walls laid as per plan. So far as the same has progressed we find the material and workmanship fully equal to the requirements of the specifications.

2. We also found that in order to get proper foundations it was necessary to dig one foot deeper so as to reach the brown clay, this change of course necessitated an extra foot in highth of walls and column footings. Prof. Ricker made estimate as to the amount of extra material and labor as follows:

Making 754 5-6 cubic feet rubble work.
7,424 bricks laid in cement.

We would recommend the following estimate as to value of the same.

754 5-6 cubic feet stone @ 30 cents
7,424 thousand brick @ $10 ₱ thousand, about } $300.69.

And we would recommend an allowance for this amount, provided, however, the contractors, Farrell & Co. will give clear receipts for that amount, so that it will not be any part of the original building or estimates.

3. We received estimate of materials laid on the ground, by the contractors, Farrell & Co., the same being made out by Sup't Brown, which showed—

4,554 cubic feet of stone laid in wall, @ 25c	$1,138 50
234 yds. excavation, @ .75	36 45
25 yds. sand, delivered, @ $1	25 00
20 cords stone, delivered, @ $14	280 00
11,800 brick, delivered, @ $6.50	767 00
	$2,246 95
Less 15 per cent	337 04
	$1,909 91

For which we certified as correct, and recommended warrant to be drawn for the same.

4. We engaged the services of Mr. Seely Brown of Champaign, as building superintendent, whose duty it is to be present on the ground during the entire time the workmen are engaged, and to see that proper materials are used, and good workmanship performed. For such service we promised to pay him at the rate of one hundred dollars per month for his time actually so occupied, and would recommend that you pay him monthly the amount named.

5. We would recommend the allowance of the following accounts, which are herewith submitted:

No. 2, W. A. Balcom	$ 5 00
No. 3, N. C. Ricker	21 90
No. 4, Work and material	6 53
No. 5, Mary L. Page	32 30
Total amount	$65 73

and that the same be charged to laboratory building account.

We would also urge upon the contractors the necessity of having more workmen on the building so as to insure its inclosure by the time stipulated, and will do what we can to aid in that result.

Respectfully submitted,

ALEX. McLAIN,
D. GARDNER,
R. B. MASON,
Building committee.

We herewith submit Prof. Ricker's report on same matter, and ask the same be filed with this report:

URBANA, Sept. 11, 1877.

To the Building Committee, of the Hon. Board of Trustees of Illinois Industrial University:

GENTLEMEN: I have the honor to report as follows, in regard to the chemical laboratory:

Work was actually begun on the excavation on August 2d, but for a week or two only three men were employed. The delay in the progress of the work was caused at first by there being but two or three masons employed, and afterwards by their waiting for sills and window frames.

The contractor, however, declares that he can enclose the building before the time agreed upon. So far, he has acted honorably and appeared anxious to do a good job, willing to throw out any material condemned by the superintendent.

The foundation or footing courses are all of dimension stone, and are better than he contracted to put in, superior to those of the main building, without any extra charge.

I placed the guide, as directed by you, making the stone water table of the laboratory 2 feet below that of the main building, thus leaving the excavation about 2 feet deep at the highest point of the site, and 16 inches at its lowest point. But after they were made they were not deep enough, and in consultation with Mr. Gardner, it was decided to go one foot deeper, which proved sufficient to reach the brown clay, and secure a good foundation. This change of course necessitated an extra foot in height of all the walls and column footings, making an addition to the amount to be paid to the contractor under the contract.

Mr. Brown and myself concluded that it would not be necessary to carry the area walls, and walls under doors of basement, any deeper than mine walls, which would make them three feet deep, sufficient protection against frost. This saves one foot in depth for these walls, which were specified one foot deeper.

Mr. Brown measured up the extra foot in height of walls, and deducted therefrom the amount saved on area walls, &c., making 754 5-6 cubic feet rubble work.
7,424 brick laid in cement.

Mr. Jewell told me that he would do this extra work for 30 cents per cubic foot of rubble, and $10 per thousand of brick. This would make the cost

754 5-6 cubic feet stone @ 30 cents	$226 45
7,424 bricks @ $10	74 24
	$300 69

Mr. Brown says that 28 cents and $8 would be a fair price, which would make the cost $270 74 or about $30 less.

I have not agreed on any price with Mr. Jewell, not being authorized to do so, but have left the matter for your decision.

The frames and inside finish were job-let to Mattier & Scovell, of Kankakee. The window frames delivered here have 1⅛ inch thick sills, while 1⅜ was given on the detail drawing, and they have not yet been accepted. Mr. Mattier, in Mr. Jewell's absence, has been notified, but no reply yet received. Mr. Brown has fulfilled his duties to my perfect satisfaction.

In order to prepare the specifications and drawings without any more delay than unavoidable, especially as much of my own time has been required in the shop, I have been compelled to obtain some assistance in inking and tracing.

Mr. W. A. Balcom, arch. student, worked four days @ 1 25	$ 5 00
Miss M. L. Page, " " 25 8½-10 days @ 1 25	32 30
I have personally expended for drawing materials, and other necessary expenses connected with chemical laboratory	21 90
Making, total office expenses	$59 20

Detailed accounts of these expenses are in the hands of the business agent.

All details of the building are completed, except mansard windows, chimney caps, stairs and iron railings and cresting. This will require about a week's work, and I can have them ready when they are required for the contractor's use.

An estimate was prepared by Mr. Bunn, at beginning of Sept., 85 per cent. of which is a little over $1,900, has been paid to the contractor by per cent.

Very respectfully submitted,

N. CLIFFORD RICKER,
Architect of Chemical Laboratory.

On motion, Mr. Gardner was authorized to take the necessary steps to furnish deeds to Mr. Burnell for lands sold to him.

The repair of sidewalks was referred to Mr. Gardner and the business agent.

The following communication from Dr. F. W. Prentice, veterinary surgeon, was received, and leave of absence was granted to him as re-

quested, without compensation during the time of absenee, and subject to the approval of the faculty.

ILLINOIS INDUSTRIAL UNIVERSITY, September 11th, 1877.

Hon. J. M. Gregory, LL. D. and Board of Trustees,

GENTLEMEN: I very respectfully ask leave of absence during the months of November, December, January and February of this school year. I am induced to make this request that I may spend the time in the study of comparative pathology, at some prominent medical school of this country.

The intimate connection between human and veterinary medicine, the many communicable maladies from animals to mankind, the similarity of treatment in numerous cases, the frequent possibility of the prevention of the spread of contagious diseases, and many other reasons, render it highly desirable that a public teacher of animal physiology and pathology, should be well versed in all that is known of human diseases and their treatment.

Should my request be granted I will do everything in my power to make up the instruction to the students, before and after my return.

Very respectfully,
F. W. PRENTICE, M. R. C. V. S.

Mr. Gardner was requested to take the necessary steps relating to opening a central avenue through the grounds, north from main building.

The treasurer, Mr. J. W. Bunn, then read his report, which was received and approved.

TREASURER'S REPORT.

John W. Bunn, Treasurer, in acc't with Illinois Industrial University.

1877			
June 5	To balance		$11,112 38
" 15	" Interest on Morgan county bonds	$2,000 00	
July 2	" " Kankakee county bonds	3,000 00	
" 2	" " Pike county bonds	3,000 00	
" 2	" " Chicago 7 per cent. bonds	875 00	
" 2	" " Illinois 6 per cent. bonds	930 00	
" 2	" " Champaign county bonds	1,208 25	11,013 25
" 2	" am't rec'd from state for taxes on lands in Nebraska and Minnesota	2,194 24	
" 2	To am't rec'd from state, buildings and grounds, for repairs and improvements	2,500 00	
" 2	To am't rec'd from state, mechanical shops, current expenses	1,500 00	
" 2	To am't rec'd from state for library and cabinets		
" 2	" " " Library cases	1,000 00	
" 2	" " " Books and publications	1,500 00	
" 2	" " " Cases for cabinets	2,250 00	
" 2	" " " Specimens for geological, mineralogical and natural history	1,000 00	
" 2	To am't recd from state for green house	2,500 00	15,444 24
" 2	" " " Chemical and phys. lab'y	1,000 00	
" 2	" " " Chemical laboratory		20,000 00
Aug. 31	" " on acc't Mechanical department	1,310 80	
" 31	" " " Architectural "	1,136 74	
" 31	" " " Agricultural "	555 03	
" 31	" " " Horticultural "	88 19	
" 31	" " " Chemical "	101 34	
" 31	" " " Buildings and grounds	36 00	
" 31	" " " Fuel and light	37 96	
" 31	" " " Microscopes	32 54	
" 31	" " " Fees and room rents	397 00	
" 31	" " " Tuition	20 00	
" 31	" " " Ill. Cent. R. R. freight	253 45	3,905 05
			$61,538 92

JOHN W. BUNN,
Urbana, Sep. 13th, 1877. Treasurer.

John W. Bunn, Treasurer, in acc't with Illinois Industrial University.

1877			
Aug. 31	By am't paid Board expense		$ 279 37
" 31	" " for salaries		7,351 85
" 31	" " Buildings and grounds		38 62
" 31	" " Fuel and lights		297 00
" 31	" " Stationery and printing		269 34
" 31	" " Mechanical department		1,165 24
" 31	" " Architectural "		1,175 19
" 31	" " Agricultural "		1,902 39
" 31	" " Horticultural "		60 33
" 31	" " Chemical "		48 05
" 31	" " Military "		23 93
" 31	" " Library and apparatus		5 64
" 31	" " Incidental expense		81 39
" 31	" " Preparatory department		90 00
" 31	" " Physical laboratory		1 00
" 31	" " Civil engineering		28 19
" 31	" " Microscopes		40 62
" 31	By am't paid on acc't state appropriations,		
" 31	For Chemical laboratory	1,957 48	
" 31	" Green house	654 76	
" 31	" Buildings and grounds	1,300 51	
" 31	" Chemical and physical laboratories	315 36	
" 31	" Mechanical shops	74 78	
" 31	" Library cases	346 57	
" 31	" Books and publications	163 00	
" 31	" Cases for cabinets	479 42	
" 31	" Cabinets	164 61	5,456 49
" 31	By balance		43,224 28
			$61,538 92

JOHN W. BUNN,

Urbana, Sep. 13, 1877. Treasurer.

APPROPRIATIONS.

For the fitting up of the book keeping room, $75 were granted, (from state appropriations) also $35 for samples and checks.

The following appropriations from current funds, were made for the six months ending February 28th, 1878.

Appropriations from current funds, for six months ending Feb. 28, 1878.

Board expense		$ 200 00
Salaries—		
Regent	$1,800 00	
9 professors	8,100 00	
2 professors	1,500 00	
Prentice	600 00	
Allen	600 00	
Baumgras	600 00	
Parsons, Scovel, Baker, Hays.	1,800 00	
Chemical assistant	150 00	
Lewellin	240 00	
Gym. and military	30 00	
Choir teaching	50 00	
Janitor N. B.	240 00	
" "	300 00	
" dorm	180 00	
Library	60 00	
		16,300 00

APPROPRIATIONS, ETC.—Continued.

Fuel and light		$2,000 00
Stationdry and printing		200 00
Buildings and grounds		100 00
Incidental expense		200 00
Agricultural department		2,331 33
Horticultural "		213 84
Mechanical "		207 78
Architectural "		402 28
Chemical "		151 95
Military "		50 00
Specials—Book keeping, checks, samples, etc.	$ 35 00	
Plants and seeds for green house	50 00	
Chicago Ep. Baker's Ep.	20 64	
Courts charges	11 55	
Advertising unexpended	69 50	
Papyrograph for regent's office	35 00	
Engineering transit	550 00	
Model of horse (from state appropriation)	786 43	
Microscopes, unexpended	17 57	1,575 69
		$23,932 87

The board then adjourned to meet again on Wednesday, December 5th, 1877, at 4 o'clock p. m.

BOARD MEETING, DECEMBER 5, 1877.

The board met in the University parlor, at 4 o'clock p. m. President Cobb in the chair.

Present, Messrs. Cobb, Gardner, Mason, McLean, Pickrell and Sabin.

Absent, Governor Cullom, Hon. Gillham, Messrs. Byrd, Brown and Flagg.

The record of last meeting was then read and adopted.

The regent, Dr. J. M. Gregory, then read the following report:

REGENT'S REPORT

To the Trustees of the Ill. Industrial University:

I am glad to be able to report a healthful and prosperous condition of the institution under your charge. The number of students in actual attendance is larger than in any former term, though less, of course, than the total attendance of last year. The total attendance shown on the catalogues always includes all who have been in attendance any term of the year. The total number of this will doubtless exceed those of any former year. Those already enrolled for this year, number 386; males 313, and females 73.

The work of the term has gone on happily and successfully.

Of the new students admitted at the opening of this term, ——entered the preparatory classes, ——entered the first year or freshmen classes, ——entered the second year or sophomore classes, and —— entered special courses, such as the farmer's or the builder's.

Our work is steadily increasing in nearly all directions, and if this increase goes on, there will be no need for additional help in some of the departments. By hard labor I have thus far been able to provide for the instruction in the two important branches of social science,

including history and political economy, and that of philosophy, including mental science, and logic. With the increase of executive work, it will be impossible for me to do this much longer. The best interests of the University will demand that these departments shall be each provided with its separate teacher.

Of the work ordered by the board, much has been accomplished, or is in progress. Some has been necessarily delayed, either because the shops have been otherwise employed, or because the appropriation was found inadequate.

1. The renovation in the chapel has been delayed for want of time to undertake it. I trust it may be reached during the coming term.

2. The work on the library cases has gone forward as fast as the shops could accomplish it. Some delay has occurred from failure to receive the castings for the railings. It will now soon be finished, at least as far as the appropriations of this year will allow.

3. The appropriation for whitewashing the walls of the carpenter shop was found insufficient. I present the estimates of Prof. Ricker for ceiling, whitening the walls, and painting the wood work of the shop, and for putting some coils in the lumber room, now used for a model room and private shop for the work on the models. As the shop has a considerable sum to its credit from its past earnings, I hope the improvements asked for may be ordered. The light and comfort for the shopwork and instruction will be greatly enhanced by these improvements.

It is found that the large electric coil can be rewound in Chicago, but as there is some doubt whether the old wire will make a good coil, it seems to me best policy to increase the appropriation to the amount necessary to have the work done in the best manner with the best materials.

5. Prof. Robinson also asks the usual appropriations for the shop practice classes, and also some appropriations for the necessary materials, and for some additional apparatus for the lectures in physics to be given during the next term. Both of these will come properly from the state appropriation.

6. The appropriation for the purchase of a papyrograph has not yet been expended. On enquiry and personal examination of the two instruments, I conclude that the electric pen will prove best adapted to our work, and I respectfully ask that the appropriation be increased to fifty dollars—the price of the pen and the press accompanying it. I am confident that it will be found of great use in our work, and will save its cost in our printing bills within a year or two, besides giving the advantage of the printing press, in many cases in which we now forego from motives of economy. It will also save to my office a large amount of clerk work in making copies of letters, etc.

7. The work on the laboratory is now so far advanced that the gas and water pipes and the heating apparatus will demand immediate attention. In anticipation of your meeting I have asked Professors Robinson and Ricker to prepare plans to submit to your inspection. These gentlemen believe that the work can be done in your own shops as well and as cheaply as by any other parties, and as we are constantly in want of work, I would earnestly ask your attention to their plans and statements.

8. The library expenditures have been made according to your di-

rection, as will be seen by the librarian's report. The pamphlet cases mentioned in his report, are needed at once, as we have already a large accumulation of valuable pamphlets which can be made available only by classification and arranging them in such cases. The expense of these cases will properly be charged to the state appropriation for library cases.

9. The subscription for our periodicals needs to be renewed at once that there may be no delay in their reception.

10. It is found that the appropriation for the counter, etc., in the book-keeping department will fall a little short of the cost. I recommend that twenty-five dollars be added to the appropriation.

11. The expenditures authorized by the board to be made by the regent and Prof. Taft, from the state appropriation for the cabinets, have been accomplished, in part, with gratifying results, giving to the departments of mineralogy and natural history much new and valuable material for their work. The taxidermist, whose employment you authorized, has not yet begun his work, but is under engagement to begin as soon as his other engagements will allow. I feel much gratified to see this department of our institution at length taking the rank its importance demands.

DEGREES.

In compliance with the direction of the board, I opened a correspondence with the several institutions organized under the congressional grants, sending to each a copy of the report of your committee, and inviting a conference. This correspondence has resulted in the calling of a convention of the presidents, or other representatives, of the several state universities and colleges, endowed wholly or in part by congressional land grants. It was found impracticable to limit the conference to the purely agricultural or technological institutions, as the grant went, in many, to state universities or state colleges already in existence when the grant was made, and as the state universities are very generally organizing technological and scientific departments, they are interested as much as we in the question of proper degrees to be given to the graduates of the scientific and technical courses. Besides this, their co-operation is desirable to secure some uniformity of usage, so important to the institutions themselves and to the public at large.

The proposed convention is to be held at the mechanical and agricultural college, of Ohio, at Columbus, December 27 and 28. It will be expected that this university will be represented, as it was on our suggestion the meeting was called.

It is known to the members of the board, that under the appointment and request of the governor of the state, who is also a member of the board, I accepted, the last summer, a position on the state board of health. This is one of those places which civilized states are accustomed to ask good citizens who may be found competent, to fill for the public good and without compensation, and which, therefore, I have not felt justified in declining, especially as so many assurances have been given me from high sources, that my stay on the board is important to the public weal. Thus far the duties involved have called me away only twice, and for short intervals, from my work at home. The calls in the future are not likely to be more frequent than in the past. I do not, however, desire to hold a position which will involve

any interruption of my work here, without the full consent of the trustees.

In this connection, I wish to ask the use of the parlor of the university, for a meeting of the state board of health, the 20th of December, inst.

Very respectfully,

J. M. GREGORY, *Regent.*

The report was received.

The treasurer, J. W. Bunn, Esq., then presented his report.

TREASURER'S REPORT.

John W. Bunn, Treasurer, in acc't with Illinois Industrial University.

1877.		DR.		
Sept.	11	To balance		$43,224 28
Oct.	8	" am't rec'd on acc't Burnett's note		450 00
Nov.	5	" " " Burton's judgment		28 65
"	30	" " " agricultural department	$3,980 03	
"	30	" " " horticultural "	137 51	
"	30	" " " mechanical "	586 15	
"	30	" " " architectural "	540 90	
"	30	" " " chemical "	7 25	
"	30	" " " fuel and lights	62 61	
"	30	" " " buildings and grounds	20 30	
"	30	" " " Microscopes	16 27	
"	30	" " " library and apparatus	31 17	
"	30	" " " Preparatory department	960 00	
"	30	" " " fees and room rents	2,474 50	
"	30	" " " Illinois Central R. R. freight	683 45	9,500 14
				$53,203 07

John W. Bunn, Treasurer, in acc't with Illinois Industrial University.

1877.		CR.		
Nov.	30	By am't paid board expense	$ 75 75	
"	30	" " for salaries	7,302 48	
"	30	" " " fuel and lights	832 98	
"	30	" " " stationery and printing	110 43	
"	30	" " " buildings and grounds	4 40	
"	30	" " " incidental expenses	43 33	
"	30	" " on acc't agricultural department	2,690 98	
"	30	" " " horticultural "	152 09	
"	30	" " " mechanical "	830 34	
"	30	" " " architectural "	632 93	
"	30	" " " chemical "	84 56	
"	30	" " " military "	39 93	
"	30	" " " book keeping	34 65	
"	30	" " " green house	39 14	
"	30	" " " Chicago exposition	64 19	
"	30	" " " court charges	7 05	
"	30	" " " engineer's transit	30	
"	30	" " " microscopes	12 31	
"	30	" " " library and apparatus	11 59	
"	30	" " " preparatory department	645 00	$13,614 43
"	30	" " " chemical laboratory	12,383 73	
"	30	" " " green house	1,260 81	
"	30	" " " cabinets	250 65	
"	30	" " " buildings and grounds	526 53	
"	30	" " " mechanical shops	395 38	
"	30	" " " cabinet cases	56 60	
"	30	" " " library cases	257 60	
"	30	" " " books and publications	279 99	
"	30	" " " physical and chemical laboratories	80 74	15,492 03
"	30	" Balance		24,096 61
				$53,203 07

Urbana, December 5, 1877. JOHN W. BUNN, Treasurer.

The report was accepted.

A communication from adjutant general H. Hilliard to Col. E. Snyder, was referred to Mr. J. B. Brown, with instructions to report at the next meeting.

Recess taken till 7:30 p. m.

EVENING SESSION.

The board met on time.

The following amounts were assigned to be expended from state appropriations:

$ 25	00	for tools, appropriation for shop practice.
15	00	for chemicals, appropriation for physical laboratory.
25	00	for hydraulic apparatus, app. for " "
125	00	for Rumkorff coil, app. for " "
100	00	for acoustic and electrical apparatus, app. for phys. laboratory.
50	00	for printing apparatus for regent's office, from current funds.

The following report of the architect, Prof. N. C. Ricker, in regard to progress of work on the new laboratory building, also recommendations for heating apparatus for same, was then read.

REPORT OF ARCHITECT.

To the Building Committee of the Hon. board of trustees, of the Illinois Industrial University:

GENTLEMEN: I have the honor to present to you my quarterly report, as architect of the chemical laboratory, as follows:

As you have already observed, the contractors have not been able to comply with that part of their contract requiring the building to be fully enclosed on November 15th, chiefly on account of delay in the stone masonry of the basement story. Still, I believe that so far no damage has occurred to the building. To settle any dispute which might arise on final settlement, as to the actual condition of the building on November 16th, I requested Prof. Webber to take a photographic negative of it, which he did on November 20th.

I have found it necessary to make a few changes in the building, to better adapt it to its purposes, or improve its appearance, which will, I believe, meet your approval. In each case where any extra expense was required, except for ground glass skylight, the cost has been fixed beforehand by agreement between Mr. Terrell and myself, and at very reasonable figures.

1st. Window and door caps are of Joliet limestone instead of Ohio sandstone, and changed design. They look much neater, and better agree with the brick walls. No extra cost.

2d. Two flues 12x12 inches from basement were put in north east part of the building, instead of one flue 4x12 inches from second story, by request of Prof. Webber, to provide for a possible need of placing a furnace in the milling room. Extra cost $52.

3d. Hot air flues in interior walls. Provision was made in the specifications that the University would furnish, and the contractors set, hot air flues of tin where required. I obtained bids for the tin pipes from four parties in Urbana and Champaign, and at the lowest price, they would cost about $125.

After thinking over the matter a while I concluded to omit the tin, forming the flues in the wall and plastering the flues with plaster of paris. This is much cheaper, less heat is transmitted from the air to the wall, though there is more friction in the flues.

To remedy this I put in a larger number of flues, and made about half of them 8x16 in.

Extra cost $25 00.

4th. Two dormer windows on east side—the two in center of building were put in extra. Four wood columns in mansard story were omitted, the weight of roof being thrown on partitions.

Expense of difference between the charges $20 00.

5th. The chimney caps were drawn to extend about 3 feet above the edge of deck roof, which would probably be sufficient; but to make sure, they have been carried 3 feet higher, or 1 foot above the central ridge.

Additional cost $35 22.

6th. It will be best to substitute ground glass for the double thick glass in skylight for photographic atelier. This has not been ordered yet, and the cost of the change not been agreed upon. Mr. Terrell can furnish this, or the business agent can purchase it, and we can then deduct from the amount due under the contract, the cost of the double thick glass, as you may think preferable.

7th. Ornamental slating.—It is purposed to put in ornamental slating, using about one square of red and two of gray, forming diamond figures where there is space for them.

Cost not to exceed $40 00; but Mr. Terrell says that if you object to paying for this ornamental work, you need not do so.

Total cost for changes,	
Extra flues	$ 52 00
Dormer windows	20 00
Hot air flues	25 00
Extra height of chimneys	35 22
Ornamental slating	40 00
	$172 22

Extra in skylight not included.

8th. If the south room in mansard is ever to be used as a drawing or modeling room, or for any similar purpose, it would be well to put in a skylight in the roof above it. The probable expense would not be very great; would depend on you.

9th. It will be best to put in partition between agricultural and quantitive laboratories, now, making it partly of glass and so light as possible. It was omitted from the drawings by request of Prof. Weber.

For the amounts paid the contractors and other persons on account of the laboratory, reference is made to the books of the business agent.

I submit herewith to you, plans of the building showing its proposed internal arrangements.

1. Arrangement of furniture, such as desks, sinks, gashoods, tables, &c. These are outlined in red lines.
2. The proposed mode of heating and ventilating the building.
3. The mode of getting rid of all noxious vapors arising from chemical manipulations. Pipes outlined in orange.
4. The water supply and distribution pipes, drawn in blue.
5. The waste water system. Not shown in plans.
6. The gas supply and distribution pipes drawn in green, except those serving to light mansard story, which are red.

1.—THE FURNITURE, ETC.

The desks in the laboratories of qualitative and quantative analysis are 4 ft. 3 in. by 16 feet placed 4 ft. 6 in. apart, each accommodating 8 students, and in general form similar to those now in use, but should be built of hard wood, best of ash, and finished in oil and shellac. Each desk is fitted with two wash bowls 16 inches in diameter, with water and waste pipes, and with two gas hoods, with gas flues, and gas pipes and burners. Each laboratory is also fitted with large gas hoods, sinks and with water and waste pipes, and blow pipes, which are furnished with pipes conveying compressed air and also gas. Store rooms have a lift, counter, shelves and drawers, and an apparatus for making distilled water, with steam and water pipes. Class and lecture rooms have platforms with water, gas and waste pipes.

Pharmacy room will have a prescription counter and desk with gas pipes, sink with water and waste pipes, and wall cases with shelves and drawers.

Laboratory of Prof. Weber will have working desk, with one gas hood and wash bowl, with water, waste and gas pipes, and gas flues, sink, balance shelf and gas hood.

Ladies' and gentlemen's clothes rooms will have wash bowls, with water and waste pipes, clothes hooks, &c.

Gas analysis room will have table with water, waste and gas pipes, and sink with water and waste pipes.

Balance room will have balance shelf and an apparatus case.

Tank room in mansard will have a 100 barrel tank of boiler iron, supported on trusses resting on brick walls, filled by pipes from pump in basement, and by down spout from deck roof, with overflow pipe discharging into main gutter of the building.

Dark room will have sink, shelves and drawers, table with gas, water and waste pipes. Toning room same.

Water pipes will also be laid into each room in mansard story to provide for any possible use of the unappropriated rooms.

2.—PROPOSED METHOD OF HEATING AND VENTILATION.

To be done by forcing air past steam coils in hot air chamber in basement, thence through ducts to each room. All the heating surface will be placed in hot air chamber except a few radiators which may be necessary in halls. Fan to be placed where indicated, in engine room, forcing air into hot air chamber. This is driven by an engine, of 8-horse power, which will be sufficient to drive fan and milling machinery, and pumps. This engine to be driven by a small separate boiler, as it will require to be run whenever building is used. Main boiler used for heating the steam coils alone.

Both discharge smoke into large smoke flue, and the waste heat assists in producing draft in ventilating shaft. Steam coils to be arranged in sections so that any injured pipe can be shut off, without interfering with the others, and arranged so that any section can be drawn out for repairs.

By tin pipes in basement, and flues in walls, the warmed air is conducted to the various rooms.

Valves will be arranged at the lower ends of flues, so that the janitor can turn on or off the hot air from any room without going to that room.

The maximum amount of air required for the whole building, is about 250,000 cubic feet per hour. 13,000 lineal feet steam pipes will be necessary to heat this, and a No. 6 or 7 Sturtevant blower to furnish it. By experiment, the openings into flues are to be made of proper size so as to supply each room equally, and under uniform pressure. I have ar-

ranged to supply 300 feet per hour for each for the maximum number of persons in each room.

Openings are made into ventilating shafts on each floor, and between double joists of hall floor, and exhaust openings in wall and floors of rooms so as to withdraw all foul air rapidly.

In the laboratories, the gas hoods draw off the foul air, and it will pass off through gas flues, so that these rooms will not require any other provision for their ventilation, but I have put in some registers in addition which can be used if necessary.

A small blower will be needed to furnish air under greater pressure to forge, furnaces and blow pipes.

ESTIMATED COST OF HEATING APPARATUS.

Prof. Robinson has obtained most of the data for this estimate, and we have made it out together.

Large Sturtevant blower	$ 100 00
Small " "	25 00
Piping to do	100 00
Large Root's safety boiler	1,150 00
Small " " "	250 00
Setting boilers	250 00
8-horse power engine	500 00
Pump	100 00
Heater for taking lime out of water for boilers	150 00
Smoke pipe	40 00
Steam pipe 13,000 feet	700 00
Fittings and valves for do	200 00
	$3,565 00

Work putting up probably not to exceed $500 00.

Water of condensation in pipes will be returned to boiler without pumping.

I believe this method of heating and ventilation will be most economical and the best in all respects, though any other system, if preferred by you, can be adopted without trouble.

3.—THE MODE OF GETTING RID OF NOXIOUS CHEMICAL FUMES.

As shown in plans and previously stated, these gases are drawn off from the place where produced, without being allowed to escape into the rooms at all, and the atmosphere of the laboratory should be as pure and healthy as that of any other building, much more so than of the main University building.

4.—WATER SUPPLY AND DISTRIBUTION.

There should be a 500 barrel cistern constructed in the ground and supplied from the down spouts of the roof. This should then be connected by pipes with the pumps, and thence with main vertical pipe in corner of store room, which extends up to the tank room in the mansard story.

On each floor from this extend distributing pipes, which are shown by blue lines on plans, to supply each wash basin and sink, and desk. These distributing pipes can be put between the floors, as they will outlast the floor unless frozen, and as the laboratory must be kept above the freezing point which would destroy the solutions &c., there will be no difficulty from the same.

It will be necessary to put in these very soon. The main vertical pipe also serves to fill tank in mansard whenever it is necessary, from the cistern outside.

Ordinarily this tank will be filled from the deck roof without pumping.

It will be necessary to run a small tell tale pipe ⅜ inch bore, down to engine room from tank, to show the janitor when tank is full. Overflow pipe from tank discharges into main gutter of the building.

5.—THE WASTE PIPE SYSTEM.

These pipes cannot be put in floors as they are liable to get choked, and will be best set vertically, to join horizontal pipes below basement story ceiling, which run into the ends of drains, formed in basement walls. Prof. Weber says these should be made of lead to resist chemical action; perhaps it would be cheaper to use iron, renewing it oftener.

6.—GAS SUPPLY AND DISTRIBUTION.

The gas main enters building on north end, east of steps, then under brick paving to connect with main vertical gas pipe in angle of store room, near water pipe. Gas pipes are shown in green, excepting those serving to light mansard story, which are in red.

On each floor the main pipe sends distributing pipes which carry the gas to each desk, gas hood, blow pipe and burner or ceiling of the story beneath.

These burners for the story immediately below are marked "G" on plans.

These gas pipes will need to be put in at once, or before the floor is laid, at least those which are put in the floor.

The gas and water can be shut off from each story where desired, for repairs, &c., without interfering with those of the rest of the building.

I submit these plans for heating, gas and water, to your consideration, requesting you to make such modifications or changes as you deem necessary, if they meet your approv-

al. I will then prepare the working drawings and specifications ready for the contracts, or such as you think proper to let at present.

The gas and water put in floors and a part of tin air flues will be needed very soon.

Very respectfully submitted,

N. CLIFFORD RICKER,
Prof. of Architecture, and Architect Chemical Laboratory.

Report referred to building committee.

On motion, the purchase of pamphlet cases for library was referred to Mr. Gardner and the regent, with power to act.

Upon a report from the librarian, the periodicals for next year were ordered to be continued the same as this year. A request for repairs of bindings was referred to Mr. Gardner and the librarian, with power to act.

An amount of $25 00 was added to a former appropriation for counter, etc., in bookkeeping room.

On motion, Dr. Gregory, Messrs. Sabin and McLean were appointed delegates to a convention at Columbus, Ohio, December 27th, 1877.

Dr. Gregory was authorized to attend the meeting of the state board of health, and an invitation was extended to said board, to use the university parlor for their meeting here on December 20th, 1877.

Authority was given to the regent and faculty to have the annual catalogues printed during winter term, 1878—cost not to exceed $200.

The farm committee made the following report, which was received:

CHAMPAIGN, December 5th, 1877.

To the Chairman and Trustees of the Industrial University of the State of Illinois:

The undersigned committee, appointed by your body, at the September meeting of your board, to examine and report relative to the working and condition (financially) of the farms belonging to the University, would beg leave to report that we have examined the accounts and statements of Mr. E. L. Lawrence, head farmer, and herewith submit his reports, accounts, etc., and desire the same may be made part of this report, the same being marked "A, B. C, D, E, F and G," respectively.

Your committee would also recommend that the stock farm, including the Busey and Griggs farms, should be under the control and superintendency of the head farmer, and that he be responsible for their proper management, and disposal of the products of the same, and that said head farmer shall, when called upon and when practicable, be subject to the orders of the professor of agriculture in the experimental farm, in furnishing horses, implements and labor for experiments in his department, and further, that the professor of agriculture shall, with the assistance of the head farmer, decide as to the manner or mode of treatment of all blooded stock belonging to the University. The purchase or sale of such stock shall be under the control of the board of trustees, or such committee as they may appoint for that purpose.

We would also recommend that proper books be obtained, opened and kept by the head farmer, wherein shall be entered each and every article, implement, stock or other property belonging to his department, together with the cost thereof (keeping such accounts separately, to-wit: stock, implements, products, labor and such other accounts as are necessary); also items of every name or nature sold from the farms, giving date and price of same, and to regularly charge all moneys for repairs, new implements and labor made or incurred during the year, and to render his account of same, when called upon by the board of trustees, and at the regular meeting of said board in the month of December of each year, showing in itemized form what property, stock, etc., with fair estimate of value of same on hand, together with statements of income from all products or other property sold from the farms during the year ending November 30, of each year hereafter.

And further recommend, that the head farmer shall keep an account of all such labor as he may furnish the several departments of the University, charging the same to the proper department, separate accounts of such labor, a statement of the same to be rendered to the board of trustees at their December meeting.

And further, that all field crops, fruits and other products raised on the experimental or horticultural farms, shall be sold by the head farmer, who shall account for the same in the manner and form designated and provided for in the stock farms.

We would further recommend, that the professor of agriculture shall designate what particular part or parts of the experimental farm he may desire for his use in his de-

partment, the remainder of said farm to be under the care and superintendency of the head farmer, who shall account for all produce raised on same in manner as provided on stock farms. All of which is respectfully submitted.

D. D. SABIN,
ALEX. McLEAN,
JOHN W. BUNN. } *Committee.*

Adjourned, to meet at University building at 8:30 a. m.

SECOND DAY'S SESSION.

The board assembled as per adjournment.

Prof. Ricker's request for fitting up carpenter shop was referred to executive committee, with power to act.

The bill of Mr. Hamburgher, clerk of supreme court of the state, to the amount of $25, was audited and allowed.

It was decided that the caps for the University battalion be changed from the present "navy" pattern in dark blue,—to the regulation cap of the U. S. infantry, same cloth and trimmings as the uniforms.

The committee on purchase of Durham cattle made the following report which was accepted:

Chairman Board of Trustees of Illinois Industrial University:

Committee to purchase Durham heifers, beg leave to report that we visited and examined the herds of Messrs. Winslow Sons, Kankakee, and J. G. Clark, Champaign, and corresponded with other parties, and after careful examination we purchased from Mr. J. G. Clark, Champaign, five two-year-olds and one yearling, for the sum of six hundred dollars, and from Messrs. Winslow Sons, Kankakee, four two-year olds, for $386 50, making the cost of the ten $986 50, being within the limit of price we were permitted to pay. Your committee further report that we deemed it inadvisable to purchase grade heifers at this time, as requested, or until we are further instructed by the board.

All of which is respectfully submitted,

D. GARDNER,
EMORY COBB,
G. E. MORROW. } *Committee.*

The following report from the business agent was read and received, the bills presented for audit were audited and ordered to be paid:

BUSINESS AGENT'S RFPORT.

ILLINOIS INDUSTRIAL UNIVERSITY, CHAMPAIGN, ILLS., Dec. 5, 1877.

Hon. Emory Cobb, President of Board of Trustees of Illinois Industrial University:

SIR:—I have the honor to make the following financial report, for the three months ending December 1st, 1877. Paper A is a statement of the current appropriations, including receipts and expenditures made under the same. Paper B gives the present condition of the state appropriations. Paper C is a list of warrants drawn in the three months, those from 162 to 220, inclusive, have not been issued, and are presented with vouchers for auditing. A few additional bills for auditing are presented in the same connection.

Respectfully submitted,

S. W. SHATTUCK, *Business Agent.*

"A."

STATEMENT *of Current Appropriations and Receipts, Nov.* 30, 1877.

ON ACCOUNT OF	APPROPRIATED.	RECEIPTS.	EXPENDED.	UNEXPENDED.
Board expense	$ 200 00		$ 75 75	$ 124 25
Salaries	16,300 00		7,302 48	8,997 52
Fuel and lights	2,000 00	62 61	832 98	1,229 63
Stationery and printing	200 00		110 43	89 57
Buildings and grounds	100 00	20 30	4 40	115 90
Incidental expense	200 00		43 33	156 67
Agricultural department	2,331 33	3,980 03	2,690 98	3,620 38
Horticultural "	213 84	137 51	152 09	199 26
Mechanical "	207 78	586 15	830 34	36 41
Architectural "	402 28	540 90	632 93	310 25
Chemical "	151 95	7 25	84 56	74 64
Military "	50 00		39 93	10 07
Special appropriations—				
Bookkeeping—checks, samples, etc	35 00		34 65	35
Plants and seeds for greenhouse	50 00		39 14	10 86
Chicago exp. Baker's exp	20 64		64 19	43 55
Court charges	11 55		7 05	4 50
Advertising, unexpended	69 50			69 50
Papyrograph for regent's office	35 00			35 00
Engineer's transit	550 00		30	549 70
Model of horse (state appropriation)	786 43			786 43
Microscopes, unexpended	17 57	16 27	12 31	21 53
Library and apparatus		31 17	11 59	19 58
Preparatory department		960 00	645 00	315 00
State appropriation			15,492 03	
Fees and room rents		2,474 50		
Illinois Central Railroad—freights		683 45	236 69	

"B."

STATEMENT *of State Appropriations, November* 30, 1877.

	APPROPRIATED.	EXPENDED.	UNEXPENDED.
Taxes on lands	$6,000 00	$2,194 24	$3,805 76
Repairs, etc.—buildings and glass	5,000 00	1,923 38	3,076 62
Current expenses—chem. and phys. lab'tories	2,000 00	396 10	1,603 90
" " and instruction in shops	3,000 00	470 16	2,529 84
Library cases	2,000 00	604 17	1,395 83
Books and publications	3,000 00	531 09	2,468 91
Cabinet cases	4,500 00	1,031 07	3,468 93
Cabinets	2,000 00	436 08	1,563 92
Chemical laboratory	40,000 00	14,341 21	25,658 79
Greenhouse	2,500 00	1,915 57	584 43
	$70,000 00	$23,843 07	$46,156 93

List of Warrants Drawn.—Continued.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
1	R. B. Mason	Expense to meeting	$ 10 00
2	Alex. McLean	" "	46 85
3	D. D. Sabin	" "	18 90
4	I. O. Baker	" to Chicago Exposition	20 64
5	N. C. Terrell & Co.	Extra work on chemical laboratory	300 69
6	N. C. Ricker	Expense on plans "	21 90
7	Architectural Department	Work and material "	6 53
8	W. A. Balcom	" on plans "	5 00
9	Mary L. Page	" " "	23 37
10	Seeley Brown	Services as superintendent engineer	100 00
11	J. M. Gregory	Expense on chemical laboratory	14 60
12	E. T. Whitcomb	Charges as clerk of court	7 05
13	N. A. Williams	2 bbls. cement	10 00
14	J. M. Gregory	Salary, Sept, 1877	300 00
15	S. W. Robinson	" "	150 00
16	T. J. Burrill	" "	150 00
17	S. W. Shattuck	" "	150 00
18	E. Snyder	" "	150 00
19	D. C. Taft	" "	150 00
20	J. B. Webb	" "	150 00
21	J. C. Pickard	" "	150 00
22	N. C. Ricker	" "	125 00
23	H. A. Weber	" "	150 00
24	J. D. Crawford	" "	125 00
25	G.E. Morrow	" "	150 00
26	E. L. Lawrence	" "	83 33
27	L. C. Allen	" "	100 00
28	F. W. Prentice	" "	100 00
29	F. A. Parsons	" "	75 00
30	I. O. Baker	" "	75 00
31	M. A. Scovell	" "	65 00
32	C. I. Hays	" "	75 00
33	P. Baumgras	" "	100 00
34	Chas. E. Pickard	" "	45 00
35	J. C. Lewellyn	" "	40 00
36	J. E. Gregory	" "	25 00
37	A. B. Baker	" "	40 00
38	C. W. Williams	" "	30 00
39	E. A. Kimball	" "	83 33
40	Seeley Brown	" "	100 00
41	N. C. Terrell & Co.	Work for September	4,639 71
42	Trevett & Green	Hardware	14 74
43	A. E. Foote	Collection of minerals	137 50
44	G. E. Morrow	Chemicals and hardware	3 15
45	W. A. More	Hardware	2 00
46	Jones & Laughlins	"	6 25
47	Crane Bros. Mfg. Co.	"	73 42
48	" "	"	35 80
49	Amos Beard	Work on hay forks	6 40
50	J. J. Spaulding & Co.	4 M. circulars	32 00
51	C. D. Webster	500 ft. ash lumber	15 00
52	The Victor S. M. Co.	1 micrometer caliper	4 50
53	E. B. Benjamin	50 nests beekers	49 25
54	F. W. Christern	Books	3 12
55	American Library Journal	"	5 00
56	W. F. Pratt	Repairs on roof	6 50
57	E. A. Robinson	Work on heating apparatus	41 65
58	Crane Bros. Mfg. Co.	Hardware	3 30
59	E. A. Pratt	Setting glass	3 00
60	C. & U. Gas Co.	Gas bill July and August	19 20
61	Agricultural Department	Farm expense September	700 29
62	Andrew Barr	Lumber and work, green house	53 50
63	Thomas Parks	Cleaning well	5 00
64	Fuller & Fuller	1 bbl. oil	25 72
65	L. W. Walker	Lumber	2 75
66	American Unitarian Ass'n	Express on books	2 25
67	Thos. Wright	1,371 lb castings	68 55
68	U. S. Patent Office	6 volumes reports	15 60
69	I. B. & W. R. W. Co.	Freights	4 72
70	Darling, Brown & Sharp	Implements and tools	7 48
71	George Ely	½ ton Blossburg coal	5 00
72	Fuller & Fuller	Glass	23 48
73	John Hensel	17½ days work on boiler	22 24
74	Workmen's pay roll	Green house	99 15
75	Baldwin Bro's.	Freight on books	14 51
76	Students' pay roll	September 1877	304 23

List of Warrants Drawn.—Continued.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
77	C. & U. Gas Co	Gas bill September	41 70
78	Goodnow & Wrightman	Tools	19 81
79	John G. Clark	6 short horn heifers	600 00
80	U. S. Express Co	Express on castings	2 65
81	W. A. Moore	Hardware	3 39
82	C. E. Roberts	Screws	3 03
83	W. M. Kennedy	Advertising	12 50
84	I. O. Baker	Expense to Ohio exposition	13 75
85	Stock Journal Co	Advertising	25 00
86	Cleveland Paper Co	Paper for com'l dep't, currency	12 65
87	Hubbard & Sons	Iron	2 98
88	Enterprise Coal Co	7 cars coal	101 40
89	Richmond & Sons	1 bushel wheat	1 50
90	Brown Bro's	Hardware	10 30
91	C. & U. Gas Co	Gas bill for May	36 60
92	L. V. Manspeaker	Soda, brushes etc	20 05
93	Backus Oil Co	1 bbl. Oil	23 20
94	J. M. Gregory	Salary, Oct., 1877	300 00
95	S. W. Robinson	" "	150 00
96	T. J. Burrill	" "	150 00
97	S. W. Shattuck	" "	150 00
98	E. Snyder	" "	150 00
99	D. C. Taft	" "	150 00
100	J. B. Webb	" "	150 00
101	J. C. Pickard	" "	150 00
102	N. C. Ricker	" "	125 00
103	H. A. Weber	" "	150 00
104	J. D. Crawford	" "	125 00
105	G. E. Morrow	" "	150 00
106	E. L. Lawrence	" "	83 33
107	Lou. C. Allen	" "	100 00
108	F. W. Prentice	" "	100 00
109	P. Baumgras	" "	100 00
110	F. A. Parsons	" "	75 00
111	I. O. Baker	" "	75 00
112	M. A. Scovell	" "	65 00
112	C. I. Hays	" "	75 00
113	Chas. E Pickard	" "	45 00
114	E. A. Kimball	" "	83 33
115	J. C. Lewellyn	" "	40 00
116	C. E. Gregory	" "	25 00
117	A. B. Baker	" "	40 00
118	C. W. Williams	" "	30 00
120	Champaign Gazette	15 thousand impressions currency	15 00
121	C. G. Carleton	Files	17 84
122	G. E. Morrow	Books	3 50
123	C. G. Carleton	Hardware	25 22
124	James Ralph	Mason work and repairs	79 62
125	Walker & Mulliken	1 doz. office chairs	17 00
126	Luddington, Wells & VanSchick	Lumber	153 43
127	Bott, Hammersley & Co	Flower pots	33 85
128	G. Deuerlich	Books and publications	223 96
129	Seeley Brown	Sup't service chemical laboratory, Oct.	100 00
130	Chicago Floral Co	Boiler & pipes for green house	677 25
131	N. C. Terrell & Co	Material & work, laboratory, Oct	3,856 85
132	Student's Pay Roll	October, 1877	278 30
133	Agricultural Department	Farm expense, Oct	353 44
134	Winslow & Son	Fine stock	386 50
135	Labor Pay Roll	Work on green house	111 80
136	J. M. Gregory	Salary, Oct., 1877	300 00
137	S. W. Robinson	" "	150 00
138	T. J. Burrill	" "	150 00
139	S. W. Shattuck	" "	150 00
140	E. Snyder	" "	150 00
141	D. C. Taft	" "	150 00
142	J. B. Webb	" "	150 00
143	J. C. Pickard	" "	150 00
144	N. C. Ricker	" "	125 00
145	H. A. Weber	" "	150 00
146	J. D. Crawford	Salary, Nov., 1877	125 00
147	G. E. Morrow	" "	150 00
148	E. L. Lawrence	" "	83 33
149	L. C. Allen	" "	100 00
150	P. Baumgras	" "	100 00
151	F. A. Parsons	" "	75 00
152	I. O Baker	" "	75 00
153	M. A. Scovell	" "	65 00
154	C. I. Hays	" "	75 00

List of Warrants Drawn.—Concluded.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
155	C. E. Pickard	" "	$45 00
156	E. A. Kimball	" "	83 33
157	J. C. Lewellyn	" "	40 00
158	J. E. Gregory	" "	25 00
159	A. B. Baker	" "	40 00
160	C. W. Williams	" "	30 00
161	F. Braum & Co	10,000 geological specimens	100 00
162	R. J. Halliday	Plants	25 79
163	R. A. Sutton	Brick	37 60
164	H. Peddicord	Plaster and lumber	21 00
165	Smith, Vail & Co	Packing, rubber, etc	1 50
166	N. A. Williams	Drain tile	92 92
167	Crane Bro's. Manuf'g Co.	Hardware	15 10
168	Jno. Wilkinson	Paper, etc	3 10
169	Webster & Wallace	Lumber	47 80
170	W. F. Pratt	Repairs on roof	11 40
171	Jones & Laughlins	Hardware	6 05
172	Goodnow & Wightman	"	6 83
173	The Illini	Notices and cards	3 00
174	J. P. Daig & Co	Hardware	15 98
175	Amos Beard	Forging hay forks	4 50
176	Champaign County Gazette	4,000 samples & checks for book page	7 00
177	Sylvester Ogg	Brick	5 47
178	Jno. Knight	Sheet lead	7 37
179	Hubbard & Son	Hinges	3 30
180	Champaign County Gazette	Periodicals	4 25
181	A. P. Armstrong	Geological specimens	3 00
182	Backus Oil Co	50 gallons Oil	20 00
183	J. O'Neil	Plumbing and soldering	29 73
184	S. B. Davis	Sand and gravel	16 00
185	E. E. Pratt	Glazing	2 00
186	U. S. Patent Office	Reports	7 80
187	Locke & Saxton	Paper	9 58
188	C. H. Cady	Hardware	9 20
189	Walker & Mulliken	20 stools	17 00
190	Crane Bro's Manuf'g Co	Packing	87
191	Thos. Wright	Castings	21 10
192	Trevett & Green	Hardware	3 10
193	Fuller & Fuller	Vitriol and insulators	7 03
194	Thos. Franks	Plants	13 35
195	I. B. & W. R. W	Freight	7 04
196	C. & U. Gas Co.	Bill for October, 1877	49 50
197	Mason & Davis	Castings	10 45
198	Trevett & Green	Hardware	16 60
199	Mechanical Department	Work for other departments	200 25
200	Agricultural Department	" " "	107 20
201	Agricultural Department	" on grounds	56 42
202	George Hanks	Sand	2 25
203	H. A. Brown	Boarding workmen	2 50
204	Agricultural Department	Labor and material, laboratory	158 52
205	Trevett & Green	Hardware	28 07
206	Jno. B. Weeks	Drayage	9 00
207	Enterprise Coal Co	16 cars coal	234 00
208	Lyon & Healy	Band instruments	30 00
209	I. C. R. R. Co	Freights advanced	4 80
210	Agricultural Department	Work for other departments	485 95
211	E. W. McAllister	Postage, Oct. and Nov	26 00
212	I. C. R. R. Co., Donation	Sept., Oct. and Nov., freights	683 45
213	D. C. Taft	Expense for cabinets	5 35
214	Brown & Henderson	Plastering green house	56 00
215	J. B. Sober	Carpenter work on green house	17 60
216	S. W. Shattuck	Petty expense, Nov. Oct. & Sept	45 18
217	Seely Brown	Salary, sup't chemical laboratory	100 00
218	Student's Pay Roll	November, 1877	278 13
219	N. C. Terrell & Co	Work on laboratory, Nov	2,860 25
220	Agricultural Department	Farm expense	236 69

Prof. Burrill's report on the construction of new green house was read and referred to the building committee.

A committee consisting of Messrs. Pickrell, McLean and Gardner, were appointed to report on the future management of the University farms and lands.

Recess taken until 3 p. m.

AFTERNOON SESSION.

Board met as by adjournment.

Mr. P. N. Endsley's bill for reporting (short hand) certain court proceedings, amounting to $6. was allowed.

A request from Mr. Canady to erect a temporary blacksmith's shop on University grounds was not granted.

Dr. Gregory nominated Mr. E. L. Lawrence, to be continued head farmer for next year, which was confirmed.

The regent and Prof. Morrow were authorized to correspond with the state board of agriculture in regard to a contemplated trial of agricultural implements on University farm.

Dr. Gregory was authorized to apply to the chief signal officer for the establishment of a station at the University.

Mr. McLean, chairman of the building committee, presented the following report upon Prof. Ricker's recommendations in regard to the heating apparatus for the new laboratory building:

CHAMPAIGN, Dec. 7th, 1877.

To the Chairman and Board of Trustees of the Illinois Industrial University:

The undersigned, laboratory building committee, would beg leave to report that we have carefully examined the plans made by Profs. Ricker and Robinson, relative to heating apparatus for laboratory building; also gas and water piping, and from information given us by said Robinson and Ricker, we would recommend as follows:

1st. That Profs. Ricker and Robinson make out full and complete plans and specifications for the heating apparatus, so that we can solicit bids for putting in the same according to the plans and specifications submitted to us, and that their report be acted on by the board or such committee as they may select.

2d. We would also recommend that said Profs. Ricker and Robinson be requested to submit a bid or estimate for said work, also estimate for heating by steam radiators as in main building, from our own mechanical department.

3d. We would recommend that gas and water piping be at once commenced and finished by our mechanical department, under superintendence of Profs. Robinson and Ricker, and according to plans as submitted to your committee, authorizing them to make such changes as may be thought advisable and prudent. We would also recommend that Prof. Ricker be requested to furnish tracings of plans for heating apparatus, for heating the laboratory, and submit the same to Crane, Breed & Co., of Cincinnati, Ohio, for their estimate and bid on said work.

Respectfully submitted,

A. McLEAN,
D. GARDNER, } Committee.
R. B. MASON.

The report was adopted and the building committee instructed to carry out its provisions.

A request from Mr. E. A. Robinson, late foreman of the shops, for additional pay, amounting to $45, was not granted.

The chairman of the building committee then submitted the following report in regard to the new greenhouse :

CHAMPAIGN, Dec. 6th, 1877.

To the Trustees of the Illinois Industrial University:

Your committee to whom was referred the building and completion of the green house, beg leave to report that:

The state appropriation for that purpose was		$2,500 00
There has already been expended as per Prof. Burrill's report	$2,364 71	
There is still required for some petty expenses	15 00	
For furniture for north-east room and apparatus for botanical investigation and experiments	75 00	
For painting outside brick work	30 00	
		2,484 71
		$ 15 29

Your committee would recommend the additional expenditure mentioned above, amounting to one hundred and twenty dollars, and the balance of the appropriation may be used in painting the roof, if sufficient to do so, but on no account to exceed the entire appropriation.

Respectfully submitted,

A. McLEAN,
D. GARDNER,
R. B. MASON. } Committee.

The report was accepted, and its recommendations agreed to.
Adjourned.

MEETING OF THE BOARD OF TRUSTEES, MARCH 12, 1878.

The board met, pursuant to call, at 3 o'clock, p. m., in the University parlor.

Present Messrs. Byrd, Brown, Cobb, Gardner, Mason, McLean, Pickrell and Sabin.

Absent, Gov. Cullom, Hon. Gillham and Flagg.

The scriptures were then read by president Cobb, and prayer offered by Prof. Morrow.

The minutes of the last meeting were read and approved.

The regent then read the following report, which was received:

REGENT'S REPORT FOR THE QUARTER ENDING MARCH 12, 1878.

To the Trustees of the Illinois Industrial University:

GENTLEMEN: I present you my quarterly report as required by law. The University is near the close of the second term of the most prosperous year of its history. The attendance has not thus far exceeded that of some years before the panic, but a much larger proportion of the students have been of advanced standing. The total attendance for the two terms of the year, is 377, against the total of 388 for the three terms of the last year. The usual accessions of the spring term will carry the whole number for the year above that of last year. There has been an increase of male students over that of any former year, but the number of female students has for some reason fallen off.

THE COLUMBUS CONFERENCE.

In accordance with your instructions, I attended the conference of presidents and representatives of the state colleges and universities,

called in accordance with your suggestions, at Columbus, O. The proceedings of the conference will be published by the national bureau of education, under the charge of Gen. Eaton, its chief, who was present and took part in its discussions. The question of college degrees, which was referred by you to the conference, and which I had the honor to present in an elaborate paper, was discussed with great fullness, interest and candor. There was not entire harmony of opinion upon all the points involved; but there seemed to be the most perfect agreement in the conclusion, that the conferring of the common degrees, for the full and satisfactory completion of a thorough course of study, is a usage too wise and useful in itself, and too firmly knit in with the whole system and theory of our higher education, to be now dispensed with. Its value as a means of stimulating earnest study, and of counteracting the strong tendency among our college students to abbreviate their courses of study, is too important to allow its discontinuance. The abuses of these degrees by institutions which have granted them for insufficient studies, or as mere literary honors, was not considered as a sufficient reason for their rejection, but rather as requiring on the part of the state colleges an effort to establish and maintain a truer and higher standard. The final report of the conference on this subject, after a careful and protracted consideration of all its clauses, has been published in the Illini, a copy of which I append.

It having become necessary to prepare a new catalogue and circular for the University, the faculty took up the consideration of the subject, and after long and patient consideration, adopted the following programme for degrees which has already been submitted to the several members of the board by letter. Several minor changes in some of the courses of study have also been suggested by the faculty, to which your approval is asked.

DIPLOMAS.

The adoption of these degrees necessitates the preparation of several forms for diplomas which should, if possible, be printed and ready for use at the next commencement. It is the common usage of American colleges, as indeed it is also in Europe, to charge a graduating fee to cover the expense of the diplomas, &c. The committee of the faculty to which this matter was referred, recommend that a fee of five dollars be established and charged for all diplomas conferring degrees.

Certificates are also needed for those who complete the course of the school of design, and the school of commerce. New certificates must also be provided for the general students, not candidates for degrees, but who are entitled under the law to certificates of the work done by them in their studies.

LIBRARY.

The purchases authorised by you for the library have been made at a satisfactory rate. Some of the books selected had to be imported, and as they have not as yet come to hand, the entire amount of the bills

cannot as yet be given; but they will fall, it is believed, within the amount of the state appropriation for the year.

The library cases, including the cases for pamphlets, authorized by your votes, are now complete. The remainder of the appropriation for library books and cases will soon be available, and it is desirable that lists of books be purchased, and plans for the completion of cases, be agreed upon as soon as practicable. I again recommend the continuance of the gallery across the south end of the library hall, and the addition of a few alcove cases on the east side, the railing being moved a few feet northward from the present alcove cases to allow room for the additional ones. The cases in the southeast corner may also be made to correspond with those opposite, and thus allow more light to be thrown into the room. As the appropriation will easily cover the expense, I recommend that there be also provided a librarian's table of suitable size and construction, in the place of the present one borrowed for his use from the draughting rooms. It should be amply provided with drawers and closets, and a case for the mail boxes.

The librarian also asks that some shelves shall be provided for the large folio volumes, belonging mostly to the engineering department, and too large for any of the shelves now in the cases.

CABINET AND MUSEUM.

The report of Professor Taft, of the expenditures from the state appropriation for the museum, will show how economically these expenditures have been made. In accordance with your votes, Mr. Geo. A. Wild was engaged and entered upon service, as taxidermist, the first of February. In addition to his work upon the skins in store, Mr. Wilde has succeeded in procuring many specimens from the locality, and has thus added to the extent and value of our collections. We have also had occasion to call upon his services as an instructor in our preparatory classes, and have thus diminished somewhat the draft made upon the museum fund. His work will be needed during the coming term in the mounting of the specimens already on hand, and I hope we may be able to avail ourselves of his services permanently in the department for which he is so well fitted.

The work on the museum cases of the lower tier is nearly finished, and the shops will soon be ready to begin upon the gallery.

There remains of the appropriation for the cabinets for the past year, as shown by the report of the business agent, an unexpended balance of $235.69. The appropriation for the current year will be $1,000. I recommend that the expenditure of this fund be intrusted to the same committee as last year, and that they be authorized to employ Mr. Wilde for such time as his services may be needed as taxidermist and osteologist. Prof. Taft judges that the specimens required in natural history can be obtained in this way for one half what they will cost if bought from the regular dealers. And he adds as an additional advantage, that Mr. Wild will teach a class in taxidermy, and thus increase the usefulness of the department, and secure many specimens from the contributions of our own students. I think the trustees will be gratified with the evident progress made in this important and interesting branch of our work.

AGRICULTURAL DEPARTMENT.

The report of Prof. Morrow, herewith presented, will show the most interesting facts in connection with the college of agriculture. I would ask attention to both his and Mr. Lawrence's suggestions in regard to experiments.

The farmers' institute, held in January was well attended, and seemed to be highly appreciated by those who attended its sessions. The desire was quite frequently expressed to have it repeated another year. No compensation was promised or expected by the gentlemen who gave us lectures, but it seems just that their traveling expenses shall be refunded. I communicate herewith a list of these lecturers, with a statement of their expenses.

The new experiment in elementary shop practice has been so successful that the thought has occurred to Professors Robinson and Ricker, of holding a summer session of two months, in the city of Chicago, as a means of more thoroughly advertising their respective schools. The great success of the mechanic arts school at the Massachusetts institute of technology, has aroused much interest in the subject over the entire country. We have an application from Peoria, to take part in such a summer session in that city. The plan of the proposed summer session in Chicago contemplates a course of lessons in wood working, and another course in working in iron and brass. The aim of these lessons is to teach the use of all the tools necessary to produce all the varieties of forms in wood and iron ever required in ordinary structures or manufactures. In learning this use of tools, the pupil also learns to produce the forms themselves, and thus he gains in the quickest and most effective way the very alphabet of the mechanic arts.

The plan has already been presented to the notice of some of the most competent judges of such matters in Chicago, and has met their warm approval. Room is offered for the school, free of rent in the exposition building. It is proposed to charge a fee sufficient to cover the cost of advertising, materials, tools and instruction. It is asked of the trustees that they shall authorize the experiment to be made and perhaps allow the use of such tools as may be spared from the shops, the professors being responsible for their safe return in good condition. It will be necessary to provide many tools that the shop cannot supply, such as vices, lathes and sets of bench tools. The expense of these must be covered by the fees to be charged. The classes will necessarily be limited to about sixteen each, but two classes can be taught each day, one occupying three hours in the forenoon, and the other three hours in the afternoon. If authorized by the board, further inquiries will be made, and if sufficient encouragement is obtained, the necessary preparations will be made to open the school about the 20th of June. In conclusion, I respectfully refer to your consideration the petition of the professors named.

HORTICULTURAL.

The report of Prof. Burrill, to which attention is asked, gives a statement of the progress and some of the wants of the horticultural

department. Will not the appropriation for buildings and grounds be properly chargeable with the cost of the lawn mowers needed to keep the grounds in good order? The plants in the green houses are presenting a fine appearance, and the florist has on hand a large number for beautifying our own grounds and for sale. He has succeeded by exchanges in adding largely to the collection, and in making the green house still more useful for the purposes of study.

BUILDINGS AND GROUNDS.

The work authorized to be paid from the state appropriation has not as yet been all accomplished. The painting in the chapel, and the setting of the new gates have been delayed for various reasons, but it is hoped they may be soon completed. It has been suggested that a high and close board fence, built from one of the wings of the main building to the other, so as to inclose the rear quadrangle, would prevent the eddies of wind which carry so much dust into the rooms facing upon this court, and would also prevent the intrusion of persons who sometimes ascend the rear balcony and piazza.

MILITARY PROFESSORS.

In accordance with the instruction of the board, application was made to the war department for the detail of an officer of the army, to act as military instructor. This application was actively endorsed by Hon. J. C. Cannon and Hon. H. C. Burchard, of this state, resulted in procuring the detail of Lieut. W. A. Dinwiddie, of the cavalry, who entered upon duty as professor of military tactics the — day of January.

I present herewith a request of Prof. Dinwiddie, for an appropriation for the purchase of 11 swords for the captains of the companies. The expense will not probably exceed $150, which I recommend to your favorable consideration if the funds of the department will allow it.

THE NEW CHEMICAL BUILDING.

The new laboratory building will doubtless be finished before our next annual commencement. I would suggest the propriety of connecting some appropriate inauguration or dedication of it, at the time of commencement. It will be one of the largest and finest laboratory buildings on this continent, and we may well ask attention to it as adding immensely to our facilities for instruction in this department.

VETERINARY CLASSES.

The classes in veterinary science have been suspended during this term, Dr. Prentice having leave of absence. He has now returned and the class will be reorganized. The model of the horse in *papier mache*, ordered from Paris, is now on its way here, the shipping papers having been received a week ago.

THE PARIS EXPOSITION.

Letters have been received from Hon. John Eaton, the commissioner of education, and from Hon. J. D. Philbrick, superintendent of educational exhibit at Paris, asking us to participate in the exhibition. Articles designed for exhibition are required to be in Washington by the last of this month. It is however quite possible that a later shipment will have to be made, by the commissioner. We can with little expense, send some documents, some photographs of the university, some sets of the shop-practice work, and some portfolios of drawings from our school of design, and the schools of architecture and engineering. With the approval of the board, I will see that some worthy and proper representation of the University shall be made.

Some weeks ago, I received a telegram from the governor requesting my presence in Springfield, and on going over, was asked by him to accept an appointment as one of the commissioners to the Paris exposition, allotted by the act of congress to this state. The post is wholly without compensation, but the wish of the governor is to send some who will be able to make a report of such facts as may be of interest and value to the people of Illinois. The object is certainly an important one, and after consulting with such of the trustees as I could reach in person, or by letter, in agreement with their advice I signified my acceptance, and commissions both from the governor and the president have been sent me. I do not wish to go without the explicit approval of the board, as my first duty is due to you and to the University. I shall not expect to leave till after commencement, and shall hope to be back by the opening of the fall term, or at least within two or three weeks of that time.

I have proposed to the governor the preparation of a handsome pamphlet containing a sketch of the history of the state, together with full statistics and descriptions of its situation, extent, resources, agriculture, manufactures, commerce and educational institutions. Such a pamphlet, freely circulated at the exposition, will do much to make the state and its institutions known to the world.

In this connection, I may, without impropriety, state that my service upon the state board of health, during the last quarter, has occupied but two days of time, and has taken me but twice from my post and work here. It is true that I have failed to attend two of the meetings of the board, but these meetings were for the examination of physicians, and I declined to leave my work, believing that these examinations are more properly the duty of the medical members of the board.

I have sent the Smithsonian Institute, a request in your name, for the specimens of Indian fabrics, implements, and other collections due the University from the Powell expedition. No reply has as yet been received.

I have also prepared the application authorized by you to the signal service bureau, for the establishment of a station at this point, but I have delayed to send it till I can make some communications with our member of congress, who promises to aid us in securing the desired result. The application will now be forwarded immediately.

J. M. GREGORY, *Regent.*

The following rules in regard to the matter of conferring degrees, were adopted:

DEGREES.

WHEREAS, on petition of the alumni, the last general assembly of the state enacted that "on recommendation of the faculty, the trustees may authorize the regent, as president of the University, to issue diplomas to such persons as shall have completed satisfactorily the required studies, and sustained the examination therein, conferring such literary and scientific degrees as are usually conferred by universities for similar or equivalent courses of studies, or such as the trustees may deem appropriate." Approved May 11, 1877. And

Whereas, before exercising the power granted by this act the trustees deemed it wise to ascertain fully the views of other institutions of similar charcter, and especially of those organized under the same congressional grant, a conference of the leading officers of these institutions was held in Columbus, Ohio, Dec. 27, 1877. The institutions represented concurred unanimously in the utility of degrees when properly conferred, and all except this University had already introduced them. In accordance with the decision of the conference, the following system of degrees were adopted for the University:

1. All studies will remain as heretofore- free. Each student may choose and pursue such studies as he may desire, subject only to such conditions as to preparation, times of study, and number of studies as may be necessary to secure efficiency in classes and economy in teaching.

2. But students who wish to be candidates for any degree, must complete fully the course of studies prescribed for such degree.

3. Students not candidates for any degree will be enrolled as special students, and will receive at the close of their attendance, if not less than a year, the certificates provided by law, with statement of work done and of credits attained.

4. It is designed that the requirements for all the bachelors' degrees shall be, as nearly as possible, equal in amount and value.

5. The degree of bachelor of science, B. S., will be given to those who complete either of the courses of studies in the colleges of engineering, agriculture, or natural science, or in domestic science. The name of the school will be inserted after the degree.

6. The degree of bachelor of letters, B. L., will be given to those who complete the course in the school of English and modern languages.

7. The degree of bachelor of arts, B. A., will be given to those who complete the course in the school of ancient languages.

8. The masters' degrees, M. S., M. L., and M. A., and the equivalent degrees of C. E., M. E., &c., will be only given to those who have pursued and passed examinations on a year of prescribed post-graduate studies, and presented an accepted thesis, or after a term of successful practice with a thesis.

The businesss agent then submitted the following report:

BUSINESS AGENT'S REPORT.

CHAMPAIGN, ILLS., March 12th, 1878.

Hon. Emory Cobb, President Board of Trustees of Illinois Industrial University:

SIR:—I have the honor to make the following financial statement for the six months ending February 28th, 1878. Paper A is a statement of the current appropriations and expenditures under the same for the six months. Paper B is a statement of the state appropriations, February 28th. Paper C is a list of warrants drawn in the last three months, the vouchers for the same, from 382 to 441, inclusive, are presented for auditing. Paper D is a package of bills which are presented for your action.

Respectfully submitted,

S. W. SHATTUCK, *Business Agent.*

"A."

STATEMENT *of Current Appropriations and Receipts February* 28, 1878.

ON ACCOUNT OF	APPROPRIATED.	RECEIPTS.	EXPENDED	UNEXPENDED.
Board expense	$200 00	.....	$114 15	$85 85
Salaries	16,300 00	.....	14,746 11	1,553 89
Buildings and grounds	100 00	55 30	30 21	125 09
Fuel and lights	2,000 00	162 56	1,605 52	557 04
Stationery and printing	269 50	9 00	256 70	12 80
Mechanical department	207 78	1,776 54	1,650 07	334 25
Architectural "	402 28	1,632 51	1,129 47	839 08
Agricultural "	2,331 33	4,703 61	4,189 44	2,690 54
Horticultural "	263 84	270 16	686 96	152 96
Chemical "	151 95	200 16	174 07	178 04
Military "	50 00	1 65	56 32	4 67
Library and apparatus	.....	34 71	15 58	19 13
Incidentals	200 00	.....	146 64	43 36
Special appropriations—				
Bookkeeping, checks, currency, samples, etc	35 00	.....	34 65	35
Chicago exposition	64 19	.....	64 19	.....
Court charges	38 05	.....	38 05	.....
Papyrograph	50 00	.....	50 00	.....
Engineer's transit	550 00	.....	30	.....
Model of horse	786 43	.....	824 97	38 54
Microscopes	17 57	16 27	29 37	4 47
Preparatory department	.....	1,813 00	1,185 00	628 00
State appropriations	70,000 00	.....	23,376 06	.....
Fees and room rents	.....	4,681 00	.....	4,681 00
Illinois Central Railroad—donation	.....	1,043 65	.....	1,043 65

URBANA, March 11th, 1878. S. W. SHATTUCK, *Business Agent.*

"B."

STATEMENT *of State Appropriations February* 18, 1878.

	APPROPRIATED.	EXPENDED.	UNEXPENDED.
Taxes on lands	$6,000 00	$2,194 24	$3,805 76
Repairs, etc.—buildings and grounds	5,000 00	2,445 96	2,554 04
Current expenses—chem. and phys. lab'ties	2,000 00	481 20	1,518 80
" " and instruction in shops	3,000 00	1,005 16	1,994 84
Library cases	2,000 00	1,096 95	903 05
Books and publications	3,000 00	1,381 90	1,618 10
Cabinet cases	4,500 00	1,305 66	3,194 34
Cabinets	2,000 00	764 31	1,235 69
Chemical laboratory	40,000 00	18,933 15	21,066 85
Greenhouse	2,500 00	2,138 57	361 43
	$70,000 00	$31,727 10	$38,272 90

URBANA, March 12th, 1878. S. W. SHATTUCK, *Business Agent.*

List of Warrants Drawn.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
221	N. C. Terrell & Co....	Work on chem. laboratory, Dec. 1 to 6..	$678 20
222	S. Brown	Laying drain tile	40 41
223	J. F. Moore	Work on plans	2 59
224	Agricultural department	Work for Hort. department	371 05
225	Thomas & Smith	1 short horn bull	300 00
226	Architectural department	Power for fall term	60 00
227	Mechanical departmeni	" " "	60 00
228	The Illini	Advertising	16 67
229	S. W. Walker	Walnut and screws	1 62
230	C. D. Webster	Hardware	3 40
231	Burt & Smith	Brooms	2 00
232	A. Snedeker	Castings	3 70
233	J. W. Shuck	Sheet zinc	8 50
234	H. Swannell	6 thermometers	2 50
235	J. C. Crannell	Hickory plank	2 80
236	Webster & Wallace	Lumber	3 62
237	Schoff & Moore	5,000 circulars	20 00
238	R. A. Sutton	Brick	9 00
239	P. M. Endsley	Reporting cases	6 00
240	Horticultural department	Rent of house	67 00
241	J. M. Gregory	Salary, Dec., 1877	300 00
242	S. W. Robinson	" "	150 00
243	T. J. Burrill	" "	150 00
244	S. W. Shattuck	" "	150 00
245	E. Snyder	" "	150 00
246	D. C. Taft	" "	150 00
247	J. B. Webb	" "	150 00
248	J. C. Pickard	" "	150 00
249	N. C. Ricker	" "	125 00
250	H. A. Weber	" "	150 00
251	J. D. Crawford	" "	125 00
252	G. E. Morrow	" "	150 00
253	E. L. Lawrence	" "	83 33
254	L. C. Allen	" "	100 00
255	P. Baumgras	" "	100 00
256	F. A. Parsons	" "	75 00
257	I. O. Baker	" "	75 00
258	M. A. Scovell	" "	65 00
259	C. I. Hays	" "	75 00
260	Chas. E. Pickard	" "	45 00
261	E. A. Kimball	" "	83 30
262	J. C. Lewellyn	" "	40 00
263	J. E. Gregory	" "	25 03
264	A. B. Baker	" "	40 00
265	C. W. Williams	" "	30 00
266	Charlotte E. Patchen	Salary fall term	25 00
267	A. E. Gregory	" "	25 00
268	H. B. Sparks	" "	20 00
269	J. H. Pickrell	Expense to meeting	11 50
270	D. D. Sabin	" "	23 65
271	City of Urbana	Lumber for sidewalk	63 80
272	A. B. Baker	Oil, putty, glass, &c	3 20
273	E. A. Pratt	Glazing	1 60
274	Brown, Holloway & Co	II vol. Ency. Brit	5 50
275	E. Hamburger	Costs of suits	25 00
276	N. C. Terrell & Co	Extras on chem. lab	132 22
277	N. C. Terrell & Co	Work and material, Dec	2,438 65
278	N. C. Terrell & Co	Extra skylight and connecting	100 05
279	Seeley Brown	Service as supt, Dec	100 00
280	Chas. Hendy	Painting and glazing	105 00
281	W. A. Moore	Hardware	3 85
282	N. C. Terrell & Co	Cement and lime	14 88
283	U. S. Express Co	Expressage	2 00
284	O. W. Fox	Books	15 00
285	C. J. Sabin	5 tons coal	19 00
286	Geo. A. Wild	Cabinet specimens	200 00
287	Thos. Wright	Castings	3 25
288	H. Jefferson	Teaming	24 25
289	Stearns & Co	1 barrel stucco	2 55
290	Jansen, McClurg & Co	250 Pamphlet cases	38 25
291	G. C. Willis	Window shades, &c	6 57
292	Jones & Laughlins	Hardware	9 75
293	E. A. Pratt	Glazing	3 00
294	Thomas Wright	Casting	12 70
295	W. E. Knibloe	Work in museum	22 95
296	Trevett & Green	Hardware	6 60
297	E. V. Peterson	Stationery, etc	18 62

List of Warrants Drawn.—Continued.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
298	Jas. Vick	Plants	$ 1 15
299	P. Henderson	Seeds	3 55
300	Robt. McRea	Work on greenhouse	5 70
301	Agricultural department	Expense Dec. 1877	249 76
302	John O'Neil	Work and material	16 60
303	L. E. Patchen	Use of piano	3 50
304	T. Montgomery	Plants	4 00
305	I. O. Baker	Books	1 30
306	Jas. McFarren	15 hours work	3 00
307	H. C. Core	1 clock	3 50
308	C. H. Blackall	Books	10 65
309	C. & U. Gas Co	Gas bill Nov. 1877	85 40
310	E. V. Peterson	Books	679 16
311	Chicago Floral Co	Plants	3 40
312	Crane Bros. mfg. co	Iron pipe, etc	154 89
313	Students' pay roll	December, 1877	409 26
314	J. M. Gregory	Salary, June 1878	300 00
315	S. W. Robinson	" "	150 00
316	T. J. Burrill	" "	150 00
317	S. W. Shattuck	" "	150 00
318	E. Snyder	" "	150 00
319	D. C. Taft	" "	150 00
320	J. B. Webb	" "	150 00
321	J. C. Pickard	" "	150 00
322	N. C. Ricker	" "	125 00
323	H. A. Weber	" "	150 00
324	J. D. Crawford	" "	125 00
325	G. E. Morrow	" "	150 00
326	E. L. Lawrence	" "	83 33
327	S. C. Allen	" "	100 00
328	P. Baumgras	" "	100 00
329	F. A. Parsons	" "	75 00
330	I. O. Baker	" "	75 00
331	M. A. Scovell	" "	65 00
332	C. I. Hays	" "	75 00
333	C. E. Pickard	" "	45 00
334	E. A. Kimball	" "	83 33
335	J. C. Lewellyn	" "	40 00
336	J. E. Gregory	Salary Jan. 1878	25 00
337	A. B. Baker	" "	40 00
338	C. W. Williams	" "	30 00
339	Seeley Brown	" Supt. Jan. 1878	100 00
340	N. C. Terrell & Co	Work and material, Jan	616 25
341	Agricultural Department	Farm expenses Jan	261 10
342	Enterprise Coal Co	Coal	277 40
343	Students' pay roll	January, 1878	310 30
344	H. Swannell	Paints, alcohols, &c	19 82
345	C. H. Cady	Hardware	30 20
346	C. H. Cady	"	12 55
347	S. B. Buckmaster	Papyragraph	50 00
348	J. D. Williams	50 gross crayons	6 25
349	Trevett & Green	Hardware	5 70
350	J. E. Armstrong	Work in cabinet	2 50
351	T. J. Burrill	Petty expense g. h	6 88
352	E. B. Benjamin	Weights	5 91
353	Trevett & Green	Hardware	3 50
354	J. M. Gregory	Salary, February, 1878	300 00
355	L. W. Robinson	" "	150 00
356	T. J. Burrill	" "	150 00
357	L. W. Shattuck	" "	150 00
358	E. Snyder	" "	150 00
359	D. C. Taft	" "	150 00
360	J. B. Webb	" "	150 00
361	J. C. Pickard	" "	150 00
362	N. C. Ricker	" "	125 00
363	H. A. Weber	" "	150 00
364	J. D. Crawford	" "	125 00
365	G. E. Morrow	" "	150 00
366	E. L. Lawrence	" "	83 33
367	Lou. C. Allen	" "	100 00
368	P. Baumgras	" "	100 00
369	F. A. Parsons	" "	75 00
370	I. O. Baker	" "	75 00
371	M. A. Scovell	" "	65 00
372	C. I. Hays	" "	75 00
373	Chas. E. Pickard	" "	45 00
374	E. A. Kimball	" "	83 33

List of Warrants Drawn.—Concluded.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
375	J. C. Lewellyn	Salary, February, 1878	$ 40 00
376	J. E. Gregory	" "	25 00
377	A. B. Baker	" "	40 00
378	C. W. Williams	Salary winter term	30 00
379	C. E. Patchen	" "	25 00
380	W. D. Rudy	" "	15 00
381	A. Gregory	" "	20 00
382	Webster & Wallace	Poplar lumber	3 05
383	Locke & Laxton	Paper	1 75
384	Eichburg Bros	Oil cloth	2 66
385	Fuller & Fuller	Chemicals	5 60
386	Fuller & Fuller	Glass	6 40
387	A. H. Andrews	4 dozen erasers	11 18
388	D. Rugg	1 doz brooms	2 00
389	Jansen & McClurg	Books	4 85
390	Jno. R. Statt	Stationery	18 09
391	Goodnow & Wightman	1 set carving tools	5 22
392	G. E. Hessel	1 doz. draw pulls	1 50
393	National almanac Co	1 almanac	1 00
394	Charles Hendy	Calcimining	7 00
395	Charles Hendy	Varnishing cases	10 96
396	Matchette & Co., Paris	Model for horse	824 97
397	I. O. Baker	Expense physicians lab'ty	4 05
398	W. Merava	Cleaning and repairing muskets	13 77
399	N. C. Thayer & Co	1 bottle colodion	1 30
400	E. V. Peterson	10 yds tracing cloth	5 00
401	Hollister & Baker	1 table	2 75
402	Geo. Wild	Wages and incidental expenses	59 45
403	Larrabee & North	Hardware	31 94
404	Pub. Nat. Guardsman	Subscription	1 00
405	W. A. Moore	Hardware	2 00
406	J. T. Wallensak	Keys and blanks	3 60
407	J. T. Wallensak	1 doz. locks	3 40
408	N. E. subscription agency	Periodicals 1878	15 10
409	S. B. Buckmaster	Printing color	2 28
410	Covert & Greenhood	2½ doz yale locks	21 45
411	A. Campbell	Forging forks	2 50
412	A. Snedeker	Castings	4 30
413	Charles Hendy	Painting	33 36
414	E. A. Pratt	" and glazing	3 00
415	Fuller & Fuller	Chemicals	11 19
416	Fuller & Fuller	"	24 89
417	Crane Bros. mfg. co	Hardware	26 08
418	H. Swannell	Paint and putty	6 35
419	H. Swannell	Chemicals	2 82
420	C. & U. Gas Co	Bill, Dec. and Jan	103 20
421	C. H. Cady	Yale locks	2 90
422	Agricultural department	Expense, February, 1878	330 69
423	" "	Work on greenhouse	18 11
424	Military "	Glass covers to hort	1 65
425	Mechanical "	Work for University	640 06
426	Architectural "	" "	832 53
427	" "	" "	72 84
428	Mechanical "	" "	203 48
429	Illinois Cen. R. R. don	Freight, Dec. and Jan	360 20
430	Agricultural department	Work for other departments	154 96
431	I. B. & W. Ry Co	Freight	8 21
432	Trevett & Green	300 ft wire for bank	15 00
433	E. N. McAllister	Postage	22 40
434	D. C. Taft	Freight and cartage	6 56
435	Champaign co. Gazette	Printing and repairing books	32 25
436	" "	Stationery	37 90
437	S. W. Shattuck, business agt	Petty expense for 3 mos	49 79
438	Students' pay roll,	February, 1878	199 69
439	Illini	Advertising and printing	18 16
440	Architectural department	Shop practice acc	60 00
441	Mechanical department	Shop practice and tool	85 00

The report and the inclosures were received, and the board took a recess until 8 p. m., to assemble at Doane house.

EVENING SESSION.

Board met at the time agreed.

Mr. McLean, chairman of building committee, laid before the board the plans and specifications for heating apparatus in chemical laboratory, from Professors Robinson and Ricker, and Crane, Breed and Co., also bids on same.

Judge Brown moved that the plans submitted by Professors Robinson and Ricker be adopted.

Carried.

The advertising and receiving of bids and awarding of contract were referred to the building committee, with power to act.

The following report, from committee on farms, was received and adopted.

To the Board of Trustees of Illinois Industrial University:

The committee, to whom was referred the future policy and management of the farms and lands, beg leave to report that they can only deal with the policy, without entering into details of management, premising that it is not the policy of the University to go into general farming for purpose of money-making, (however desirable that, under times of great depression, might be) but the farms are kept primarily for the purpose of illustrating the various branches of farming and stock raising.

We would therefore recommend that it would be the best policy to conduct the experiments at first on a small scale, and that further experiments should be made on a larger scale of those only that promise to succeed, knowing full well that even then, like all other promises that they are liable to sometimes fail. We would recommend that the Busby farm be so shaped that at least two-thirds of it be seeded down into grass for permanent pasture lands, and that the balance be kept under the system of rotation of crops that may promise best results as demonstrated by the experiments conducted on the experimental farm.

We would recommend that the continuation of the system of tile draining, as already commenced, be further extended, as the profits of the farm may justify.

We would further recommend that the blooded stock kept on the farm should always be kept in such a condition that it shall meet the approbation of all visitors.

We would also recommend the policy of breeding such stock, both horses and neat, as the farm will require for its use.

J. H. PICKRELL,
ALEX. McLEAN,
D. GARDNER. } Committee.

Treasurer J. W. Bunn then read the following report, which was referred to a committee consisting of Messrs. Pickrell, Gardner and Byrd, and the board adjourned to meet at 9 o'clock, a. m., in University parlor.

John W. Bunn, Treasurer, in Acc't with Illinois Industrial University:

1877.				
Dec. 5	To balance			$24,096 61
" 24	" J. O. Cunningham on note			125 00
1878.				
Jan'y 1	" Interest on Chicago 7 per cent. bonds			875 00
" 1	" " Illinois 6 per cent. bonds			930 00
Feb'y 25	" " Champaign county bonds			4,600 00
" 28	" am't rec'd on acc't mechanical department		$1,190 39	
" 28	" " " architectural "		1,091 61	
" 28	" " " agricultural "		723 58	
" 28	" " " horticultural "		132 65	
" 28	" " " chemical "		192 91	
" 28	" " " military "		1 65	
" 28	" " " buildings and grounds		35 00	
" 28	" " " library		3 54	
" 28	" " " fuel and light		99 95	
" 28	" " " fees and room rents		2,206 50	
" 28	" " " tuition, preparatory department		853 00	6,530 78
				$37,157 39

John W. Bunn, Treasurer, in Acc't with Illinois Industrial University:

1878.						
Feb'y	28	By am't paid board expense			$	38 40
"	28	" " salaries				7,443 63
"	28	" " on acc't buildings and grounds				25 81
"	28	" " " fuel and lights				772 54
"	28	" " " stationery and printing				146 27
"	28	" " " mechanical department				819 73
"	28	" " " architectural "				496 54
"	28	" " " agricultural "				1,498 46
"	28	" " " horticultural "				495 73
"	28	" " " chemical "				89 51
"	28	" " " military "				16 39
"	28	" " " library and apparatus				3 99
"	28	" " " incidental expenses				103 31
"	28	" " " model of horse				824 97
"	28	" " " preparatory department				540 00
"	28	" " " court charges				31 00
"	28	" " " papyrograph				50 00
"	28	" " " microscopes				18 56
"	28	" " " chemical laboratory		$4,591 94		
"	28	" " " green house		223 00		
"	28	" " " cabinets		328 23		
"	28	" " " cabinet cases		274 59		
"	28	" " " books and publications		850 81		
"	28	" " " library cases		492 78		
"	28	" " " current ex. instruction in shops		535 00		
"	28	" " " chemical & physical laboratory		85 10		
"	28	" " " buildings and grounds		522 58		7,904 03
"	28	" balance				15,838 52
						$37,157 39

CHAMPAIGN, March 12th, 1878. JOHN W. BUNN, *Treasurer.*

MARCH 13TH, 1878.

The board assembled at 9 a. m., as per adjournment.

On motion of Judge Brown, $200 were appropriated to engrave and prepare diplomas and certificates of scholarship.

It was also ruled that a fee of $5 00 be charged for every diploma conferring a degree.

That part of the regent's report, which relates to library cases and table, was referred to building committee.

The farm committee were continued, and on motion of Judge Brown the reports of Prof. Morrow and the head farmer were referred to them.

The following request from Professors Robinson and Ricker was received:

ILLINOIS INDUSTRIAL UNIVERSITY, March 11, 1878.

To the Regent and Board of Trustees:

GENTLEMEN: Believing it to be to the interest of our schools to hold a summer session of about two months, at Chicago, and perhaps one or two other points, we respectfully ask permit to do so at our risk as regards the financial outcome of it, and in the name of the University.

Also we would ask that we be allowed, for the purpose, the use of some of the cabinet models and apparatus of the schools, and such portions of the shop practice tools as will not be required here during the time. All being entered upon record, to be returned in good order.

Very respectfully,

S. W. ROBINSON,
N. CLIFFORD RICKER.

The request, on motion of Mr. McLean, was referred to Col. Mason, Mr. Sabin and Mr. Cobb, with power to act.

On motion of Judge Brown, $100 were appropriated for purchase of lawn mowers.

The request, from Lieutenant W. A. Dinwiddie, for the purchase of swords for officers of the University battalion, was on motion, referred to the executive committee.

The faculty were directed to make arrangements for the dedication and opening of the new laboratory building.

An amount of $15 was allowed to the publishers of the "Illini" in settlement of old account.

$25 were appropriated for transportation charges of articles from the University, for exhibit at the Paris exposition.

On motion, it was resolved that we approve of the regent's acceptance of the appointment tendered him by the president, on nomination of the governor, as commissioner from the state to the Paris exposition, and that leave of absence be granted him for the time necessary to fulfill such appointment after the close of the spring term, as requested in his report.

The following report from Mr. Gardner, was received:

To the Hon. Board of Trustees, Illinois Industrial University:

Your committee to whom was referred the consideration and enquiry relative to the sale of the new lands in Nebraska and Minnesota, beg leave to report that I have had correspondence with land agents and other parties west, and think from best information I can get, that if they were put upon the market, sales could be effected, in tracts of 160 acres or more, for five dollars per acre on long time, with 8 per cent. interest per annum (perhaps in advance), or say six to eight dollars per acre on parcels of less amount. Your committee have no recommendations at this time as to the policy of selling, as I am not personally acquainted with the quality or location of the lands, and submit all consideration of same to you.

Respectfully,

D. GARDNER, *Committee.*

Upon the report of Mr. Gardner, in regard to improvements in arboretum and parade grounds, an amount of $150 was appropriated for setting out trees, etc., as by recommendations.

Mr. L. Taft was allowed $27 50 for instruction of class in clay modeling.

It was voted that the thanks of the board be extended to the gentlemen who delivered lectures at the farmers' institute held at the University in January last, and that their expenses be paid.

The following report from the building committee, was received.

CHAMPAIGN, March 13th, 1878.

To the Board of Trustees of Illinois Industrial University of the State of Illinois:

The undersigned, your building committee on erection and completion of laboratory, would respectfully report as follows:

The building is now nearly completed; the following is a statement of moneys paid according to contract, with contractors and builders.

Terrill & Co., estimates for	August	$1,909 91
" " " "	September	4,639 71
" " " "	October	3,856 85
" " " "	November	2,860 25
" " " "	December	678 20
" " bal. " "	"	2,438 65
" " " "	January	616 25
		$16,999 82

Contract price of Terrill & Co., $23,896 00, showing a balance due Terrill & Co., when completed, of $6,896 18, which is payable July 1, 1878, under act of appropriation for the same. We further report the following amounts paid to Seeley Brown, as superintendent of building laboratory:

For the month of August	$100 00
" " September	100 00
" " October	100 00
" " November	100 00
" " December	100 00
" " January	100 00
Total paid for superintendency on building to date	$600 00

The following is a statement of extras ordered and put in said building:

Extra wall in foundations—stone and brick	$300 69
" flooring of concrete, etc	132 22
" skylight and concreting	100 00
" S. Brown, brick and work	40 41
	$573 32

And the following constitute sundry accounts on same:

Tribune, advertising bids and building	$25 92
Llewellyn, work on plans	9 65
J. F. Moore " "	5 00
Champaign Gazette, advertising	7 00
N. C. Ricker, expense to Chicago on plans	21 90
Architectural department, work on plans	6 53
" " W. A. Balcom, on plans	5 00
" " Mary L. Page	23 37
J. M. Gregory, expenses to Chicago	14 60
W. A. Moore, iron bill	3 29
N. C. Williams, drain pipe	92 92
Agricultural department, tile and labor	158 52
J. F. Moore, work on plans	2 59
C. N. Cady, hardware bill	30 20
C. V. Peterson, ten yards tracing cloth	5 00
Mechanical department, piping, etc	341 89
Architectural department, labor	6 53
	$760 01

Showing a total expenditure on said building paid to date of $18,933 15, divided as follows:

Paid N. C. Terrill & Co., on contract	$16,999 82
" Seeley Brown, superintendent	600 00
" N. C. Terrill & Co., and others, extra work and material	573 32
" sundry bills, including draining, etc	760 01
	$18,933 15

In this bill of sundries are included draining, building, making plans, advertising, and mechanical department labor, part of which should not be chargeable to building appropriation, to-wit: the work executed by mechanical department was gas and water piping which properly belonged to appropriation for fixtures.

So far as building is completed, we can report as well done, both as to material and workmanship, and from present indications, the building will be completed, according to plans and specifications, within the next thirty days; we would therefore recommend that your committee be requested and authorized to close the contract with N. C. Terrill & Co., by accepting the building and certifying to said Terrill & Co., the amount due them on said contract.

Respectfully submitted,

ALEX. McLEAN,
D. GARDNER,
R. B. MASON. } *Committee.*

The report was adopted and the building committee authorized to accept the new chemical laboratory when finished, close the contract and to certify to N. C. Terrill & Co., the amount due them.

The building committee submitted the following report on completion of the green house:

CHAMPAIGN, ILLS., March 13, 1878.

To President and Board of Trustees, Ills. Industrial University:

Your committee on building greenhouse would respectfully report as follows: The amount of appropriation, $2,500 00; of this amount, bills and accounts have been allowed and paid amounting to $2,496 35, leaving $3 65 as a balance of said appropriation unexpended, and recommend that the same be returned back to the state treasury.

The building is now complete, according to contract, and accepted by your committee; we now ask to be discharged from further consideration of the same.

ALEX. McLEAN,
D. GARDNER,
R. B. MASON. } *Committee.*

The report was accepted and adopted.

The auditing committee submitted the following report, which was received and recommendations concurred in:

The committee, to whom was referred the report of the treasurer, beg leave to report that they have carefully examined his books and vouchers, and find that warrants numbered 346 to 721 inclusive, issued from March 1st, 1877, to September 1st, 1877, and warrants numbered 1 to 444 inclusive, issued fom September 1st, 1877, to March 1st, 1878, have been paid and cancelled. We also find in the hands of the treasurer, $27,000 00 of endowment funds uninvested. We would recommend that the treasurer be authorized to invest in such legal bonds as he may be able to find; subject, however, to the approval of President Cobb. If more profitable and equally as secure bonds cannot be obtained, we would recommend that said funds be invested in four per cent. government bonds.

J. H. PICKRELL,
D. GARDNER,
JNO. J. BYRD. } *Committee.*

The following appropriations from current funds were then made for the six months ending August 31st, 1878:

Board expense	$200 00
Salaries	15,225 00
Fuel and lights	1,000 00
Stationery and printing	600 00
Buildings and grounds	200 00
Incidental expenses	200 00
Library	25 00
Furniture and fixtures	100 00
Agricultural department	2,845 50
Chemical "	178 04
Military "	150 00
Mechanical "	334 25
Architectural "	839 08
Sundries—	
Freight on model of horse	50 00
Engineering transit	550 00
Paris exposition	25 00
Illini	15 00
	$22,536 87

It was voted that $500, or as much thereof as needed, be appropriated from the state funds for chemical laboratory, in payment for certain extras to the account of N. C. Terrill & Co., subject to the order of the building committee.

The board then adjourned.

MEETING OF THE BOARD OF TRUSTEES, JUNE 4TH, 1878.

The board met at 3:30 p. m., in the University parlor.

Present: Messrs. Byrd, Cobb, Gardner, Gillham, McLean, Pickrell and Sabin.

Absent: Gov. Cullom and Mr. Brown.

The minutes of last meeting were read and adopted.

On motion a committee, consisting of President Cobb, Messrs. Pickrell and Gillham, were appointed to draft resolutions, expressing the high esteem for the deceased member of the board, Hon. W. C. Flagg, of Maroa, Ill.

Mr. McLean, chairman of the building committee, submitted the following report and inclosures, regarding the acceptance of the recently finished chemical laboratory:

THE CHEMICAL LABORATORY.

URBANA, June 4th, 1878.

To the Chairman of Board of Trustees of the Illinois Industrial University:

GENTLEMEN: The undersigned, a committee appointed at a regular session of your body to take charge of and superintend the erection of the chemical laboratory, would respectfully report that we have carefully attended to the duties assigned us. The building is now completed, under the contract entered into with N. C. Terrill & Co. The contract price of same was twenty three thousand, eight hundred and ninety-six dollars. Of this sum, Terrill & Co., have been paid sixteen thousand nine hundred and ninety nine dollars and eighty two cents, retained 15 per cent. as per contract, three thousand dollars and eight cents, and due on contract three thousand eight hundred and ninety six dollars and ten cents. The last two sums yet due Terrill & Co., payable July 1, 1878, amounting to six thousand, eight hundred and ninety six dollars and eighteen cents, making a grand total on original contract, $23,896.00, as above stated.

During the erection of the building we found many defects, or rather where improvements could be made, not provided for by the architect, which we thought best to have done. Said extra improvements cost one thousand and four dollars and twelve cents; said amount has been paid in full.

We herewith attach a detailed statement of the several amounts paid on said contract, and extras marked "chemical laboratory building," which we desire to be made a part of our report herein.

We also incurred or opened a sundry account, such as salary of superintendent of building, Mr. S. Brown, a practical builder, deeming it of importance to have such a person overlook and decide as to quality of materials and workmanship, and other items of necessary materials and labor, all of which we herewith attach and mark "sundry expenses," and desire the same to be made a part of our report.

We would further recommend that the laboratory building be now accepted, the same being constructed in all particulars as stipulated in the contract with N. C. Terrill & Co., and further that the amount due said contractors to-wit: $6,896.18, be ordered paid July 1, 1878, out of the fund appropriated by the legislature for that purpose, and proper warrants for same be issued.

We herewith present the report of Prof. Ricker, architect of said laboratory, and make it part of our report, desiring that it be incorporated in this our final report on said building.

We would also recommend that a warrant be issued in favor of J. M. Van Osdel, for the sum of twenty five dollars, fee as consulting architect on laboratory.

Also recommend that a warrant be issued in favor of Prof. N. C. Ricker, for extra labor draughting plans and specifications of chemical laboratory, for the sum of one hundred and twenty dollars.

Above bills to be paid after July 1, 1878.

ALEX. McLEAN, }
D. GARDNER. } *Committee.*

CHAMPAIGN, April 13th, 1878.

I hereby certify that I have superintended the building of laboratory of the Illinois Industrial University, having daily examined the materials and workmanship as it progressed, and regard the same in every particular substantially such work as required of Terrill & Knight, under their contract with the trustees of said University.

SEELEY BROWN, *Superintendent.*

CHAMPAIGN, April 13th, 1878.

I hereby certify that I have acted as architect of the laboratory building, recently erected for the Illinois Industrial University, and also that I have examined said building, and compared it with the plans, drawings and specifications thereof, and find and certify that said building is built and completed substantially, as is required in the contract of Terrill & Knight, with the trustees of said University.

N. CLIFFORD RICKER, *Architect.*

ILLINOIS INDUSTRIAL UNIVERSITY, CHAMPAIGN, March 11th, 1878.

To the Building Committee of the Hon Board of Trustees of the Illinois Industrial University:

GENTLEMEN:—I am pleased to be able to report to you that the laboratory is now, as you have doubtless seen by examination, nearly completed as to the building itself, and I hope that you will find its appearance and construction satisfactory.

Some changes have been made in the building during its erection, causing some cost additional to the contract price. To prevent any misunderstanding, I desire to say that I have never recommended or directed any changes, so far as I can recollect, without first consulting your resident member, Mr. Gardner, through Mr. Brown, and obtaining his consent thereto. I believe that you will find them all to be proper, either improving the appearance of the building, its convenience, or its adaptation to its destined purpose, and at a very reasonable cost.

Since your last meeting the following changes have been made: Newel posts at angles of opening in hall floors; mansard story to match those of stairs, instead of continuous rail, cost not agreed upon, should not exceed $10; stairs widened one foot in first floor, to give better access to qualitative laboratory, cost about $10; 44 square yards of iron lathing in milling room. Prof. Weber desires to provide for a furnace there if necessary, cost about $27 00; 1500 lineal feet extra member in base, cost about $35 00; concreting basement floors, in smelting, milling and boiler rooms, cost, $60 00, paid; difference between plain and ground glass in skylight for photographic room, Mr. Terrill claims about $51 00, but I believe it is too much. Extra skylight over mansard story, $40 00, paid; extra cost of figured slating should not exceed $10; extra cost of window in tank room should not exceed $5.

I would recommend also that a base in addition to wainscoting be put in halls, at a cost of $20; also that the stone walls in basement be plastered one coat inside with cement before whitewashing, this will cost $75 00.

The last two amounts are Mr. Terrill's offers for the work. Some of the other items he has refused to set any price upon, saying that he preferred to leave it to me, as I had accepted his offers several times and he had lost every time.

In the St. Louis and Chicago iron work's circulars, I could find no satisfactory designs for iron railings for the north and south steps, and therefore concluded to use wood balusters and rail instead, as they harmonize much better with the building, and if kept well painted are very durable. They will not cost any more, and I believe ought not to quite as much.

The tin pipes required in south end of building were put in, also the necessary thimbles where hot air pipes pass through the floors, so as to finish up to them. I request instructions as to your preferences in regard to the remaining hot air pipes, whether bids be obtained for them, or they be let to some responsible party, or the matter be referred entirely to Mr. Gardner's decision. It is not necessary to put them in at present, and will probably not be before the other heating apparatus be put in. The registers have been ordered from Crane Bros. Manufacturing Co., Chicago. They offer 50 per cent. discount from list prices.

In regard to the heating and ventilating apparatus, I complied with your instructions and sent tracings of plans and other necessary information to Crane, Breed & Co., Cincinnati. Mr. Abbot, their engineer, came here during the Christmas vacation and examined the building. He stated his opinions: 1st. That more air would be required than I calculated for, viz.: 250,000 cubic feet per hour. This is based on the greatest number that would be ever gathered in each room at the same time, each room to have its maximum number of occupants at the same time, and allowing for each person 300 cubic feet per hour. Not half of the building will be simultaneously used or fully occupied, this allowance will be from 600 to 1200 feet each per man, several times the probable amount allowed in the main building, and certainly as much as it will be found economical to pay for. By putting in a larger fan, however, the volume of air can be increased as much as desired. Mr. Abbot stated also that natural ventilation—that is, with coil boxes at the bases of ducts—put in as in main buildingand without any fans at all, nothing but natural draught, would suppiy the required amount of air. I certainly do not think this probable, judging from the results of the system in the main building.

Messrs. Crane, Breed & Co. mailed me, under date of January 28th, a signed bid or agreement, proposing for $3,150 to finish and put in boilers, pipes, etc., to heat the two large rooms in basement, the first story, the second story, except gas analysis room, also photographic room only, in mansard story. This included 13,760 feet of inch steam heating pipe, two boilers and fixtures, registers and hot air pipes, but not fan, engine, pump, nor carpenter's work and material for coil boxes, for which an extra price of $476 was asked. On receipt I made reply that I did not think this bid would be acceptable to the trustees, as I believed they desired to heat the entire mansard story, and requested them to estimate the additional cost required for that purpose, also that they would make a proposition embodying any mode of heating and ventilating they would prefer, to that already suggested for the building. Under date of February 28th, they forwarded a reply, stating that on account of a clerical error, they desired to withdraw their previous bid and substitute two others. The first, for $4,170, furnishing boilers and attachments, heating pipes, etc., complete, and fixing, but not including hot air pipes, registers, fan, engine, or pumps, or carpentery work of coil casings, and to heat milling rooms and manufacturing laboratory, and all rooms above basement, except gas analysis room. The second, using natural draught only, not requiring fan or engine, for $4,196, furnishing boilers, etc., as before, placing pipe and coil boxes, for which an additional charge of $280 is made, if put in by them.

I submit the three propositions and accompanying letter for your examination, with this report.

Prof. Robinson has prepared a detailed estimate, and also drawings, to fully exhibit the method prepared by him for heating the building, which I also present with this, and to which I beg to refer you for full details of the proposed method. I believe it will be found fully satisfactory and the most economical. Prof. Robinson's estimate, as you will see, includes the cost of all the apparatus and fixtures complete, except hot air

pipes, while the bid of Crane, Breed & Co. does not include fan, pump nor engine, nor of boxing for coils, so that the cost of the additional fixtures will require to be additional to their bid.

I would recommend that one or more large cisterns be built in the ground outside the building, for storing rain water, both for laboratory and boiler use, and connected by piping with the pump, so that the tank in mansard can be filled whenever it becomes empty. Pipes will be put in to conduct the water from deck roof into it, so that with ordinary amount of rain it will be kept full, This cistern or cisterns should contain, I think, about no less than one thousand barrels. Tank in mansard will contain 100 barrels. I equest also instructions, if you have any preference, as to the colors used for painting the inside finish of the building.

Very respectfully submitted,

N. CLIFFORD RICKER,
Architect of Chemical Laboratory.

In account with Chemical Laboratory.—Sundry Expenses.

Date.	No.	To Whom Drawn.	For What Drawn.	Supt. service.	Amount.
1877.					
July 2.....	551	Tribune Company.....	Advertising	.....	$25 92
"	564	J C Llewellyn	Work on plans.....	.....	9 65
"	565	J F Moore.....	" "	.....	5 00
August 31.	657	Champaign Co. Gazette..	Advertising	.....	7 00
Sept. 15...	6	N C Ricker.....	Expenses on plans.....	.....	21 90
" ...	7	Architectural departm't	Work, etc	.....	6 53
" ...	8	W A Balcom.....	Work on plans.....	.....	5 00
" ...	9	Miss Mary Page.....	" "	.....	23 37
" ...	10	S Brown.....	Service as supt., August.	$100 00	.....
" ...	11	J M Gregory.....	Expenses.....	.....	14 60
Oct. 3.....	40	Seeley Brown	Service as supt., Sept.....	100 00	.....
" 31....	81	W A Moore.....	Iron.....	.....	3 39
" 31....	129	Seeley Brown	Service as supt., Oct.....	100 00	.....
Nov. 30....	166	N C Williams.....	Drain pipe.....	.....	92 92
"	204	Agricultural department	Work and tile.....	.....	158 52
"	217	Seeley Brown	Salary as supt., Nov.....	100 00	.....
Dec. 6.....	222	S W Brown.....	Brick and work.....	.....	40 41
"	223	J F Moore	Work on plans.....	.....	2 59
"31....	279	Seeley Brown	Service as supt., Dec.....	100 00	.....
Jan.31.....	339	" "	" " Jan.....	100 00	.....
Feby. 28...	345	C H Cady.....	Hardware.....	.....	30 20
" ...	400	E V Peterson	Ten yds. tracing cloth	.....	5 00
" ...	425	Mechanical department.	Work and material	.....	341 89
" ...	426	Architectural "	" " "	.....	6 53
March 13..	443	Seeley Brown	Service as supt., Feby....	100 00	.....
" 31..	482	" "	" " "	100 00	.....
April 13...	484	" "	" " to date.	50 00	.....
" 15...	497	Mary L Page.....	Work on plans.....	.....	2 12
" 15...	502	J F Moore.....	" "	.....	2 32
" 15...	504	Crane Bro's. Mf'g Co...	Hardware.....	.....	118 43
		Paid superintendent...	.....	$850 00	850 00
		Total.....	.....	.....	$1,773 29

In account with N. C. Terrill & Co.—For Chemical Lab'y Building.

Date.	No.	To whom drawn	For what drawn	Estimate.	15 per ct. reserved.	Extras.	Amount paid.
1877.							
August 15.	636	N.C.Terrill & Co	Estimates—Aug	$2,246 95	$337 04	.....	$1,909 91
Sept. 15...	5	" " "	Extras	.....	.....	$300 69	.....
Oct. 3.....	41	" " "	Estimates—Sept	5,458 48	818 17	.....	4,639 71
" 31....	131	" " "	" —Oct	4,537 47	680 62	.....	3,856 85
Nov. 30...	219	" " "	" —Nov	3,365 00	504 75	.....	2,860 25
Dec. 6.....	221	" " "	" to date	798 00	119 80	.....	678 20
" 31....	276	" " "	Extras on lab'y	.....	.....	132 22	.....
" 31....	277	" " "	Estimates —Dec	2,869 00	430 35	.....	2,438 65
" 31....	278	" " "	Skl'gt concrt'g	.....	.....	100 00	.....
Feby. 28..	340	" " "	Estimates—Jan.	725 00	108 75	.....	616 25
March 13..	454	" " "	Extras	.....	.....	163 34	.....
" 31..	481	" " "	"	.....	.....	110 00	.....
April 12...	483	" " "	"	.....	.....	197 87	.....
				$19,999 90	$3,000 08	$1,004 12	$16,999 82
			15 p.ct.reserv'd	.....	.....	.....	*3,000 08
" 13...	.....	" " "	Estima's to date	.....	.....	.....	*3,896 10
			Total on contr't	.....	.....	.....	$23,896 00
			Paid for extras.	.....	.....	.....	1,004 12
		Total.....	N.C.Terrill & Co	.....	.....	.....	$24,900 12
		Total paid for	sunds' per stm't	.....	.....	.....	1,773 29
" 15...	.....	.....	Total to date.	.....	.....	.....	$26,673 41

*Warrants have not yet been drawn for these amounts.

The report was received and approved, and the committee continued.

On motion the thanks of the board were tendered to the committee for the faithful and efficient discharge of their duties.

On motion, the following degrees and certificates were conferred, upon the recommendation of the regent and faculty:

DEGREE OF B. S.

Wallace E. Bridge, school of agriculture.
Charles L. Richard, " "
Charles C. Lyford, " "
Charles I. Hays, " horticulture.
Ellis M. Burr, " mechanical engineering
Wensel Morava, " " "
Louis R. Noble, " " "
August Ziezing, " " "
Ira O. Baker, " civil "
Alexander C. Swarts, " " "
John A. Ockerson, " " "
Henry Hauser, " " "
Theodore S. Abbott, " mining "
N. Clifford Ricker, " architecture.
Charles H. Blackall, " "
Samuel A. Bullard, " "
Joseph C. Llewellen, " "
Charles K. Ballard, " "
James A. McLane, " "
Melville A. Scovell, " chemistry.
Arthur E. Barnes, " "
William D. Rudy, " "
Charles W. Rolfe " natural history.
Henry S. Reynolds, " "
John J. Davis, " "
Noah B. Coffman, " "
Mahlon O. Weed, " "

DEGREE OF B. L.

Fernando A. Parsons,	school of	English	and modern	languages.
Mary C. Steele,	"	"	"	"
F. Adelia Potter,	"	"	"	"
Maggie E. Stewart,	"	"	"	"
George F. Kenower,	"	"	"	"
Frank Barry,	"	"	"	"
Charles W. Allen,	"	"	"	"
Eddy O. Lee,	"	"	"	"
James S. Pollock,	"	"	"	"
Manford Savage,	"	"	"	"
John F. Whitlock,	"	"	"	"
Henry W. Zimmerman,	"	"	"	"
Emma Page,	"	"	"	"
Henrietta M. Culver,	"	"	"	"

DEGREE OF B. A.

John L. Pierce,	school of	ancient	languages.
Alfred Gregory,	"	"	"
Helen B. Gregory,	"	"	"

FULL CERTIFICATES.

Frank A. Brown,
Edward J. Baker,
Ralph Brown,
Wm. B. Chandler,
Emma Columbia,
Sarah Deardorff,
Nannie J. Davis,
Frank A. Dean,
Ida M. Estep,
Jessie Estep,
Charles B. Gibson,
Theophilus Gaffner,
Mary S. Larned,
Frank H. Lloyde,
Aaron H. Moore,
Jennie C. Mahan,
John W. Patchen,
Mary L. Page,
Abram R. Rutan,
H. W. Sawyer,
Martin Sprague,
Coler Sim,
William F. Spradling,
Hosea B. Sparks,
Walter P. Ward.

PARTIAL CERTIFICATES.

Charles A. Dean,
Albert Colvin,
E. M. Thorpe,
James M. Wilson.

FOR MASTER'S DEGREES.

N. Clifford Ricker,	for the	degree of	M. Arch.
Charles W. Rolfe,	"	"	M. S.
Fernando A. Parson,	"	"	M. L.
Alex. C. Swartz,	"	"	C. E.
Ira O. Baker,	"	"	C. E.
Melville A. Scovell,	"	"	M. S.

It was resolved, that the regent be authorized to issue the proper diplomas, and certificates, to all students now entitled and recommended, and be authorized to confer degrees on such students, as have been recommended, and shall give satisfactory evidence of having completed the course of studies entitling them to the same.

The board adjourned to meet at 8 o'clock, p. m.

EVENING SESSION.

The board assembled on time.

Treasurer J. W. Bunn, read the following report, which was accepted :

J. W. Bunn, Treasurer, in Account with Illinois Industrial University.

1878.			
May 31	By board expense	$134 85	
"	am't. paid salaries	7,613 42	
"	" " for fuel and lights	295 33	
"	" " " stationery	306 63	
"	" " " buildings and grounds	110 01	
"	" " " library and apparatus	3 12	
"	" " " mechanical department	742 33	
"	" " " architectural do	644 71	
"	" " " agricultural do	1,982 22	
"	" " " horticultural do	154 05	
"	" " " chemical do	52 01	
"	" " " military do	102 25	
"	" " " furniture and fixtures	4 16	
"	" " " freight on model for horse	15 22	
"	" " " Paris exposition	12 00	
"	" " " Illini	15 60	
"	" " " tuition in preparatory department	570 00	
"	" " " cabinets	13 98	
"	" " " agricultural institute	36 50	
"	" " " incidentals	43 48	
"	" " " prem. on Sangamon 10 pr. c. bonds	1,850 00	
			14,701 87
"	" " " taxes on lands in Neb. and Minnesota	2,111 78	
"	" " " chemical laboratory	844 08	
"	" " " cabinets	228 39	
"	" " " books and publications	122 11	
"	" " " mechanical laboratory	270 00	
"	" " " physical and chemical do	15 39	
"	" " " building and grounds	36 00	
			3,627 75
"	Balance		5,954 65
			$24,284 27

John W. Bunn, Treasurer, in acct. with Illinois Industrial University.

1878.			
March 12	To Balance		$15,838 52
"	" interest on endowment funds		1,960 00
April 8	" interest on Putnam county bonds		500 00
May 1	" " of Champaign county		2,000 00
31	" amt. rec'd on acct. mechanical department	248 99	
"	" " " " architectural do	42 63	
"	" " " " agricultural do	328 24	
"	" " " " horticultural do	476 96	
"	" " " " fuel and light	101 04	
"	" " " " buildings and grounds	50 09	
"	" " " " fees and room rents	1,504 50	
"	" " " " tuition, preparatory depart.	611 50	
"	" " " " cabinet	30 00	
"	" " " " Illinois Cen. R.R. co. freight	591 80	3,985 75
			$24,284 27

Urbana, June 4, 1878. JOHN W. BUNN, Treasurer.

To the Board of Trustees of the Illinois Industrial University:

I have made the following investments on account of the endowment funds, which were approved by the president:

Kankakee 10 per cent. school bonds	$6,000 00
Pike county 10 per cent bonds	5,000 00
Sangamon county 10 per cent. bonds	25,000 00
Total	$36,000 00

URBANA, June 4th, 1878. JOHN W. BUNN, Treasurer.

The matter of binding the biennial university reports was referred to a committee consisting of the treasurer and recording secretary, with

authority to have the work completed, the cost not to exceed $227.50.

The president and secretary were directed to draw an order upon the state auditor for the appropriations due for the fiscal year 1878–79, in favor of treasurer J. W. Bunn.

A request from Mr. F. A. Parsons for use of bookkeeping room for instruction during the session of the county teachers' normal school, was referred to the business agent, with power to act.

The board adjourned to meet on Wednesday, June 5th, 1878, at 3:30 p. m.

SECOND DAYS' SESSION.

The board met as by adjournment.

It was decided, that all special students, and also post graduates shall be charged $10 per term for instruction in drawing and painting.

On motion, Prof. J. B. Webb was granted leave of absence till Sept. 1st, 1878, and further furlough for one year without pay.

Mr. M. A. Scovell was employed to analyze soils of this state, under direction of Prof. G. E. Morrow, during the months of July and August, 1878, at $40 per month.

The graining of the wainscoting, etc., of the third floor, main building, was ordered to be done this vacation.

A committee consisting of Mr. Gardner, Prof. Morrow and head farmer Lawrence, were directed to sell certain surplus shorthorn bulls.

Mr. Cobb made the following report, as chairman of special committee on subject of summer school of mechanic art.

To the Board of Trustees of Illinois Industrial University:

SIRS:—Your committee on mechanical art school met at Col. Mason's office, Chicago, April 5. Present: Messrs, Cobb, Mason and Sabin and regent. It was resolved to recommend that Profs. Robinson and Ricker be authorized to make preparations for and hold a summer session of the mechanical art school, without expense to the University, except that $25 may be used for a circular, and the professors be allowed the use of such models and tools as may not be needed for use at University shops, and they be responsible for safe keeping and return of same.

All of which is respectfully submitted,

E. COBB,
R. B. MASON,
D. D. SABIN,
J. M. GREGORY. } *Committee.*

The report was received and the recommendation agreed to.

Upon nomination of the regent, the following appointments of instructors for the next academic year were made.

Professor of drawing and painting—Prof. P. Baumgras	$15	per	month	for	10 months.
Instructor in bookkeeping—Mr. F. A. Parsons	75	"	"	"	"
1st asst. in chem. and inst. in agr. chem.—Mr. M. A. Scovell	75	"	"	"	"
1st assistant in engineering and physics—Mr. J. D. Baker	75	"	"	"	"
2d assistant in civil engineering—Mr. C. W. Clark	50	"	"	"	"
Asst. architect and foreman of carp. shops—Mr. J. C. Llewellyn	60	"	"	"	"
2d assistant in chemistry—Mr. W. D. Rudy	35	"	"	"	"
Asst. in English and ancient languages—Mr. C. E. Pickard	50	"	"	"	"
Lecturer on veterinary science—Dr. F. W. Prentice	100	"	"	"	"
Asst. in horticulture and botany—Mr. C. I. Hays	75	"	"	12	"
Taxidermist and assistant in natural history—Mr. G. W. Wild	50	"	"	"	"
Janitor—A. B. Baker	40	"	"	"	"
Janitor—C. W. Williams	30	"	"	"	"

The final furnishing and finishing of the chemical laboratory and

heating apparatus, was referred to the building committee with power to act.

The business agent then presented the following report:

ILLINOIS INDUSTRIAL UNIVERSITY,
CHAMPAIGN, ILL., June 4, 1878.

Hon. EMORY COBB, President of the Board of Trustees of Illinois Industrial University:

SIR:—I have the honor to present the following financial report for the three months ending June 1st. Paper A is a statement of the appropriations with expenditures and receipts under the same. Paper B is a list of warrants drawn in the three months; those from 573 to 606 inclusive, are presented with their vouchers for auditing. Paper C is a list of bills presented for auditing. Paper D is a statement of the state appropriation at date.

Respectfully submitted,

S. W. SHATTUCK, *Business Agent.*

"A"

STATEMENT *of Current Appropriations and Receipts, June* 1, 1878.

ON ACCOUNT OF	APPROPRIATED.	RECEIPTS.	EXPENDED.	BALANCE.
Board expense	$ 200 00		$ 134 85	$ 65 15
Salaries	15,225 00		7,613 42	7,611 58
Fuel and lights	1,000 00	$101 04	295 33	805 71
Stationery	600 00		306 63	193 37
Buildings and grounds	200 00	50 09	110 01	140 08
Library and apparatus	25 00		3 12	21 88
Mechanical department	334 25	248 99	742 33	159 09
Architectural "	839 08	42 63	644 71	237 00
Agricultural "	2,845 50	328 24	1,982 22	1,191 52
Horticultural "		476 96	154 05	322 91
Chemical "	178 04		52 01	126 03
Military "	150 00		102 25	47 75
Furniture and fixtures	100 00		4 16	95 84
Sundries: freight on model of horse...$50.			15 22	
engineer's transit... 550.				
Paris exposition... 25.			12 00	
Illini... 15.	640 00		15 60	
Illinois Central Railroad donation		591 80		
Fees and room rents		1,504 50		
Tuition in preparatory department		611 50	570 00	41 50
Sundries: cabinets		80 00	13 98	16 02
agricultural inst			36 50	
Incidentals	200 00		43 48	156 52
State appropriation 3 months			3,627 75	
Ill. Cent. freight		591 80		
Premium on bonds			1,850 00	
			$18,329 62	

"B."

List of Warrants Drawn.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
442	Lorado Taft	Teaching clay modeling	$ 27 50
443	Seeley Brown	Service, supt. chem. laboratory	100 00
444	J. H. Pickrell	Board expenses	8 75
445	A. M. Brown	" "	25 00
446	R. B. Mason	" "	11 00
447	John J. Byrd	" "	20 65
448	Alex McLean	" "	46 95
449	Demuth Bros	Eyes for cabinet specimens	39 03
450	W. F. Baird	3,000 apple stock	9 35
451	G. E. Morrow	Expense of lectures agricul. institute	36 50
452	E. V. Peterson	Books	122 11
453	E. V. Houghwort	Steam fixtures for printing press	15 60
454	N. C. Terrill & Co	Extras for chem. laboratory	163 34
455	J. M. Gregory	Salary, March, 1878	300 00
456	S. W. Robinson	" "	150 00
457	T. J. Burrill	" "	150 00
458	S. W. Shattuck	" "	150 00
459	E. Snyder	" "	150 00
460	D. C. Taft	" "	150 00
461	J. B. Webb	" "	150 00
462	J. C. Pickard	" "	150 00
463	N. C. Ricker	" "	125 00
464	H. A. Weber	" "	150 00
465	J. D. Crawford	" "	125 00
466	G.E. Morrow	" "	150 00
467	E. L. Lawrence	" "	83 33
468	L. C. Allen	" "	100 00
469	F. W. Prentice	" "	100 00
470	P. Baumgras	" "	100 00
471	F. A. Parsons	" "	75 00
472	M. A. Scovell	" "	65 00
473	C. I. Hays	" "	75 00
474	I. O. Baker	" "	75 00
475	Chas. E. Pickard	" "	45 00
476	E. A. Kimball	" "	83 33
477	J. C. Lewellyn	" "	40 00
478	J. E. Gregory	" "	25 00
479	A. B. Baker	" "	40 00
480	C. W. Williams	" "	30 00
481	N. C. Terrill & Co	Extra work on laboratory	110 00
482	Seeley Brown	Salary supt. laboratory	100 00
483	N. C. Terrill & Co	Extra work on laboratory	197 87
484	Seeley Brown	Salary supt. to April 15	50 00
485	Crane Bros. mfg Co	Hardware	91 66
486	Webster & Wallace	Lumber	80 38
487	Emory Cobb	Expense to meeting	22 50
488	I. B. & W. Ry	Freight on muskets and cannon, &c	46 41
489	Fuller & Fuller	Paint	72 38
490	Luddington, Wells & Van S	Lumber	269 89
491	Prairie Farmer	Advertising	6 00
492	Alice M. Urie	Care of art gallery	6 00
493	E. B. Blatchford	Oil cake	8 25
494	Larrabee & North	Hardware	15 75
495	Western Rural	Advertising	4 40
496	Thos. Wright	Castings	11 24
497	Mary L. Page	Work on plans	2 12
498	U. S. Express Co,	Express on box to Washington	8 00
499	R. K. Bliss & Co	Spring wheat	2 00
500	C. H. Cady	Hardware	4 48
501	J. S. Miller	Hardware	5 00
502	J. F. Moore	Work on plans	2 32
503	Robt. Hammersley & Co	Flower pots	24 75
504	Crane Bros. mfg Co	Hardware	118 43
505	R. Blum	1 lantern	1 40
506	J. M. Gregory	Expense to Columbus meeting	9 15
507	Agricultural department	Expense March, 1878	266 69
508	Students' pay roll	March, 1878	292 18
509	S. W. Shattuck	Petty expense, March	17 45
510	Champaign Co. Gazette	Printing 2,500 catalogues	190 00

List of Warrants Drawn.—Continued.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
511	J. M. Gregory	Salary, April, 1878	$ 300 00
512	S. W. Robinson	" "	150 00
513	T. J. Burrill	" "	150 00
514	S. W. Shattuck	" "	150 00
515	E. Snyder	" "	150 00
516	D. C. Taft	" "	150 00
517	J. B. Webb	" "	150 00
518	J. C. Pickard	" "	150 00
519	N. C. Ricker	" "	125 00
520	H. A. Weber	" "	150 00
521	J. D. Crawford	" "	125 00
522	G. E. Morrow	" "	150 00
523	E. L. Lawrence	" "	83 33
524	Lou. C. Allen	" "	100 00
525	F. W. Prentice	" "	100 00
526	P. Baumgras	" "	100 00
527	F. A. Parsons	" "	75 00
528	M. A. Scovell	" "	65 00
529	C. I. Hays	" "	75 00
530	I. O. Baker	" "	75 00
531	Chas. E Pickard	" "	45 00
532	J. C. Lewellyn	" "	40 00
533	G. E. Gregory	" "	25 00
534	A. B. Baker	" "	40 00
535	C. W. Williams	" "	30 00
536	E. A. Kimball	" "	83 33
537	Agricultural department	Farm expense April 1878	722 35
538	Students' pay roll	April, 1878	364 33
539	Brown & Sharp mfg Co	Cutting wheels	14 90
540	W. D. Rudy	Assisting in chem. laboratory	30 00
541	Chas. R. Webb	Cabinet specimens	37 13
542	Chadbourne & Caldwell	2 mowers	105 00
543	I. O. Baker	Expense in chem. laboratory	3 20
544	M. M. Bayersdorf	Plants	4 77
545	G. A. Wild	Work and cabinet specimens	63 40
546	Chas. G. Aiken	Specimens for cabinet	51 50
547	J. M. Gregory	Salary, May 1878	300 00
548	S. W. Robinson	" "	150 00
549	T. J. Burrill	" "	150 00
550	S. W. Shattuck	" "	150 00
551	E. Snyder	" "	150 00
552	D. C. Taft	" "	150 00
553	J. B. Webb	" "	150 00
554	J. C. Pickard	" "	150 00
555	N. C. Ricker	" "	125 00
556	H. A. Weber	" "	150 00
557	J. D. Crawford	" "	125 00
558	G. E. Morrow	" "	150 00
559	E. L. Lawrence	" "	83 33
560	L. C. Allen	" "	100 00
561	F. W. Prentice	" "	100 00
562	P. Baumgras	" "	100 00
563	F. A. Parsons	" "	75 00
564	M. A. Scovell	" "	65 00
565	C. I. Hays	" "	75 00
566	I. O Baker	" "	75 00
567	C. E. Pickard	" "	45 00
568	E. A. Kimball	" "	83 33
569	J. C. Lewellyn	" "	40 00
570	J. E. Gregory	" "	25 00
571	A. B. Baker	" "	40 00
572	C. W. Williams	" "	30 00
573	Enterprise coal co	8 cars coal	110 40
574	C. & U. Gas Co	Gas from Dec. to May 1878	144 00
575	Lyon & Healy	1 pr bass drum sticks	1 50
576	Geo. S. Maxwell	5 cuspadors	4 16
577	Thos. Naughton	24 prints	4 00
578	C. J. Sabin	Coal	4 00
579	Paxton Mills	Hemp and Flax	5 20
580	J. Davis Wilder	Slated paper	1 30
581	Crane Bros. mfg. Co	Hardware	6 91
582	B. C. Beach	Coal	9 00
583	Fuller & Fuller	Glass	56 33
584	Fuller & Fuller	Tubing	1 44

List of Warrants Drawn.—Concluded.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
585	Thos. Wright	Castings	$ 48 53
586	Illinois Central R. R.	Freight	5 00
587	I. B. & W. R. R. Co	Freight, March and April	54 03
588	Ill. Central R. R. Co	Freight	231 60
589	W. Morava	Work in armory	18 68
590	J. B. Webb	Expense in physician's laboratory	10 75
591	E. V. Peterson	Stationery and Printing	24 70
592	The Illini	Advertising	16 66
593	Champaign co Gazette	Printing	26 35
594	W. A. Hendrie	Labor on gears	13 15
595	Crane Bros. mfg Co	Hardware	29 33
596	J. W. Keys	Painting clock dial	36 00
597	J. W. Bunn	Taxes on lands	2,111 78
598	E. V. Peterson	Record and printing	10 50
599	Lorada Taft	1,442 specimen trays	21 63
600	Miss C. E. Patchin	Instruction of choir	25 00
601	Thos. Naughton	Photo views	10 00
602	E. N. McAllister	Postage, March, April and May	43 22
603	Agricultural department	Expense, May 1878	487 21
604	S. W. Shattuck	Petty expense, May	68 27
605	Students' pay roll	May, 1878	269 95
606	J. W. Bunn	Premium on bonds	1,850 00

"C."

Statement *of State Appropriations.*

	APPROPRIATED.	EXPENDED.	UNEXPENDED.
Buildings and grounds	$5,000 00	$2,481 96	$2,518 04
Chemical and physical laboratory	2,000 00	496 59	1,503 41
Mechanical and agricultural shops	3,000 00	1,275 16	1,724 84
Library cases	2,000 00	1,096 95	803 05
Books and publications	3,000 00	1,504 01	1,495 99
Cabinet cases	4,500 00	1,305 66	3,194 34
Cabinets	2,000 00	992 70	1,007 30
Chemical laboratory	40,000 00	19,777 23	20,222 77
Greenhouse	2,500 00	2,138 57	361 43
Taxes on lands	6,000 00	4,306 02	1,693 98
	$70,000 00	$35,374 85	$34,625 15

S. W. SHATTUCK, *Business Agent.*

Urbana, June 3d, 1878.

The report was received, and ordered to be placed on file.
On motion, it was

Resolved, That the president of this board be and he is hereby instructed to consummate the sales to William Burnett and Christopher Burnett, of the S. half of the S. E. quarter and the N. half of the S. E. quarter, section 21, town 19, range 9, by executing to them on behalf of this board, and with the usual covenants of warranty, conveying to each the tract so sold, when he receives information from the treasurer that the considerations for said sales have been paid; and that such deeds be attested by the secretary and the seal of the University.

Mr. Gardner and the business agent were appointed a committee to have the cleaning and repairing of the University buildings done; also to determine the prices of room rent in University dormitories.

The following appropriations, from state and current funds, were made:

For material, cement and slate to Mr. N. C. Terrill & Co. from state appropriation for buildings and repair	$25 00
For library table and post office, from state appropriation for library cases	97 70
For binding of periodicals, from state appropriation for books and periodicals	75 00
For curtains for library cases, from state appropriation	15 00
For books and periodicals for library, to be assigned to the different departments with consultation of the faculty, and expended by a committee consisting of the regent, librarian and business agent	500 00
For the purchase of chemical apparatus, from the state appropriation for physical chemical laboratory	451 95
For purchase of jig saw, from current appropriation, architectural department	100 00
For tools and materials for architect practice, from state appropriation for shop practice	100 00
For a drawing table, special appropriation from current funds, fixtures and furniture	15 00
For a desk and platform, special appropriation from current funds, fixtures and furniture	15 00
For a dozen chairs, special appropriation from current funds, fixtures and furniture	9 00
For collections of insects and plants, from state appropriations for cabinets	50 00
For engraving of University buildings, from current appropriation, special, stationery and printing	40 00
For purchase of tools and material for mechanical shop, from state appropriation for shop practice	50 00
For services as architect, drafting plans and specifications for chemical laboratory, to Prof. N. C. Ricker, from state appropriation for chemical laboratory	120 00
For service as consulting architect, to Mr. J. M. Van Osdel, from state appropriation above	25 00
For printing circulars, Chicago summer school of mechanic art, special, stationery and printing, from current funds	25 00
For printing diplomas, and engraving plates, special, stationery and printing, current funds	350 00
For expenses incurred at the meeting of colleges at Columbus, Ohio, (incid. ex. current funds.)	25 00
For expenses to Dr. E. Orton, inaugural address at dedication of chem. laboratory (incid. exp. current funds.)	20 00

The board then adjourned.

MEETING OF THE BOARD, SEPTEMBER 10, 1878.

The Board of Trustees of the Illinois Industrial University met at the University parlors, on Tuesday, September 10th, 1878, at 3:30 p. m.

Present, Messrs. Cobb, Gardner, Mason and McLean.

Absent, Messrs. Brown, Byrd, Pickrell, Sabin, Gillham and Governor Cullom.

A letter from Judge A. M. Brown was read, regretting that court business prevents his attendance.

No quorum being present, the Board adjourned to September 11th, 1878, at 8 a. m.

SECOND DAY.

The Board met as per adjournment.

The same members being present, the Board adjourned to meet at Freeport, on Thursday, the 19th day of September, 1878, at 7 p. m.. at the Brewster House, and the Secretary was instructed to notify absent members of such meeting.

MEETING AT FREEPORT.

The Board of Trustees met at the Brewster House, in Freeport, Illinois, pursuant to adjournment, on Thursday, September 19th, 1878, at 7:30 P. M.

Present, Messrs. Cobb, Gillham, Pickrell, Sabin, Gardner, Mason and McLean, President Cobb in the chair.

The recording secretary being absent, on motion of Mr. Pickrell, John W. Bunn was appointed secretary pro tempore.

On motion of Mr. Sabin, the appropriations from current fnnds for the six monihs ending February 28, 1879, were passed. (See page 104.)

On motion of Mr. Gardner, the nomination of Prof. Peabody to the chair of Mechanical Engineering at a salary of $1,800 per annum, made by Dr. Gregory, was confirmed.

On motion of Mr. McLean, Mr. E. A. Kimball's salary was increased to $1,200 per annum, commencing September 1st, 1878.

On motion of Mr. Gardner, Mr. F. A. Parson's salary was increased to $75 per month for twelve months, beginning September 1st, 1878.

DEATH OF HON. WILLARD C. FLAGG.

Mr. Cobb reported a series of resolutions in relation to the death of Hon. WILLARD C. FLAGG, which were unanimously adopted.

In Memoriam.

—o—

WHEREAS, Our much loved associate and worthy member, WILLARD C. FLAGG, has been removed by the hand of death; therefore

Resolved, That by this event the Illinois Industrial University has been deprived of one of its most faithful friends, who has been prominently identified with it from its infancy, as trustee, corresponding secretary, and superintendent of agricultural experiments, and whose service in every capacity has been marked with high personal integrity and a true appreciation of its interests.

Resolved, That as a member of the Board of Trustees he was ever kind and courteous, and that we recognize in his faithful counsels the principles of justice and right, which were the marked characteristics of his life.

Resolved, That the State of Illinois in his death has lost one of its purest public men and one of its most valuable and self sacrificing citizens.

Resolved, That in his death we feel the loss of a friend, and we do hereby express to his family our most heartfelt sympathy in their great bereavement.

Resolved, That the recording secretary forward a copy of the resolutions, neatly engrossed, to the family of the deceased, and that he set apart a page in our record book, appropriately headed and bordered, as an obituary page in honor of our deceased member, on which these resolutions shall be copied, and that the corresponding secretary have a like page prepared in the current published transactions of the University.

Appropriations from Current Funds for the six months ending Feb. 28th, 1879.

Board expenses	$ 300 00	
Salaries—		
Regent	1,800 00	
Eight Professors at $900	7,200 00	
Three " at $750	2,250 00	
Two " at $600	1,200 00	
Four Instructors at $450	1,800 00	
Lewellyn	360 00	
Pickard $300, Clark $300	600 00	
Rudy $210, Wild $200	410 00	
Kimball	600 00	
Janitors	240 00	
Janitor 2d and 3d	360 00	
Assistants	300 00	
Choir $25, library $115	140 00	
Gymnasium	50 00	
		$17,310 00
Fuel and gas light		3,000 00
Stationery and printing		300 00
Buildings and grounds		100 00
Incidental expenses		200 00
Furniture and fixtures		100 00
Library		50 00
Military department		50 00
Agricultural department balance		1,152 17
Horticultural " "		190 52
Chemical " "		258 12
Mechanical " "		260 68
Architectural " "		109 61
Sundries—		
Physical laboratory balance		198 55
Cabinets, balance		11 44
Architectural department furniture, balance		39 00
		$23,629 09

Hon. J. M. Gregory made the following report, which was received and placed on file:

REGENT'S REPORT.

To the Trustees of the Illinois Industrial University:

GENTLEMEN:

As you are already aware, immediately after your last meeting, and with your consent, I embarked for Europe to serve as one of the commissioners of the United States at the Paris exposition. The results of my observations made in the interests of the state will be duly communicated to the governor in a formal report. You will be pleased to learn that the fame of our university had preceded the exhibit which we sent over, and the exhibit itself was asked for by the eminent men in the jury even before it was known to be there. It attracted much attention, and secured for the University, the award of the gold medal which is, as far as I could ascertain, the only gold medal awarded to any American institution.

I may also state as a result of my summer's observations, an increased confidence in the importance of our work, and in the general excellence of our plans. Scientific education and the application of science to the industrial arts, are commanding more and more the attention and support of the great manufacturing nations, the educational exhibits, and especially those of practical character surpassing those of any former exposition. The Russian technical schools, whose display at

Philadelphia created so great a sensation in the east, have at Paris an exhibition still more magnificent and complete. The technical schools, also, of Belgium, Austria and Switzerland were well represented, but the French exhibit surpassed all others in the volume and variety of the practical work of the students of the several grades and classes of technical schools. We may rest assured that we are none too soon in the field in this great department of education, and that what we have already accomplished should be counted but as the beginning of the vast work which lies before us.

I am too recently returned, having reached home on Saturday evening, to be prepared to state to you more than an outline of the work performed here during the summer. Much of it shows for itself in the beautiful, renovated look of the college building, the good order of the college grounds, and the nearly completed work in the laboratory building. I shall expect to lay before you, from the several departments, reports from the professors in charge of such things as may require your attention.

CHAIR OF MECHANICAL ENGINEERING.

It is with profound regret that I announce to you the resignation, since your last meeting, of Prof. S. W. Robinson, who has so long and ably filled the important chair of mechanical engineering. It is due to those who have served faithfully and efficiently, that some recognition be made of the value of the services rendered, and of our appreciation of their good qualities, as well as of their fidelity and success. Prof. Robinson, though still a young man, has already made a reputation in his department on both sides of the Atlantic, and stands to-day among the recognized authorities in mechanical science. The untiring zeal and energy with which he has worked for the developement of the school of mechanical engineering, are too well known to need new testimony. The position that this school occupies in our University is due chiefly to his eminent ability and enthusiasm. It mitigates, if possible, my regret at his loss to know that he will be organizing, elsewhere, another centre of education so important to our country.

Immediately on the receipt of the tidings of Prof. Robinson's resignation, I opened a correspondence in several directions, to secure a competent candidate for the vacant chair. Prof. Shattuck also corresponded with several leading institutions for the same purpose. As a result a large number of candidates have been nominated to us, and in many cases strongly recommended. After as careful a consideration as the limited time would allow, I have concluded to nominate, as in my judgment the best man for the place, Prof. S. H. Peabody, now of the Chicago high school, but formerly professor of engineering in the Massachusetts agricultural college. Prof. Peabody's reputation was formerly well known to the members of our board of trustees when the professorship now in question was tendered to him. His standing as a scholar, his reputation as a teacher, and his eminent ability in the direction required, will go far to maintain without diminution the reputation of the school at the high point already obtained.

Among the candidates for this chair, the case of Prof. H. Herr is worthy of special notice, not alone from the high testimonials which he presents, but also from his peculiar qualifications for the chair of

mining engineering, and if that chair was now to be filled, possibly no better man could be found for the place.

ASSISTANT TEACHERS.

As I nominated to you at your last meeting, and you reappointed assistant teachers for the coming year for nearly all the departments, I need at present only ask to have lodged in the hands of the regent and of the professors in charge, authority to employ any additional instructors which the emergencies of our work may possibly demand. It is impossible to foresee in all cases the amount of work, and we have been accustomed from year to year to supply temporary deficiencies in our teaching force in this way. We may need an instructor in education, to be paid as heretofore by the fees, and perhaps also in clay modeling and in chemistry. Beyond this I believe that our teaching force will be found adequate, unless the attendance shall largely exceed that of any former year.

SALARIES.

I crave the indulgence of the board in laying before you again the question of salaries. I am not unmindful of the embarrassments which beset the trustees of institutions like this, in the almost universal inadequacy of their funds to the many and diverse wants which press upon them. And I know how willingly the board of trustees would vote ample salaries to capable and faithful instructors. In the case of this University there is an additional reason for economizing in salaries in the increasing demand for additional men to fill chairs not yet provided for: but after all, there is a law of supply and demand which controls college salaries as well as the wages of all labor. If we would have and keep first class men we must pay the market price. The reduction of salaries below the average paid by similar institutions for similar services, exposes us constantly to losses such as that which we have just suffered in the removal of Prof. Robinson. Professors may not resign at once when their salaries are reduced; but each will feel himself at liberty to leave on the first offer of a larger salary, and as every really valuable man is steadily increasing in ripeness and value, we may expect to see one after another removed as fast as their ripened worth becomes known. And on the other hand a low rate of salaries forbids us to go into the market and seek the best men; whenever occasion comes to fill a vacant chair we must necessarily look for cheap men, which means young men without experience or reputation, or older men with but little merit or ability. I feel bound to utter to you my conviction that this University can never be maintained in full standing and power at the present rate of salaries, a rate not only lower than the state universities and other reputable colleges around us, but lower even than is paid at the state Normal schools. I am well aware that a general increase of salaries is impossible without an increase of current income. I feel that I should be wanting in duty if I did not urge on the board early consideration of the several sources from which an increase of funds might be obtained, and the adoption of measures for the restoration of the salaries to the old standard before suffering

other losses in our faculty. I recommend the appointment of a committee to report upon this subject to the board at its next quarterly meeting in December.

SPECIAL CASES.

In connection with this subject of salaries I ask your attention to the following requests for immediate increase:

I. E. C. Kimball, foreman of the machine shop, is now receiving but $1,000 a year. Mr. K. has proved himself a faithful, capable and efficient officer, and as we must now throw additional responsibility upon him in the instruction of the shop-practice classes, I recommend that his salary be increased to $100 a month.

II. I repeat my recommendation that the salary of F. A. Parsons be increased to $1,000 per annum, or at least that the monthly pay of $75 be continued through the twelve months.

III. As Chas. E. Pickard is now serving his third year, and as his work occupied more than the average time, it seems but reasonable that his salary should be increased to the $60 per month heretofore paid by the board to the instructors of equal standing.

IV. I wish also to call the attention of the board to the cases of Prof 's Crawford and Ricker. These gentlemen have now approved themselves, by several years of increasing usefulness, as good and true men in their respective departments; they have also been called upon for extra service, Prof. Ricker in the case of the shop, and Prof. Crawford in the management of the library. Starting with us as young men, they have risen by faithful efforts to an equality of rank and service with the professors employed before them, and there seems no reason why their salaries should not be raised to the common standard. If it is not possible to make this increase at present, I recommend that these cases be referred to the committee already suggested on the subject of salaries. I refer herewith the communications of Messrs. Kimball, Parsons and Pickard.

ANNUAL REPORTS.

The communication from the corresponding secretary will inform you of the causes of the delay in the appearance of our reports. The board will recollect that under the law of congress, the University is bound to present annual reports instead of biennial ones as required by the state law. It may be wise to call the attention of the coming general assembly to this discrepancy.

STATE APPROPRIATIONS.

As the governor will ask from us a statement of our wants, to lay before the state legislature, it is desirable that steps be taken at an early day to determine the amounts which may be needed from the state for the next two years. There are some other questions which may properly be considered in connection with the legislation to be asked, especially that of the name of the University, a misnomer which has already cost much confusion and the loss of many valuable

students. It was impolitic to give another club to our enemies at the outset of our work, but the character and reputation of the University are now so well established that the rectification of its title cannot create apprehensions or do harm.

MILITARY DEPARTMENT.

The communication of Prof. Dinwiddie, asking you to define his position as teacher of military tactics, will call to your attention the trouble which has come to the military department from the attempt to make a double head, Prof. Snyder retaining command of the battalion while Prof. Dinwiddie holds charge as professor. Whatever may be the merits of the present case, it has become evident that this arrangement ought to be abandoned. As by the new militia law the battalion does not any longer exist as a legal military organization, the office of commandant expires by natural limitation. The simple recognition of this plain fact will at once relieve the situation, and the board will treat the department like all other departments of instruction, and supply such teaching force as they may find best.

J. M. GREGORY, *Regent.*

On motion of Mr. Sabin, the president was authorized to appoint a committee of three on the question of salaries and state appropriations to report at the next regular meeting. The president appointed Messrs. McLean, Gardner and Pickrell as said committee.

On motion of Mr. Pickrell, Dr. Gregory was requested to draw resolution in regard to the resignation of Prof. Robinson, and report same at the next meeting.

John W. Bunn presented his report for the quarter ending August 31st, 1878. The president and treasurer also presented a statement of the investment of the endowment fund, showing the kind of bonds said funds was now in, which was approved and ordered placed on record.

SPRINGFIELD, ILL. Sept. 10th, 1878.

List of Bonds belonging to the Illinois Industrial University.

Champaign county 8 per cent. bonds	$115,000
Morgan county 8 " "	25,000
Kankakee county 10 " "	30,000
Pike county 10 " "	35,000
Sangamon county 10 " "	25,000
Sangamon county 8 " "	11,000
Douglas county, school district " district No. 3, Township No. 16	9,000
Menard county 7 per cent. "	10,000
Chicago Water 7 " "	25,000
Illinois 6 " "	31,000
Champaign county 10 " "	2,000
Balance not invested $1,178 87.	$318,000

JOHN W. BUNN, Treasurer.

EMORY COBB, President.

Illinois Industrial University, in acc't with John W. Bunn, Treasurer.

1878.		DR.		
Aug.	31	To am't paid board expense	$138 61	
"	31	" " for salaries	7,197 03	
"	31	" " " buildings and grounds	10 97	
"	31	" " " fuel and lights	358 54	
"	31	" " " stationery and printing	256 45	
"	31	" " " furniture and fixtures	4 15	
"	31	" " " mechanical department	4,666 00	
"	31	" " " architectural "	1,487 60	
"	31	" " " agricultural "	2,521 08	
"	31	" " " horticultural "	454 88	
"	31	" " " chemical "	138 66	
"	31	" " " military "	12 70	
"	31	" " " library and apparatus	3 99	
"	31	" " " incidental expenses	123 97	
"	31	" " " premium and accrued interest on bonds purchased	1,611 00	
				$18,985 63
"	31	" " " physical laboratory	2 70	
"	31	" " " diploma	350 00	
"	31	" " " horse model	20 50	
"	31	" " " preparatory department	157 50	
"	31	" " " cabinets	49 58	
"	31	" " " Paris exposition	50	
				580 78
"	31	" " " chemical laboratory	16,308 09	
"	31	" " " chemical and physical laboratories	1,125 54	
"	31	" " " mechanical and architectural shops	286 93	
"	31	" " " cabinets	310 75	
"	31	" " " books and publications	175 43	
"	31	" " " buildings and grounds	1,115 83	
"	31	" " " cabinet cases	50 55	
"	31	" Balance state appropriation	$15,252 89	19,373 12
		Current expenses	8,697 54	23,950 43
				$62,889 96

Illinois Industrial University, in acc't with John W. Bunn, Treasurer.

1878		CR.		
June	4	By balance		$5,954 65
"	15	" Interest on Morgan county bonds		2,000 00
July	2	" " Kankakee county bonds		3,000 00
"	2	" " Pike county bonds		3,000 00
"	2	" " Champaign county bonds		4,600 00
"	2	" " Illinois 6 per cent. bonds		930 00
"	2	" " Chicago 7 per cent. bonds		875 00
"	2	" " Champaign county "		225 00
"	2	" " Kankakee school "		200 00
"	2	" am't rec'd from state for taxes on lands in Nebraska and Minnesota		
"	2	To am't rec'd from state, buildings and grounds	$2,111 78	
"	2	To am't rec'd from state, mechanical shops	2,500 00	
"	2	" " " Books and publications	1,500 00	
"	2	" " " Cases for cabinets	1,500 00	
"	2	" " " Chemical and phys. lab'y	2,250 00	
		" " " Specimens for geological, mineralogical and natural history	1,100 00	11,861 78
"	2		1,000 00	
"	2	" " " Chemical laboratory building	10,000 00	
		" " " Heating and furnishing do	10.000 00	20,000 00
Aug.	31	" " on acc't Mechanical department	5,085 77	
"	31	" " " Architectural "	1,360 21	
"	31	" " " Agricultural "	2,486 21	
"	31	" " " Horticultural "	322 49	
"	31	" " " Chemical "	270 75	
"	31	" " " Buildings and grounds	51 00	
"	31	" " " Physical laboratory	201 25	
"	31	" " " Cabinets	45 00	
"	31	" " " Fees and room rents	160 00	
"	31	" " " Tuition in preparatory department	80 00	
"	31	" " " Ill. Cent. R. R. freight	180 85	
				10,243 53
				$62,889 96

Urbana, Sept. 10, 1878. JOHN W. BUNN, Treasurer.

STATEMENT *of Current Expenses and Receipts, six months, ending August* 31, 1878.

	APPROPRIATIONS.	RECEIPTS.	EXPENDITURE.	BALANCES.
Board expenses	$ 200 00		$ 273 46	$ 73 46
Salaries	15,225 00		14,810 45	414 55
Buildings and grounds	200 00	$ 101 09	120 98	180 11
Fuel and lights	1,000 00	101 04	653 87	447 17
Stationery and printing	665 00		563 08	101 92
Fixtures and furniture	139 00		8 31	130 69
Mechanical department	334 25	5,334 76	5,408 33	260 68
Architectural "	839 08	1,402 84	2,132 31	109 61
Agricultural "	2,845 50	2,809 97	4,503 30	1,152 17
Horticultural "		799 45	608 93	190 52
Chemical department	178 04	270 75	190 67	258 12
Military "	150 00		114 95	35 05
Library and apparatus	25 00		7 11	17 89
Incidental expense $200.	245 00		167 45	77 55
Sundries—freights 50.			35 72	14 28
engineer's transit 550.				550 00
Paris exposition 25.			12 50	12 50
Illini 15.			15 60	60
diploma 350.			350 00	
physical laboratory		201 25	2 70	198 55
preparatory department		691 50	727 50	36 00
cabinets		75 00	63 56	11 44
agricultural institute			36 50	
premium on bonds and accrued int.			3,461 00	
State appropriations	70,000 00		22,798 01	15,252 89
Ill. Cent. R. R. Freights		772 65		
Fees and room rents		1,664 50		

LIST OF WARRANRS DRAWN.

No.	TO WHOM.	FOR WHAT.	AMOUMT.
607	D. B. Gillham	Expense to meeting	$ 12 90
608	John J, Byrd	" "	19 15
609	Alex McLean	" "	39 85
610	D. D. Sabin	" "	12 75
611	J. H. Pickrell	" "	9 80
612	Emory Cobb	" to 3 meetings	22 35
913	Lorado Taft	Instruction in clay modeling	27 30
614	Barker & Co	Electrotype cuts	40 00
615	Western Bank Note Co	Engraving diploma plate	350 00
616	D. Gardner	Expense to university meeting	12 71
617	J. W. Bunn	Expense to meetings 1 year	46 60
618	A. B. Baker	Cleaning and grading lab'y	38 12
619	Edward Orton	Expense to inaugurate lat'y	45 00
620	Hamburg Am. Packet Co	Freight on horse model	20 50
921	C. & U. Gas Co	Bill for May '78	63 90
622	J. Saleron	Apparatus, physician's laboratory	10 90
623	Jas Wright	Castings	50 12
624	Ill. Central R. R. Co	Freight	1 76
925	J. M. Gregory	Salary, June 1878	300 00
626	S. W. Robinson	" "	150 00
627	T. J. Burrill	" "	150 00
628	S. W. Shattuck	" "	150 00
629	E. Snyder	" "	150 00
630	D. C. Taft	" "	150 00
631	J. B. Webb	" "	150 00
632	J. C. Pickard	" "	150 00
633	N. C. Ricker	" "	125 00
634	H. A. Weber	" "	150 00
635	J. D. Crawford	" "	125 00
636	G. E. Morrow	" "	150 00
637	E. L. Lawrence	" "	83 33
638	S. C. Allen	" "	100 00
639	F. W. Prentice	" "	100 00
640	P. Baumgras	" "	100 00
641	F. A. Parsons	" "	75 00
642	M. A. Scovell	" "	65 00
643	C. I. Hays	" "	75 00
644	I. O. Baker	" "	75 00
645	C. E. Pickard	" "	45 00

List of Warrants Drawn.—Continued.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
646	E. A. Kimball	" "	83 33
647	J. C. Lewellyn	" "	40 00
648	J. E. Gregory	" "	25 00
649	A. B. Baker	" "	40 00
650	C. W. Williams	" "	30 00
651	N. C. Terrill & Co	Balance chem. laboratory cont'd	6,896 18
652	N. C. Ricker	Service of arch. and plans and spec'ns.	120 00
653	J. M. Van Osdel	Services as consulting architect	25 00
654	N. C. Terrell & Co	Extra material	25 00
655	Luddington, Wells & Van S.	Lumber	154 05
656	Arthur Seymour	Work	25 00
657	Agricultural department	Farm expense June	947 43
658	Peterson & Lloyde	Books	28 18
659	Zell, Francis & Co	1 bbl alcohol	16 20
660	D. Van Nostrand	1 vol Rigg's steam engine	13 60
661	F. W. Christian	Periodicals	78 97
662	J. Burkett Webb	8 vols. Franklin's Inst	9 60
663	Thos. Wright	Castings	85 42
664	Garden City lead pipe co	Pipe, sheet lead, etc	207 37
665	Whitall, Tatum & Co	Apparatus	25 01
666	Geo. A. Wild,	Wages and expenses in cab's	129 35
667	J. M. Gregory	Salary, July, 1878	300 00
668	S. W. Robinson	" "	150 00
669	T. J. Burrill	" "	150 00
670	S. W. Shattuck	" "	150 00
671	E. Snyder	" "	150 00
672	D. C. Taft	" "	150 00
673	J. B. Webb	" "	150 00
674	J. C. Pickard	" "	150 00
675	N. C. Ricker	" "	125 00
676	H. A. Weber	" "	150 00
677	J. D. Crawford	" "	125 00
678	G. E. Morrow	" "	150 00
679	E. L. Lawrence	" "	83 33
680	Lou. C. Allen	" "	100 00
681	P. Baumgras	" "	100 00
682	M. A. Scovell	" "	40 00
683	C. I. Hays	" "	75 00
684	E. A. Kimball	" "	83 33
685	A. B. Baker	" "	40 00
686	C. W. Williams	" "	30 00
687	G. A. Wild	" "	57 50
688	J. A. Fay & Co	1 scroll saw	105 00
689	Larrabee & North	Hardware	13 82
690	Students' pay roll	June 1878	292 41
691	Crane Bros. mfg co	Hardware	939 28
692	Walker & Stayman	85 per ct. on chem. lab'y desks	151 00
693	Geo. A. Wild	Mounting specimens	55 35
694	Agricultural department	Farm expense July, '78	868 26
695	Larrabee & North	Hardware	63 08
696	J. F. Lawrence	Labels for plants	3 50
697	G. E. Morrow	Seeds	5 35
698	Wm. Raydon	Handling coal	9 25
699	Stearns & Co	1 bbl. stucco	2 25
700	E. B. Benjamin	Filter paper	4 08
701	Culver, Page, Hoyne & Co	Paper	9 69
702	W. S. Maxwell	Duster and stationery	4 05
703	G. C. Willis	6 yards delaine	2 10
704	W. S. Maxwell	Wall paper	6 04
705	Jno. S. Stott	Stationery	5 15
706	D. Humphreys	Brass castings	3 00
707	D. W. Williams	7½ days' work	7 50
708	H. Paulsen	Brushes and dusters	6 55
709	E. A. Pratt	Calsomining	49 50
710	U. S. patent office	Binding reports	7 80
711	Brown, Holdaway & Co	Books	5 50
712	Eichberg Bros	7 curtains	14 68
713	T. J. Burrill	Expense to Springfield	9 10
714	B. F. Sturtevant	Machinery	168 00
715	Inter Ocean pub. co	Advertising	16 05
716	Adelphic Society	Rent of piano	4 00
717	Fuller & Fuller	5 gals. alcohol	11 53
718	N. H. Edgerton	Physical apparatus	10 60
719	Henry & Keriher	Buckets, etc	9 65
720	Wm. E. Story	Periodicals	5 00
721	W. F. Pratt	Repairs on roof	13 37
722	Besore	Lumber	34 11

List of Warrants Drawn.—Continued.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
723	Covert & Greenhood	½ doz. draw locks	4 42
724	N. A. Williams	35 bbls cement	54 25
725	Jno Williams	Tools	16 93
726	Andrew Barr	Lumber	26 77
727	Ill State Journal	Advertising proposals	10 50
728	C. & W. Kirkpatrick	1 bbl white clay	2 00
729	C. W. Williams	Petty expenses	3 20
730	Abendroth & Root, mfg co	60 horse power engine	1,146 80
731	Students' labor pay roll	July, 1878	682 54
732	A. B. Baker	Pay roll of workmen	99 50
733	Richard Cox	Digging 1 well, 2 cisterns	38 00
734	Crane Bros. mfg co	Hardware	215 60
735	Crane Bros. mtg co	Hardware	381 11
736	J. M. Gregory	Salary, August 1878	300 00
737	S. W. Robinson	" "	150 00
738	T. J. Burrill	" "	150 00
739	E. Snyder	" "	150 00
740	S. W. Shattuck	" "	150 00
741	D. C. Taft	" "	150 00
742	J. B. Webb	" "	150 00
743	J. C. Pickard	" "	150 00
744	N. C. Ricker	" "	125 00
745	H. A. Weber	" "	150 00
746	J. D. Crawford	" "	125 00
747	G. E. Morrow	" "	150 00
748	E. L. Lawrence	" "	83 33
749	P. Baumgras	" "	100 00
750	M. A. Scovell	" "	40 00
751	C. I. Hays	" "	75 00
752	E. A. Kimball	" "	83 33
753	A. B. Baker	" "	40 00
754	L. C. Allen	" "	100 00
755	C. W. Williams	" "	30 00
756	G. A. Wild	" "	50 00
757	J. C. Lewellyn	July and Aug, 1878	120 00
758	Hollister & Baker	Looking glass	2 40
759	J. W. Harp	2 days teaming	4 00
760	A. R. Scott & Co	2,500 fire brick	87 50
761	Daily Normal	Advertising	5 00
762	Flemming Doane	Work and material	190 99
763	Seeley Brown	Supt. service	100 00
764	A. B. Baker	Pay roll of workmen	21 50
765	Wm. Jenkins	20 yards sand	25 00
766	E. Snyder	Expenses to Springfield	10 85
767	Fuller & Fuller	Glass	39 68
768	R. S. Wilbur	Hauling coal	34 80
769	Jas. M. Smith	13¼ days work, masonry	29 81
770	S. W. Robinson	Books	8 40
771	John O. Neil	Plumbing	100 00
772	Robinson & Burr	Shafts, collars and pulleys	62 50
773	Williamson & Phinnister	Hardware	7 80
774	Agricultural department	Farm expense, Aug	378 64
775	E. A. Pratt	Painting and calsomining	66 00
776	E. L. Lawrence	Boxes and picking cherries	24 54
777	Wm. Price	Painting and calsomining	175 45
778	Students' pay roll	August, 1878	596 20
779	N. A. Williams	Cement	26 35
780	Matthiessen & Hegler zinc co.	Zinc	1 36
781	Larrabee & North	Hardware	2 60
782	Thos. Wright	Castings	112 52
783	Jno. H. McGowan	Belting	15 14
784	W. F. Pratt	Repairs on buildings	34 03
785	Stillwell & Burce, mfg co	1 heater	60 00
786	G. E. Hessel	Belting	13 60
787	Eichberg Bros	Oil cloth	1 75
788	C. J. Sabin	Coal	6 40
789	Fuller & Fuller	Glass	7 75
790	John Schreiber	13½ days labor	16 87
791	I. B. & W. Ry	Freight	83 42
792	Jno. S. Stott	Stationery	9 00
793	Geo. C. Morgan	1 boiler	390 00
794	R. Blum	Pipe, tank, &c	93 71
795	Mary Page	Work on plans	8 93
796	G. Roop	Specimens for cabinets	6 00

List of Warrants Drawn.—Continued.

No.	TO WHOM.	FOR WHAT.	AMOUNT.
797	Adolph Sturm	Veneers and woods	42 39
798	Bott Hammersley & Co	Flower pots	23 10
799	H. Swannell	Medicine, chemicals, &c	21 86
800	Enterprise Coal Co	20 cars coals	280 60
801	Mechanical department	Heating app. boiler, &c	4,629 35
802	" "	Work for other departments	134 56
803	" "	Work on buildings	32 46
804	" "	Material and work for cabinets	4 50
805	Charles Hendy	Painting and graining	54 00
806	Charles Hendy	Glazing, paint and putty	50 55
807	Crane Bros. mfg co	Hardware	343 27
808	Crane Bros. mfg co	Hardware	20 73
809	Champaign co Gazette	Circulars and printing	170 75
810	H. Swannell	Chemicals	423 15
811	E. Benjamin	Chemicals	680 89
812	Brown & Anderson	Plastering	47 50
813	Agricultural department	Work 6 mos	58 98
814	" "	Grading, chem. laboratory	188 85
815	" "	Work for other departments	409 26
816	E. N. McAllister	Postage	23 00
817	Walker & Stayman	Estimate of work on desks	780 00
818	Ill. Central R. R	Freight	180 85
819	Architectural department	Fixtures in chem. laboratory	1,264 58
820	" "	Power spring term S. P	60 00
821	Mechanical "	" " "	60 00
822	F. A. Parsons	1 set Spencerian charts	3 70
823	S. W. Shattuck	Petty expense 3 mos	95 37
824	D. C. Taft	" in cab's	8 16
825	J. W. Bunn	Premium and accrued interest	398 00
826	Horticultural department	Work 6 mos. and trees	202 86
827	D. Gardner & Co	Premium and accrued inst	1,213 0(

On motion of Mr. McLean the following resolution was passed:

WHEREAS, The University battalion has ceased by law to be a legal military organization, the office of commander of the battalion ceases to exist; therefore

Resolved, That the military professor therefor has charge of the military classes and drill organizations, under the supervision of the regent.

Mr. McLean, chairman of the building committee, made the following report, which was accepted, and on motion of Mr. Pickrell, placed on file:

REPORT OF THE BUILDING COMMITTEE.

To the President and Board of Trustees of the Illinois Industrial University:

The undersigned, your building committee, would respectfully report as follows:
At a regular meeting of your board, held June 10th, 1878, we were ordered to publish for bids to furnish and complete the laboratory building, according to plans and specifications approved by your board, which was accordingly done. Copy of said published notice is herewith made a part of our report.

PROPOSALS FOR THE ERECTION OF A CHEMICAL LABORATORY FOR THE ILLINOIS INDUSTRIAL UNIVERSITY AT URBANA, ILL.

Bids will be received for the above purpose by the trustees of the said University, on Tuesday, the tenth day of July, 1877, at the University, at Urbana, Illinois.
Plans and specifications will be at the office of their consulting architect, Mr. J. M.

Van Osdel, Chicago, Ill., 41 Clark street, from June the nineteenth to June the twenty-fifth, 1877, and at the University from June the twenty-seventh to July the ninth, 1877.

The trustees reserve the right to reject any and all bids.

EMORY COBB, President.

URBANA, Ill., June 6th, 1877.

On the 25th day of June, 1878, your committee met at the University building and opened the bids made in accordance with said notice as follows:

To Walker & Stayman, of Champaign, was awarded the making of nineteen desks for laboratory, at his bid to-wit: One hundred and nineteen dollars and fifty-four cents ($119 54) each. And to J. C. Lewellin, of Illinois Industrial University machine shops, was awarded the furnishing of heating apparatus and remainder of furnishings necessary for said laboratory, according to plans and specifications, for the sum of six thousand, five hundred and seven dollars and thirty cents. And on consideration of bid of W. A. Moore, of Urbana, for plumbing, was rejected, and ordered that Mr. Gardner have the same done at lowest price and best workmanship.

We further report that we have examined the workmanship and material used in the completion of it, and find it equal to the specifications.

There is some finishing yet to be done on the desks, but from the fact that the bowls are not ready yet, the contractor has to wait their reception before completing same.

We refer to the report of architect N. Clifford Ricker for particulars, and make same part of this report.

CHAMPAIGN, Sept. 10th, 1878.

To the building Committee of the Hon. Board of Trustees, of the Illinois Industrial University:

GENTLEMEN:—I have the honor to report to you as follows:

The heating apparatus is nearly completed, a few connections, &c., only remaining to be made, and the shafting, belts, &c., to be put in place. As you may see, the boilers are set coil of steam pipes complete, engine pump and fan are complete and set.

The hot air pipes are also in place, the registers in mansard story being still to be put in.

Mr. Walker's contract is nearly completed, the principal items still incomplete being:

1. Cutting holes for wash bowls.

2. Furnishing and putting on angle castings which fasten regent's cases to tables.

3. Furnishing and putting on sash fastenings, and lock plates, &c., for doors and drums.

One hundred dollars will, I believe, complete these items.

The contract of architectural shops is also nearly finished. The things remaining to be done are:

1. Sash pulleys and weights for sashes in private laboratory and gas hoods. The pulleys are ordered, sash weights now being cast at Illinois Industrial University foundry.

2. Case for specimens and models in lecture room. Sash, panels and table are made.

There seems to be some uncertainty as to whether this case was ordered by your committee or not, and the records do not decide the point.

There are several items also incomplete which are to be furnished directly by the University.

1. *Water Tank.*—The iron and rivets were obtained, ready to put together, from Crane Bro's, Chicago. Mr. P. Sullivan, of Urbana, agreed to build the tank for $35, but owing to delay in getting the materials, Mr. Sullivan obtained a job in Danville, and declines to carry out the agreement. Mr. J. Reedy, of the Illinois Central railroad, offers to do the work for $65. Mr. Gardner directed me to leave the matter until your meeting, and write to other parties.

2. *Wash Bowls.*—These could not be obtained ready made, and are being manufactured at New York, but have not yet been received.

3. *Gas Flues from Gas Hoods.*—These cannot be permanently fixed until the bowls are set in the desks.

The supply of rain water to the cistern can be much increased by connecting southwest conductor with the south cistern, which can easily be done by running a conductor along the ceiling of southwest room in basement. This would not cost over $25, and I recommend that it be done.

I would also recommend that as it may become necessary to place steam heating coils in the halls, in addition to the apparatus already provided, a sufficient sum be reserved until the heating apparatus can be fully tested. $250 would be ample.

Respectfully submitted,

N. CLIFFORD RICKER.

We would also report that the contractors, N. C. Terrill & Co,, have been fully paid all demands whatsoever, and the receipts in full for same are filed with voucher No. 651, of July 1st, 1878. And further that the contractors under the award of bids, and other parties that have furnished materials and labor in and about said premises have been paid for said labor and material certain sums of money as per schedule herewith attached, and made part of this report.

Drawn on Chemical Laboratory building—Account from June 1, 1878, to August 31, 1878.

DATE.	NO.	TO WHOM DRAWN.	FOR WHAT DRAWN.	AMOUNT.
1878.				
June 6	618	A. B. Baker	Cleaning and grading	$ 36 12
July 1	651	N. C. Terrill & Co	Balance on contract	6,896 18
" 1	652	N. C. Ricker	Service as architect and plans	120 00
" 1	653	J. M. Van Osdel	Services as consulting architect	25 00
" 22	664	Garden City Lead Pipe Co	Pipe, sheet, lead, etc	207 37
" 22	665	Whitall, Tatum & Co	Apparatus	25 01
Aug. 2	692	Walker & Stayman	85 per cent. on chemical lab. desks	1,151 00
" 15	715	Inter Ocean Publishing Co	Advertising	16 05
" 15	724	N. A. Williams	35 barrels cement	54 25
" 15	727	Illinois State Journal	Advertising	10 50
" 15	733	Richard Cox	Digging 1 well, 2 cisterns	38 00
" 15	734	Crane Bro's Manufacturing Co	Hardware	215 60
" 31	763	Seeley Brown	Supt. service 1 month	100 00
" 31	765	Wm. Jenkins	20 yards sand	25 00
" 31	771	John O. Neil	Plumbing	100 00
" 31	769	James M. Smith	13¼ days mason work	29 81
" 31	779	N. A. Williams	Cement	26 35
" 31	790	John Screiber	13½ days labor	16 87
" 31	795	Mary Page	Work on plans	8 93
" 31	801	Mechanical department	Heating apparatus, engine, &c	4,629 35
" 31	807	Crane Bro's Manufacturing Co	Hardware	343 27
" 31	814	Agricultural department	Grading	188 85
" 31	817	Walker & Stayman	Estimate of work, desks	780 00
" 31	819	Agricultural department	Fixtures in chemical laboratory	1,264 58
				16,308 09
			Amount paid	19,777 23
				36,085 32

Which shows a total expended in the erection, grading and furnishing said laboratory, and paid to Sept. 11, 1878, amounting to thirty six thousand, eighty five dollars and thirty two cents.

We would further submit the estimates made by Profs. Shattuck and Ricker, to complete the furnishing of said laboratory for present use, viz:

Estimates of amounts yet to be paid on Chemical Laboratory.

Plumbing	$ 100 00
152 wash bowls	300 00
20,000 brick	160 00
Balance to Walker & Stayman	340 00
Tank	65 00
Hot air flues	300 00
Condensing apparatus, etc	50 00
Specimen case	150 00
Other small bills	200 00
Extra work from arch department	150 00
Extra work from mechanical department	150 00
Bottles for desks	800 00
Chairs	150 00
Extra heaters	250 00
Gas flues	200 00
Contingent	160 00
	$3,400 00

It was recommended by Prof. Weber, and deemed necessary by your committee, to dig two cisterns and one well, to furnish an ample supply of water for the laboratory, which was done under the direction of Mr. Brown, assistant superintendent, together with the grading around the building.

We would recommend that so far as the state appropriation will permit, that the items of furnishings, as set forth in estimates submitted by Profs. Shattuck & Ricker, heretofore referred to, be ordered and finished according to plans and specifications.

Respectfully submitted,

ALEX. McLEAN,
D. GARDNER,
R. B. MASON. } Committee.

A communication from Prof. Morrow, reporting some wants on the University farm, was referred to Mr. Gardner with power to act.

The regent was authorized to employ a third assistant in the chemical laboratory at $10 per month, also a teacher of elocution to be paid by fees collected.

A communication from Mr. Robert Eccel, in regard to heating pipe, was referred to the regent and Mr. Gardner with power to act.

Messrs. Mason, Sabin, Gardner and the regent, were appointed a committee to employ a professor of mechanical engineering.

A report from the corresponding secretary in regard to the president's report of the University for 1875 and 1876, now in the hands of the state printer, was received and ordered to be placed on file.

On motion adjourned.

JOHN W. BUNN,
Secretary pro tem.

EMORY COBB,
President.

CHARACTER AND ORGANIZATION

Of the University.

OFFICERS AND INSTRUCTORS.

FACULTY.

HON. JOHN M. GREGORY, LL. D.,
Regent, and Professor of Philosophy and History.

*STILLMAN W. ROBINSON, C. E.,
Professor of Mechanical Engineering.

THOMAS J. BURRILL, M. A.,
Professor of Botany and Horticulture, and Secretary.

COL. SAMUEL W. SHATTUCK, M. A., C. E.,
Professor of Mathematics, and Vice-President.

COL. EDWARD SNYDER, M. A.,
Prof. of Modern Languages and Commander University Battalion.

DON CARLOS TAFT, M. A.,
Prof. of Geology and Zoology.

J. BURKITT WEBB, C. E.,
Prof. of Civil Engineering.

JOSEPH C. PICKARD, M. A.,
Professor of English Language and Literature.

N. CLIFFORD RICKER, M. Arch.,
Professor of Architecture.

JAMES D. CRAWFORD, M. A.,
Professor of Ancient Languages, and Librarian.

HENRY A. WEBER.
Professor of Chemistry.

GEORGE E. MORROW, LL. B.,
Professor of Agriculture.

SELIM H. PEABODY, Ph. D.,
Professor of Mechanical Engineering and Physics.

FREDERICK W. PRENTICE, M. D.,
Lecturer in Veterinary Science.

MISS LOU CATHERINE ALLEN,
Preceptress and Instructor in Domestic Science.

FERNANDO A. PARSONS, M. L.,
Instructor in Book-Keeping.

PROF. PETER BAUMGRAS,
Instructor in Industrial Art and Designing.

MAJ. WM. A. DINWIDDIE, First Lieut. 2d Cav. U. S. A.
Professor of Military Science and Tactics.

[* Resigned.]

INSTRUCTORS AND ASSISTANTS.

MISS CHARLOTTE E. PATCHIN.
Instructor in Music.

IRA O. BAKER, C. E.,
Assistant in Civil Engineering and Physics.

MELVILLE A. SCOVELL, M. S.,
First Assistant in Chemical Laboratory.

CHARLES I. HAYS, B. S.,
Assistant in Horticulture and Botany.

CHARLES L. PICKARD, B. A.,
Assistant in English and Ancient Languages.

EDWIN L. LAWRENCE,
Head Farmer.

E. A. KIMBALL,
Foreman in Machine Shop.

JOSEPH C. LEWELLIN, B. S.,
Assistant in Architecture and Foreman of Carpenter Shop.

WILLIAM D. RUDY, B. S.,
Second Assistant in Chemical Laboratory.

C. W. CLARK, B. S.,
Second Assistant in Civil Engineering.

JOHN E. GREGORY,
Third Assistant in Chemical Laboratory.

GEORGE A. WILD,
Taxidermist.

Teacher of Elocution.

LORADO TAFT,
Teacher of Clay Modeling.

SUMMARY OF STUDENTS.

For the Year Ending June 6th, 1877.

Resident Graduates—Gentlemen	3	3
Seniors—Gentlemen	29	
—Ladies	13	42
Juniors—Gentlemen	45	
—Ladies	11	56
Sophomores—Gentlemen	56	
—Ladies	21	77
Freshmen—Gentlemen	77	
—Ladies	16	93
Preliminary—Gentlemen	84	
—Ladies	30	114
Special Students—Gentlemen	2	
—Ladies	1	3
Total		388

Summary for the Year Ending June 5th, 1878.

Resident Graduates—Gentlemen	6	
—Ladies	4	10
Seniors—Gentlemen	35	
—Ladies	11	46
Juniors—Gentlemen	36	
—Ladies	13	49
Sophomores—Gentlemen	49	
—Ladies	10	59
Freshmen—Gentlemen	78	
—Ladies	25	103
Preparatory—Gentlemen	104	
—Ladies	14	118
Special Students—Ladies		19
Total		404

ILLINOIS INDUSTRIAL UNIVERSITY.

HISTORY.

The Illinois Industrial University, the State University of Illinois, had its origin in a movement for the higher education of the industrial classes, began in 1851, and resulting in the congressional grant of lands for this purpose, made to the several states in 1862, and amounting in this state to 480,000 acres. The University was chartered in February, 1867, and opened to students in March, 1868. In addition to the endowment from the land grant, over $400,000 were donated by Champaign county in bonds, buildings and farms. The state has also made large appropriations for fitting up and stocking the farms, for library and apparatus, and for buildings, including the large main building erected in 1872 and 1873, the mechanical building and drill hall, and the chemical laboratory, the present [1878] year. Successive colleges and schools have been added as required, till four colleges, including fifteen distinct schools, have been organized.

The whole number matriculated as students since the opening is 1285. The number graduated from the several colleges, including the class of 1877, is 160. In 1871 the University was opened for lady students, on the same terms as to gentlemen. In 1874 a fine art gallery was established, containing a large collection of casts of celebrated statues and sculptures, and of engravings and autotypes.

LOCATION.

The University has a beautiful and healthful situation on the high grounds between the contiguous cities of Champaign and Urbana, and within the corporate limits of the latter. It is one hundred and twenty-eight miles south from Chicago, at the junction of the Illinois Central Railroad and the Indianapolis, Bloomington and Western Railway. The county is a region of beautiful rolling prairies, with large belts of timber along the streams, and is one of the richest farming districts in the state.

BUILDINGS AND GROUNDS.

The domain occupied by the University and its several departments embraces about 623 acres, including stock farm, experimental farm,

orchards, gardens, nurseries, forest plantations, arboretum, ornamental grounds, and military parade ground.

The University buildings, fifteen in number, include a grand main building for public use, one large and two small dormitory buildings, a large mechanical and drill hall, a large chemical laboratory, a veterinary hall, a small astronomical observatory, three dwellings, two large barns, and a large green-house.

The mechanical building and drill hall is of brick, 126 feet in length and 88 feet in width. It contains a boiler, forge and tank room; a machine shop, furnished for practical use, with a steam engine, lathes, and other machinery; a pattern and furnishing shop, shops for carpentry and cabinet work, furnished with wood-working machinery; paint and draughting-rooms, and rooms for models, storage, etc. In the second story is the large drill hall, 124 by 80 feet, sufficient for the evolutions of a company of infantry, or a section of a battery of field artillery. It is also well supplied with gymnastic apparatus. One of the towers contains an armorer's shop and military model room, an artillery room and a band room. The other contains a printing office and editor's room.

The large dormitory building is 125 feet in length and five stories in height. It affords 80 dormitory rooms for students. Two smaller dormitory buildings contain eight rooms each. The new chemical building, erected in 1878, at a cost, including furniture, of $40,000, contains five laboratories, and is said by good judges, to be one of the best and largest in the United States.

PROPERTY AND FUNDS.

Besides its lands, buildings, furniture, library, etc., valued at $470,000, the University owns 25,000 acres of well-selected lands in Minnesota and Nebraska. It has also endowment funds invested in state and county bonds amounting to $319,000, besides other property and avails valued at $33,000. The state has appropriated $25,000 to the agricultural department for barns, tools, stock, etc.; $20,000 to the horticultural department for green-house, barns, drainage, tools, trees, etc.; $25,000 for mechanical and military building, machinery, etc.; $127,000 toward the erection of the main building, and furnishing the same; $10,500 for chemical apparatus; $25,000 for library and apparatus; $5,000 for the apparatus of a physical laboratory; $3,000 for a veterinary hall, stable and apparatus; $40,000 for chemical building; besides smaller amounts for agricultural experiments, etc

MUSEUM AND COLLECTIONS.

The collections of minerals, fossils, shells, birds, mammals, insects, plants, etc., have been made with much care, and are notably large in some departments, affording valuable facilities in the study of natural history and geology. The collection in entomology is one of the largest in the west. With the aid of a late state appropriation, valuable collections of mammals, birds and fishes have been purchased, embracing many specimens of great rarity and value.

One of the trustees presented the full series of celebrated casts of fossils made by Prof. H. A. Ward, of Rochester, N. Y. This collec-

tion embraces the most rare and valuable fossils of the British museum, and of other great European collections, as well as those of President Hitchcock and others in America.

ART GALLERY.

This gallery is one of the largest and finest in the country. It is the gift of citizens of Champaign and Urbana. It occupies a beautiful hall, 60x80 feet, and the large and beautiful display of art objects in it surprises and delights all visitors. Perhaps no collection in the west equals it in the number and value of its specimens. Many of the great masterpieces of sculpture are here exhibited in cases, taken directly from the originals. The value of this splendid collection, as a means of education, is already exhibiting itself in the several departments of drawing and design at the University.

LIBRARY.

The library, selected with reference to the literary and scientific studies required in the several courses, includes over 11,000 volumes. The large library hall, fitted up as a reading room, is open throughout the day for study, reading and consultation of authorities. It is well provided with American, English, French and German papers and periodicals, embracing some of the most important scientific and art publications.

ORGANIZATION OF THE UNIVERSITY.

COLLEGES AND SCHOOLS.

The institution is a true University in the best American sense, though differing designedly in the character of some of its colleges from the older institutions of this country. It is divided into four colleges, and these are again subdivided into schools. A school is understood to embrace the course of instruction needful for some one profession or vocation. Schools that are cognate in character and studies, are grouped under the same college.

I. THE COLLEGE OF AGRICULTURE.

School of Agriculture.

School of Horticulture.

II. COLLEGE OF ENGINEERING.

School of Mechanical Engineering.
School of Mining Engineering.

School of Civil Engineering.
School of Architecture.

III. COLLEGE OF NATURAL SCIENCE.

School of Chemistry. School of Natural History.
School of Domestic Science.

IV. COLLEGE OF LITERATURE AND SCIENCE.

School of English and Modern Languages. School of Ancient Languages.

V. ADDITIONAL SCHOOLS.

School of Military Science. School of Commerce.
School of Art and Design.

Vocal and instrumental music, telegraphing and photography are also taught, but not as parts of the regular courses.

CHOICE OF STUDIES.

It has been a favorite aim of the University from the outset, to allow as much freedom as possible in the selection of studies.

A university is designed, not for children, but for young men and women, who may claim to know something of their wants, powers and tastes. It is not useful to require every student, without regard to his capacity or practical wants, to take entire some lengthened "course of study." Each student should weigh carefully his own powers and needs, and counsel freely with his teachers as to the branches he may need to fit him for his chosen career, and then pursue them with earnestness and perseverance, without faltering or fickleness.

It is necessarily required, 1st, that the student shall be thoroughly prepared to enter and keep pace with the classes in the chosen studies; and, 2nd, that they shall take these studies in the terms in which they are taught.

Each student is expected to have three distinct studies, affording three class exercises each day. On special request, the faculty may allow less or more.

No change in studies can be made after the beginning of a term, without permission of the faculty.

Students often need advice in the selection of studies, and the arrangement of a proper course. To meet this need, the faculty have carefully arranged several courses of studies, which are expected to be followed by those who have no special reason for diverging from them.

See Courses under the several schools.

Due care will be taken, to prevent, as far as possible, all abuse of the liberty of choice. Students failing to pass satisfactory examinations in their chosen studies, will not be permitted to remain and take other studies, without a vote of the faculty.

To secure the more certainly the diffusion of the sciences relating to the great industries, the state legislature, in 1873, prescribed that each student should be taught some of those branches.

The trustees have accordingly made the following classification of studies, and they require that each student shall take, each term, one study at least from the first class. The second study must be of either the first or second class, and the remaining studies from either of the three classes.

Class I. Physics, chemistry, mineralogy, physical geography, anatomy and physiology, botany, zoology, geology, entomology, algebra, geometry, trigonometry, calculus, drawing, surveying and engineering, mining and metallurgy, mechanics, architecture, principles of mechanism, hydraulics, thermodynamics, strength of materials, prime movers, mill work, machine drawing, origin and treatment of soils, culture, etc., of plants, breeding of domestic animals, veterinary science, farm products and manufactures, roads and rail roads, book-keeping, construction and use of machinery, modeling and patterns, bridges, etc., astronomy, military science and domestic science.

Class II. English language and literature, German language and literature, French language and literature, general history, United States history, ancient history, mediæval history, modern history, constitutional history, history of civilization, logic, political economy, history of agriculture, constitutional law, international law, rhetoric and oratory.

Class III. Any study taught in the University not enumerated in the first and second classes.

AIMS OF THE UNIVERSITY.

The University, being both state and national in origin, its aims are defined by the following extracts from the laws of congress and of the state legislature:

"Its leading object shall be, without excluding other scientific and classical studies, and including military tactics, to teach such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the states may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life."—*Act of Congress*, 1862, *Sec.* 4.

"The trustees shall have the power to provide the requisite buildings, apparatus, and conveniences, to fix the rates of tuition, to appoint such professors and instructors, and establish and provide for the management of such model farms, model art, and other departments and professorships as may be required to teach, in the most thorough manner, such branches of learning as are related to agriculture and the mechanic arts, and military tactics, without excluding other scientific and practical studies."—*Act of general assembly*, 1867, *Sec.* 7.

In accordance with the two acts above quoted, the University holds, as its principal aim, to offer freely the most thorough instruction which its means will provide, in all the branches of learning useful in the industrial arts, or necessary to "the liberal and practical education of the industrial classes, in the several pursuits and professions in life." It includes in this all useful learning—scientific and classical—all that belongs to sound and thorough scholarship.

ADMISSION.

Candidates for admission to the University must be at least fifteen years old, and must pass satisfactory examinations in arithmetic, geography, English grammar, history of the United States and the studies of the preliminary year. For expenses see page

PRELIMINARY YEAR.

Preparatory work is already well done in the many excellent high schools of the state, and the funds of the University ought not to be diverted from their proper uses, to provide instruction in merely preparatory studies. But a needful advance in the standard for admission to the college courses, and the necessity of providing temporarily for those who come from places where no good high schools exist, have induced the trustees to provide for preparatory classes *in the studies lying between the common school studies and the college courses.*

Candidates for these classes must be at least fifteen years old. They must also pass satisfactory examinations in arithmetic, geography, English grammar, and history of the United States. The examination in these branches should be equal to that usually required for a second grade certificate for teachers. This examination may be made by county superintendents. The studies taught in the preliminary year are as follows:

FIRST TERM.

Algebra (Olney's), Physiology (Dalton's), Book-Keeping.

SECOND TERM.

Geometry (Olney's), English, Elements of Composition (Swinton's School Composition, or an equivalent), Orthoepy and Word Analysis (Introduction to Webster's academic dictionary), and Natural Philosophy (Peck's Ganot).

THIRD TERM.

Geometry completed; English (as in second term, with the addition of Goldsmith's traveler, or an equivalent, read for analysis), and Botany.

For candidates for the classic course the studies will be as follows:

FIRST TERM.—Algebra, Latin (Cæsar), Greek (grammar and reader). SECOND TERM.—Geometry, Latin (Cicero), Greek (Anabasis). THIRD TERM.—Geometry, Latin (Virgil), Greek (Anabasis).

Students in the preparatory studies are not matriculated as University students. They pay no entrance fee, but are charged a tuition fee of ten dollars a term, and the incidental fee of five dollars a term. They have all the privileges of the library and of the public lectures.

COLLEGE OF AGRICULTURE.

FACULTY.

The REGENT,
Professor SHATTUCK,
Professor TAFT,
Professor WEBER,
Professor MORROW, Dean.
Professor BURRILL,
Doctor F. W. PRENTICE,
C. I. HAYS,
M. A. SCOVELL.

SCHOOLS.

School of Agriculture.

School of Horticulture.

SCHOOL OF AGRICULTURE.

OBJECT OF THE SCHOOL.

The aim of this school is to educate scientific agriculturists. The frequency with which this aim is misunderstood, demands that it shall be fully explained. Many who look upon agriculture as consisting merely in the manual work of plowing, planting, cultivating and harvesting, and in the care of stock, justly ridicule the idea of teaching these arts in a college. The practical farmer who has spent his life in farm labors, laughs at the notion of sending his son to learn these from a set of scientific professors. But all this implies a gross misunderstanding of the real object of agricultural science. It is not simply to teach *how* to plow, but the reason for plowing at all—to teach the composition and nature of soils, the philosophy of plowing, of manures, and the adaptation of the different soils to different crops and cultures. It is not simply to teach *how* to feed, but to show the composition, action and value of the several kinds of food, and the laws of feeding, fattening, and healthful growth. In short, it is the aim of the true agricultural college to enable the student to understand thoroughly, all that man can know about soils and seeds, plants and animals, and the influences of light, heat and moisture on his fields, his crops, and his stock; so that he may both understand the reason of the processes he uses, and may intelligently work for the improvement of those processes. Not "book farming," but a knowledge of the real nature of all true farming—of the great natural laws of the farm and its phenomena—this is the true aim of agricultural education. Agriculture involves a larger number of sciences than any other human employment, and cannot be regarded as an unfit end of a sound collegiate training.

The steady aim of the trustees has been to give to the college of agriculture the largest development practicable, and to meet the full demand for agricultural education, as fast as it shall arise. Agricultural students are especially invited to the University.

Boards of agriculture, and agricultural associations, state and county, are invited to co-operate with the University in its efforts to awaken a more general appreciation of the value of education, and to add, by the establishment of scholarships or other means, to the number of those who avail themselves of its facilities for instruction.

INSTRUCTION.

The instruction unites as far as possible, theory and practice—theory explaining practice and practice illustrating theory. The technical studies are mainly taught by lectures, with careful readings of standard agricultural books and periodicals, and frequent discussions, oral and written, by the students, of the principles taught. These are also illustrated by demonstrations and observations in the fields and stables, not only of the University, but of leading farmers and stock-growers in the vicinity.

TECHNICAL STUDIES.

Elements of Agriculture.—Outline of the general principles underlying agriculture in its theory and practice, introductory to the other technical and scientific studies of the course.

Agricultural Engineering and Architecture.—Arrangement of the farm; its improvement by mechanical means, as drainage and irrigation; its divisions, fences, hedges, etc.; its water supply; the construction of roads; arrangements, planning and construction of farm buildings; the construction, selection, care and use of farm implements and machinery.

Animal Husbandry.—Principles of breeding and management of our domestic animals; descriptions of all important breeds and varieties, giving their history and adaptations.

Rural Economy.—Relations of agriculture to other industries and to national prosperity; influences which should determine the class of farming to be adopted; comparisons of special and general systems; uniting of manufacturing with farming; culture of the various farm crops—cereals, grasses, etc.

History of Agriculture.—Progress and present condition in this and other countries. Influence of climate, civilization and legislation in advancing or retarding. Agricultural literature and organizations.

Rural Law.—Business law; laws especially affecting agriculture—tenures of real estate; road, fence, drainage laws, etc.

Laboratory Work.—Experiments and special investigations by each student. A *thesis* is required embodying the results of this work.

VETERINARY SCIENCE.

In veterinary science, the lectures are given by a graduate of the schools of veterinary science in both Edinburgh and London. This science is taught during the third year. In the first term the anatomy and physiology of the domestic animals will be taught by lectures, demonstrations and dissections. Post-mortems of healthy and diseased

animals will be made, so that the student may become practically acquainted with the tissues in health and disease. The first six weeks of the second term will be devoted to the study of veterinary medicines, their action and uses; the remainder of the term to lectures on the principles and practice of veterinary science. During the third term, practical instruction will be given in clinical work, as cases present themselves, at the veterinary infirmary, where animals are treated or operated on free of charge, for the instruction of the students. Lectures will also be given on veterinary sanitary science and the principles and practice of veterinary surgery.

For details as to the study of botany, chemistry, zoology, entomology, geology and meteorology, see statements in college of natural science.

APPARATUS.

The college has, for the illustration of practical agriculture, a stock farm of 410 acres, provided with a large stock barn fitted up with stables, pens, yards, etc.; also an experimental farm of 180 acres, thoroughly furnished with all necessary apparatus. It has also fine specimens of neat cattle, short-horns and jerseys. Also several breeds of swine, to illustrate the problems of breeding and feeding, The experimental department exhibits field experiments, in the testing of the different varieties and modes of culture of field crops, and in the comparison and treatment of soils. It includes also experiments in agriculture and horticulture, under the direction of the professors of agriculture and of horticulture, and of the farm superintendent, and experiments in feeding animals of different ages, and development upon the various kinds of food. In common with similar departments in the several state agricultural colleges of the country, it attempts to create positive knowledge towards the development of an agricultural science.

The barn on the stock farm has north and west fronts of 80 feet each. Each limb, or L, is 40 feet wide. It is of the kind known as the side-hill barn. The barn on the experimental farm is of less size, but is fitted up with great convenience, and is supplied with a mill for grinding feed, run by a large wind-mill.

A veterinary hall and stable has been provided, and a clinic is held to illustrate the lectures on veterinary science. The department has *papier-mache* models of the foot and teeth of the horse at different ages. Dr. Anzoux' celebrated complete model of the horse in 97 pieces, and exhibiting 3,000 details of structure, has just been received from Paris.

Surveying and drainage are illustrated by field practice, with instruments, and by models. Agricultural chemistry is pursued in connection with laboratory practice, in the analysis of soils, fertilizers, foods, etc. The college also has fine collections of soils, seeds, plants, implements, skeletons of domestic animals, plans, charts, and other apparatus, including a large number of models of agricultural machinery from the Patent Office.

AGRICULTURAL COURSE.

Required for the Degree of B. S. in School of Agriculture.

FIRST YEAR.

1 Elements of agriculture, chemistry, trigonometry and adv. geometry.
2. Chemistry, American authors, free-hand drawing.
3. Vegetable physiology, chemistry, rhetoric.

SECOND YEAR.

1. Agricultural chemistry, (soils and plants), botany, German.
2. Agricultural chemistry, (tillage, fertilizers, foods), botany, German.
3. Economic entomology, zoology, German.

THIRD YEAR.

1. Agricultural engineering and architecture, animal anatomy and physiology, geology or ancient history.
2. Animal husbandry, veterinary science, physics or mediæval history.
3. Landscape gardening, veterinary science, physics or modern history.

FOURTH YEAR.

1. Meteorology and physical geography, mental science, history of civilzation.
2. Rural economy, constitutional history, logic.
3. History of agriculture and rural law, political economy, laboratory work, graduating thesis.

FARMER'S COURSE.

To meet the wants of young farmers, or others who cannot give the time necessary for the full course, and yet desire to better fit themselves to be successful farmers, a special course has been arranged in which the student gives exclusive attention to the technical agricultural studies, including veterinary science, and completes these in one year. Students will be admitted to this course on passing a satisfactory examination in the common school branches, but they will receive greater benefit from it if they have made better preparation, especially if they have a good knowledge of botany and chemistry. They should not be less than eighteen years of age. The studies in this course are arranged in the following order:

1. Elements of agriculture, agricultural engineering and architecture, animal anatomy and physiology.
2. Animal husbandry, rural economy, veterinary science.
3. History of agriculture and rural law, practical entomology, landscape gardening or veterinary science.

SCHOOL OF HORTICULTURE.

OBJECT OF THE SCHOOL.

The aim of this school is to afford a scientific and practical education specially adapted to the wants of those who cultivate garden and orchard plants, or wish to manage nurseries, parks and pleasure grounds.

INSTRUCTION.

The instruction is both theoretical and practical. The class-room recitations and lectures are supplemented by practice in the fields and plant houses. The course recommended for those intending to prepare for the duties of the practical horticulturalist, is given below.

At the end of the course a thesis is required upon some subject connected with horticultural science or pursuits. This must be the record of original experiment or research, with appropriate deductions. Suitable illustrations are to accompany the paper. All theses will be deposited in the library of the University.

APPARATUS.

Ample provision is made for the illustration of the subjects taught. The cabinet contains among other things : a series of colored plaster-casts of fruits prepared at the University; *modeles clastiques* of fruits and flowers by Auzoux of Paris ; collections of seeds of native and exotic plants ; of specimens of native and foreign woods ; of beneficial and injurious insects, and specimens showing their work ; numerous dry and alcoholic specimens and preparations ; maps, charts, diagrams, drawings, etc.

The school is well supplied with compound microscopes and apparatus, and students have abundant opportunity to learn their use, and to make practical investigations with them. The herbarium is rich in specimens of useful and noxious plants, including many of the fungous parasites which cause disease to cultivated crops.

Upon the grounds devoted to the use of the school, there are :

1. A very large specimen apple orchard, planted in the year 1869, and containing above 1,000 varieties,—many varieties of pears, cherries, grapes, and small fruits. 2. A nursery of young trees, in which students have regular work in propagation, etc. 3. A forest-tree plantation, embracing the most useful kinds of timber. 4. An aboretum in which all hardy, indigenous and exotic trees are planted as fast as they can be secured, and now containing nearly 100 varieties. The ornamental grounds which surround the University building, embrace about twenty acres, and are kept in neat and attractive style. These, with all the adjuncts of trees and flowering shrubs, lawn and beds of flowers and foliage plants, walks of different material, and styles of laying out, give illustration to the class-room work in landscape gardening. A spacious green-house, much enlarged the past year, contains a collection of plants of great value for the classes in floriculture and landscape gardening, besides furnishing students with practice in hot-house and green-house management. The library contains the best literature upon these subjects.

Elements of Horticulture—This study is an introduction to the subjects which are presented in a comprehensive manner afterward, and gives the most possible information in regard to cultivated trees, fruits, vegetables and flowers, in the time devoted to it. The instruction is mainly by lectures illustrated by specimens and drawings. The following topics are discussed: orchard sites, the age of trees to plant, the season to plant, how to plant, what to plant, the management of the soil, pruning and care of trees, gathering and preserving fruit, diseases and injuries, the nursery, ornamental trees and shrubs, flower gardens, vegetable gardens, including propagating beds and houses, the vineyard and small fruits, and timber tree plantations. Students have instruction and practice in grafting, budding, propagation by cuttings, etc. Each student has usually grafted from two hundred to one thousand root-grafts of apples.

Pomology and forestry are studied fourteen weeks. Much of the first half of the term is spent in the orchards, nurseries, and forests, making observations and collections, and in laboratory work, determining species, varieties, etc. A large collection of apples, pears, grapes peaches, etc., is made each year, and the chief characteristics of each pointed out, Practice is also had in making drawings and plaster-casts. Written descriptions of the fruits are carefully made and compared with those given in the books, and systems of analysis and classifications put to practical test. Students see and perform the skilled operations usually practiced in the propagation and growth of trees.

Pruning and training by various methods, especially of grapes, are discussed in the class-room, and illustrated upon the grounds.

Students also study the injurious insects and fungi which cause or accompany diseases of trees and fruits, and the methods of preventing or diminishing their ravages.

The native forests of the vicinity and of the country at large are studied as a foundation for the lessons upon the influence and value of timber and other trees, and their artificial culture. For the latter, the forest tree plantation on the University grounds, and the aboretum afford practical illustration.

Downing's "Fruits and Fruit Trees of America"; Warden's "Pomology"; Thomas' "Fruit Culturist"; Grigor's "Arboriculture"; Brown's "The Forester"; and Bryant's "Forest Tree Culturist," are important books of reference.

Plant Houses and Management.—This study includes garden and landscape architecture, the methods of construction, heating and ventilation and general management, so as to secure, under the different circumstances, the best plant growth. The class-room work consists of lectures and architectural designing and drawing. Illustration and practice are afforded by the plant houses of the University.

Landscape Gardening.—Eleven weeks are devoted to this study. Lectures are given upon the general principles of the art, the history and styles, the kinds and use of trees, shrubs, grass and flowers, the introduction and management of water, the construction and laying out of drives and walks, fences, buildings, etc. The class draw first from copy, then, after the actual study of some locality with its

environments, design and draw full plans for its improvement, indicating position of all prominent objects, including the kinds and groups of trees and other plants. These plants, with specifications, are to be deposited in the library of the school. Excursions are made when found practicable for the study of public and private grounds.

Important reference books are: Downing's "Landscape Gardening"; Weideman's "Beautifying Country Homes"; Robinson's "Parks, Promenades and Gardens of Paris."

Floriculture.—Fourteen weeks are occupied in the study of the kinds, propagation, growth and care of flowering and other ornamental plants. Each student has practice in propagating by cuttings and otherwise, in potting and shifting, and care of plants requiring various treatments. Insects and diseases with the remedies are thoroughly treated, and the means of securing vigor of growth, or abundance of flowers, are studied and illustrated by practice.

Among the reference books the following are important: Henderson's "Practical Floriculture"; Loudon's "Encyclopedia of Plants"; Parkman's "Book of Roses."

For statement of studies in Botany and Entomology and for Microscopy and Fungology, see school of natural history.

For Agricultural Chemistry, see school of chemistry.

Horticultural History and Rural Law.—Ten weeks. This term's study nearly corresponds with that for the same time in the agricultural course, and when alike the two classes are made one. Students of this course have speeial study of the history and literature of horticulture, so far as these are distinct from that of agriculture.

All thesis and other required manuscripts in the college of agriculture must be on regulation paper, of the size of 8x11½ inches.

HORTICULTURAL COURSE.

Required for Degree of B. S. in School of Horticulture.

FIRST YEAR.

1. Elements of Horticulture, Chemistry, Trigonometry and Advanced geometry.
2. Chemistry, Free Hand Drawing, American authors.
3. Vegetable Physiology, Chemistry, Rhetoric.

SECOND YEAR.

1. Botany, Agricultural Chemistry (soils and plants), German.
2. Botany, Agricultural Chemistry (tillage and fertilizers), German.
3. Economic Entomology, Zoology, German.

THIRD YEAR.

1. Pomology and Forestry, Architecture and Engineering, Geology or Ancient History.
2. Plant Structures and Management, Physics, Mediæval History.
3. Landscape gardening, physics, modern history.

FOURTH YEAR

1. Floriculture, Meteorology and Physical Geography, Mental Science.
2. Microscopy and Fungology, Constitutional History, Logic.
3. Horticultural History and Rural Law, Political Economy, Laboratory work, Graduating Thesis.

COLLEGE OF ENGINEERING.

FACULTY.

The REGENT,
Prof. SHATTUCK,
Prof. WEBB,
Prof. RICKER,
Prof. ROBINSON, Dean.
Prof. WEBER,
I. O. BAKER,
Prof. BAUMGRAS,
J. C. LEWELLIN.

SCHOOLS.

Mechanical Engineering,
Mining Engineering,
Civil Engineering,
Architecture.

SCHOOL OF MECHANICAL ENGINEERING.

OBJECT OF THE SCHOOL.

This school seeks to prepare students for the profession of mechanical engineering. It aims to fit them to invent, design, construct and manage machinery for any branch of manufactures. The state has need of men who, to a thorough knowledge of the principles of ma, chinery and of the various motors, shall add the practical skill necessary to design and construct the machines by which these motors are made to work.

INSTRUCTION.

The instruction, while severely scientific, is thoroughly practical. It aims at a clear understanding and mastery of all mechanical principles and devices. Practice in the mechanical laboratory, is counted as one of the studies of the course.

In PRINCIPLES, the knowledge is imparted by lectures, combined with the use of plates and illustrative models, and by text books. Examples are also given showing the application of the theories and principles taught. Experiments in the testing of machines and motors are undertaken by the student.

In PRACTICE, the instruction consists in the production of elementary forms and in the execution of projects, in which the student constructs machines, or parts thereof, of his own designing, and from his own working drawings.

In DESIGNING, the student begins with elements, and proceeds with progressive exercises till he is able to design and represent complete machines.

INSTRUCTION IN MECHANICAL ART AND DESIGN.

An elementary course of shop practice has been carefully arranged, the object of which is to familiarize the student with the forms of the parts of machines, and how to produce them. It aims to acquaint the student with all the ordinary cutting tools for iron and wood; the form and condition for most effective work; the machines and appliances by which they are put into action, and the instruments by which desired dimensions of product are obtained. This practice is carried on in the mechanical laboratory, and represents five different shops, viz:

1—PATTERN MAKING.

2—BLACKSMITHING.

3—MOULDING AND FOUNDING.

4—BENCH WORK FOR IRON.

5—MACHINE TOOL WORK FOR IRON.

In the 1st, the practice consists of planing, turning, chiseling, etc., in producing true surfaces of various forms in wood, and also of combining pieces by glue joint, etc., preliminary to correct pattern making. Patterns are finally made from which are cast pieces in iron, brass, etc., to be worked in the subsequent shops.

In the 2d, the student uses the forge and performs the various elementary operations, such as drawing, upsetting, bending, welding, etc.

In the 3d, several pieces are moulded in sand and cast, part of which are useful in the succeeding shops.

In the 4th, there is first a course of free-hand bench work, where the cold-chisel and file are the only tools. After the hand and eye are sufficiently trained, fitting is begun, and the square, bevel, rule, compasses and other auxiliary bench tools are brought into requisition. Pieces are then fitted together by the file, with surfaces carefully finished in the best manner of the fitter's art.

The 5th shop involves the use of the ordinary machine tools of the machine shop. The first practice employs three machines with their usual cutting tools or bits, in the common operations, such as turning cylinders, disks, grooves and fillets; boring, drilling, hand-turning, milling, planing, etc. Following this is a course of practice in fitting and finishing in which the usual aids, such as calipers, rules, etc., are introduced, and many of the various fittings employed in machinery are produced. Polishing and finishing of surfaces are also practiced.

Lectures are combined with this practice, in which the most favorable forms and manipulation of cutting tools and auxiliary appliances are explained.

Previous to the shop work, the pieces are drawn by the student, and the exact thing to be done is indicated, thus avoiding mistakes, and facilitating practice.

Simultaneously with this practice, the designing of such machine elements as pullies, journal boxes, cranks, stuffing boxes, etc., cultivates a knowledge of proportion, and of its proper representation on paper. This practice in designing and drawing is a leading feature in the course of instruction.

This elementary practice fits the student for the advanced shop practice in designing and construction of complete machines undertaken later in the course.

STUDIES.

The studies are given by the year and term in the tabular view of the course. The order of studies there indicated should be closely followed, that the student may avoid interference of his hours of recitation. The following is a detailed view:

PURE MATHEMATICS.

Advanced Geometry.—Applications of algebra to geometry; transversals; harmonic proportions, etc.

Trigonometry.—Analytical and plane; relations between the functions of an arc; formation and use of tables; solution of plane triangles.

Analytical Geometry.—Construction of equations; discussion, in a plane, of the point, right-line, circle, ellipse, parabola and hyperbola; higher plane curves, cycloid, cissiod of diocles, etc.

Differential Calculus.—Differentials of algebraic and transcendental functions; Maclaurin's Theorem; Taylor's Theorem; maxima and minima of functions of one variable; equations of tangents, normals, sub-tangents, sub-normals, etc.; differentials of lines, surfaces and volumes.

Integral Calculus.—Integration of elementary forms and of rational fractions; rectification of plane curves; quadrature of plane areas and surfaces of revolution; and cubature of solids of revolution.

SECOND YEAR.

Advanced Algebra.—Binomial theorem; properties and summation of series. Exponential quantities, Logarithms. General theory and methods of solving equations.

Analytical Geometry.—Loci in space, surfaces of the second order.

Differential Calculus.—Differential and maxima and minima of functions of two or more variables; osculatory curves; radius of curvature; evolutes, involutes and envelopes; discussion of algebraic and transcendental curves and surfaces; tangent and normal planes; partial differentials of surfaces and volumes.

Integral Calculus.—Integration of transcendental and irrational differentials; differentials of higher orders; differential equations; rectifications, quadrature and cubature in general.

Spherical Trigonometry.—General formulas; solution of spherical triangles.

Calculus of Variations will be taught to advanced students.

PHYSICS.

The course in physics is complete and thorough, embracing the four kinds of work following:

1. Recitation, four exercises a week, in which a text book is used as a guide.
2. Physical experiments one day each week, in which the student uses the instruments in testing the principles taught.
3. Illustrated experiments one evening each week, in which the more costly apparatus is used before the whole class, in such experiments as are difficult to perform, and which are most effective when prepared for an audience.
4. The higher physical experiments by advanced classes, consisting either of researches, or of reviews of careful and elaborate experiments previously worked up by others.

To prepare for the last named work, the student must have pursued physical studies at least one term in the first three.

The department of physics is amply provided with illustrative apparatus for use in the lecture room, and an extensive physical laboratory. The collection of instruments, costing over $5,000, embraces acoustic apparatus from R. Koenig, of Paris; apparatus for heat and molecular physics from J. Salleron, of Paris; for light, optics and electricity from Stoehrer, of Leipsic, and Browning and Newton, of London; pneumatic and electrical apparatus from E. S. Ritchie, of Boston; and a large number of pieces prepared at the mechanical shops of the University. It includes, also, Browning's electric lamp; and from Eliot Bros., London, resistance coils, galvanometers, etc., for higher researches in electricity.

TECHNICAL STUDIES.

Cinematics, and Principles of Mechanism.—Relative motion of points in a system of connected pieces; motion independent of force; velocity ratio; investigation of motion of elementary parts of machines, as friction and noncircular wheels in rolling contact, cams and curves in sliding contact; correct-working gear teeth; gearing chains; escapements; link-work.

Analytical Mechanics.—Equations of equilibrium; moments; virtual velocities; centers of gravity; mechanical powers; friction; dynamics.

Hydraulics.—Amount and center of pressure upon submerged surfaces; flow of liquids through orifices, weirs, pipes and channels; distribution of water in cities. Forms and arrangement of orifices for fountains.

Thermodynamics.—The laws and complete theory of thermodynamics as required in the study of all kinds of heat engines, including the deportment of perfect gases during expansion, and also steam and other fluids not perfect gases; action of heat in changes of state, and in confined fluids.

Resistance of Materials.—See school of civil engineering.

Prime Movers.—The theory and useful effects of turbine water wheels, and best form of the parts for high efficiency. Other water wheels and wind wheels. Application of thermodynamics in the study of heat engines, relative economy of different engines.

MILL-WORK AND MACHINERY.

Trains of mechanism, studied with reference to their resistance and efficiency. Best forms for transmission of power for short and great distances. Forms of the parts for securing desired results in power and velocity; elastic and ultimate strength of parts.

Projection Drawing.—Use of instruments in applying the elements of descriptive geometry; use of water colors; isometrical drawing; shades and shadows; perspective.

Free Hand Drawing.—Sketches of Machinery; ornamentation; lettering.

Machine Drawing.—Working drawings of original designs; finishing in water colors, and in line-shading; details for shop use according to the practice of leading manufacturers.

Projects and Practice—The shop practice of the first year has already been described. The second year practice will have for its object the production of some model or machine. The students under the immediate direction of teachers, carefully determine the dimensions and shapes best suited for the parts of some machine, reduce them to neat and accurate working drawings, and make tracings for shop use. No student will commence his advanced shop practice without working drawings. The designs are such as require executions in iron, brass, and wood, for the purpose of giving breadth of practice. The student is required to make the patterns and castings, finish the parts, and put them together in accordance with the working drawings and the required standard of workmanship. This acquaints him with the manner in which the mechanical engineer carries his designs into execution, and teaches him to so shape, proportion and dispose the parts of a machine as to secure the greatest economy of construction and durability in use. The practice of the third year will include the careful construction of mechanical movements, strictly in accordance with the theoretical determination of the form of the parts.

Besides these practical exercises, students of sufficient skill may be employed in the commercial work which is undertaken by the shop. For this work they receive compensation. This work includes all kinds of machine building and repairing, and will serve to extend and confirm the practical experience of the student.

Experiments and Practical Problems.—Experiments in the testing of prime movers and other machines, are undertaken by each student. They take indicator diagrams from the engine of mechanical laboratory and in factories in the adjoining towns, and determine from them the power developed with different degrees of expansion, and the defects of valve movement in distribution of steam.

In strength of materials, the student determines the modulus of rupture and coefficient of elasticity of about six kinds of building material. In hydraulics the flow of water through orifices of different form are studied experimentally. In mechanism each student works out and reports on an original problem, involving mechanical movements.

APPARATUS.

This school is provided with plates and a cabinet of models, illus-

trating mechanical movements and elementary combinations of mechanism. This collection is rapidly increasing by our own manufacture, and by purchase from abroad. It includes many of Riggs' models, and others from the celebrated manufactory of J. Schrœder, of Darmstadt, Germany. About two hundred valuable models from the United States patent office are also included in the cabinet.

The state has provided a large mechanical laboratory and workshop. The pattern shop is furnished with complete sets of tools, benches and vises for pattern-makers. In a separate building are forges, a moulder's bench with sand, and brass and iron furnaces sufficient for the castings ordinarily required. Additional sets of tools are provided for the special use of students in the shop practice classes.

MECHANICAL ENGINEERING COURSE.

Required for Degree of B. S. in School of Mechanical Engineering.

FIRST YEAR.

1. Plane Trigonometry and Advanced Geometry; Projection Drawing; French.
2. Analytical Geometry; Descriptive Geometry and Lettering; French.
3. Calculus; Shop-practice and Free-hand Drawing; French.

SECOND YEAR.

1. Designing and Construction of Machines; Advanced Algebra and Analytical Geometry; German.
2. Advanced Calculus; Designing and Construction of Machines; German.
3. Advanced Calculus; Astronomy; German.

THIRD YEAR.

1. Mechanism and Mechanical Laboratory; Advanced Descriptive Geometry; Chemistry and Laboratory practice.
2. Analytical Mechanics and Mechanical Laboratory; Chemistry and Laboratory practice; Physics.
3. Analytical Mechanics; Modern History; Physics.

FOURTH YEAR.

1. Resistance of Materials and Hydraulics; Geology; Thermodynamics; Pneumatics.
2. Prime Movers; Constitutional History; Construction Drawing.
3. Mill Work; Designing and Laboratory Practice; Political Economy, Graduating Thesis.

SCHOOL OF CIVIL ENGINEERING.

OBJECT OF THE SCHOOL.

a The school is designed to furnish a course of theoretical instruction, ccompanied and illustrated by a large amount of practice, which will

enable students to enter intelligently upon the various and important duties of the engineer.

INSTRUCTION.

The student should lay a broad foundation in general culture, which will enable him to pursue his professional studies with greater ease and advantage. With this view, the subjects peculiar to civil engineering are not introduced until the second year.

The instruction is given by lectures, text books and reading, to which are added numerous problems and practical exercises, as serving best to completely explain subjects and fix them in the mind. Models and instruments are continually used, both in lectures and by the students themselves.

COURSE OF STUDIES.

The complete Course occupies four years. The tabular view shows the arrangement of the subjects. The studies of the first three years will prepare students for undertaking many engineering operations, such as the building of railroads, canals, embankments, etc. The fourth year is intended to fit them for the higher engineering constructions, as the building of arches, trussed bridges, and supporting frames of all kinds.

Each year consists of thirty-six working weeks, divided into fall, winter and spring terms. The four years are divided among the different branches nearly as follows: languages, 360 recitations; pure mathematics, 369 recitations; drawing of all kinds, 840 hours; lectures with mathematical analysis, 100 hours; surveying, recitations, drawing and field practice, 200 hours; physics, mechanics, hydraulics, astronomy, geology, chemistry, mental philosophy, logic, political economy, history, altogether 680 lectures, recitations, and exercises: practice in the chemical laboratory, 110 hours; engineering projects, 240 hours. Besides the above, there are various special exercises requiring time, the amount of which cannot be assigned. Each recitation requires one hour in the class room, and to its preparation should be given an average time of three hours.

TECHNICAL STUDIES.

Mathematics.—For a list of the principal subjects included under pure mathematics, see the school of mechanical engineering.

The following are those included in applied mathematics:

Descriptive Geometry.—Problems on the point, right line and plane; warped surfaces; perspective; shades and shadows; practical problems.

Analytical Mechanics and Hydraulics.—See school of mechanical engineering.

Astronomy.—The Observatory; instruments and their adjustments; determination of time, latitude and longitude; practical exercises.

Geodesy.—Figure of the earth; surveys of the earth's surface: base

lines; parallel's and meridians; methods of the United States surveys; barometric measurements.

Land Surveying.—Areas; distances: omissions and corrections; standard units; metrical system; refraction; curvature of the earth; theories of surveying instruments; adjustment of instruments.

R. R. Surveying.—Curves; turnouts; crossings; obstructions; slope stakes; earthwork; grades; curvature of rails; coning of wheels; calculation and use of tables.

DRAWING.

Projection Drawing.—Use of instruments in applying the elements of descriptive geometry; use of water colors; isometrical drawing; shades; shadows and perspective; drawings finished in colors and by right-line shading; bridges; right and oblique arches.

Free-hand.—Landscapes; buildings; lettering and ornamental work.

Topographical.—Sketching; ink drawings; conventional signs, etc.

Mapping.—Railroad and city and county maps.

Architectural.—Designing and drawing of engineering structures.

NATURAL SCIENCE.

Physics.—See school of mechanical engineering. *Chemistry.*—Inorganic chemistry and qualitative analysis. *Geology.*—Elements of physiographic, lithological, historical and dynamical geology.

ASTRONOMY AND GEODESY.

Descriptive Astronomy is given by lectures with a text-book. The equatorial telescope is in constant use during the favorable weather. *Practical Astronomy* is given by lectures and practical work with the meridian circle, sextant, theodolite, and engineer's transits adapted to astronomical work; and by astronomical calculations. *Geodesy* is given by lectures, practice and calculations.

ENGINEERING.

Road Engineering.—Location and construction of roads and railroads; grades; gauges; tunnels, etc.

Resistance of Materials.—Elasticity; safe limits; shearing stress; flexure and strength of beams and columns; practical formulæ.

Trusses.—Analysis of a variety of roofs and frames, with methods of obtaining the strains.

Bridge Construction.—Warren's, Howe's, and other trusses; tubular and suspension bridges; arches, etc.

Stone Work.—Stone; limes and mortars, foundations, etc.

PROJECTS.

During the spring term of the second year, an accurate topographical survey of a locality is made by the class, and instruction given in the use of the level, preparatory to a project in railroad engineering,

which is executed in the fall term of the next year. The plane-table is used as in the U. S. surveys.

The project consists of a preliminary survey, locations, drawings and estimates.

The preliminary survey will consist in an examination of the locality, and in running tangent lines, with leveling and topographical sketching.

The location will consist in running the line over the route decided upon, with all the necessary measurements and calculations for establishing the grade, setting slope stakes, determining the amount of earthwork, designing the buildings, bridges, culverts, etc.

The drawings will include alignment, profile, plans and sections.

The estimates will give the cost of ground, earthwork structures, rolling stock, etc.

A project in geodesy, or higher engineering, will be executed during the senior year.

APPARATUS.

The school is provided with both English and American instruments for the different branches of engineering practice, and for the astronomical work of higher surveying. It has numerous models for illustration of its specialties, and access to the cabinets of other schools. To facilitate the practice in trigonometrical and land surveying, it has a specially prepared area, in which the difficulties of plane surveying are presented to the beginner as he is able to meet them and where he is taught practical methods of overcoming them. This area is subdivided by a large number of lines, the positions of which are accurately known, but not by the student. He is then required to determine the position of the "corners" by various methods, and to calculate the enclosed areas. Other problems are given in determining inaccessible distances, passing obstacles, avoiding local attractions, etc., for which the ground is prepared. The number of divisions is so large that no two students need have the same problem, and so accurately laid out that the correctness of the student's work can at once be determined.

An astronomical observatory for meridian observations, and of suitable size for the practical exercises in astronomy, has been erected and is in use. An equatorial telescope has also been mounted for the use of the students. A set of Smithsonian meteorological instruments has been procured, placed in suitable positions, and observations commenced. A universal instrument for astronomical and geodetic work is being made for the use of the senior classes, by Messrs. Ertel & Son, Munich. It will read the seconds of arc both in altitude and azimuth by four micrometers, and will in all respects be a superior instrument, adapted to the most accurate work.

CIVIL ENGINEERING COURSE.

Required for Degree of B. S. in School of Civil Engineering.

FIRST YEAR.

Same as in mechanical engineering.

SECOND YEAR.

1. Advanced Algebra and Analytical Geometry; Land Surveying; German.
2. Advanced Calculus; Drawing, 10; German.
3. Advanced Calculus and Spherical Trigonometry; Topographical Surveying; German.

THIRD YEAR.

1. Advanced Descriptive Geometry; Chemistry and Laboratory Practice; Railroad Surveying.
2. Analytical Mechanics; Chemistry and Laboratory Practice; Physics; Weekly Exercises in Practical Astronomy.
3. Analytical Mechanics; Astronomy; Physics; Weekly Exercises in Practical Astronomy.

FOURTH YEAR.

1. Resistance of Materials and Hydraulics; Meteorology and Physical Geography; Geodesy.
2. Bridges; Constitutional History; Geology.
3. Stone Work; Physical Laboratory; Political Economy; Graduating Thesis.

SCHOOL OF MINING ENGINEERING.

OBJECT AND INSTRUCTION.

This school is intended to qualify the student for undertaking mining operations of all kinds. Its instruction consists of a thorough training in the principles of theoretical and applied chemistry, of chemical and blow-pipe analysis, of assaying and metallurgy, and of the engineering operations of mining.

STUDIES AND APPARATUS.

The course of studies embraces both the engineering and metallurgical studies, with practical exercises in analysis and assaying.

A large collection of models from a celebrated European manufactory, and costing over $2,000, has been provided for this school. The geological and mineralogical cabinets are well provided with specimens of minerals, ores and rocks. In the new chemical laboratory, provision is made for metallurgical assaying laboratories, with stamp mill, furnaces and other apparatus required for practical instruction in this department.

COURSE IN MINING ENGINEERING.

Required for Degree of B. S. in School of Mining Engineering.

FIRST YEAR.

1. Plane trigonometry and Advanced Geometry; Projection Drawing; French.
2. Analytical Geometry; Descriptive Geometry and Drawing; French.
3. Calculus; Drawing; French.

SECOND YEAR.

1. Advanced Algebra and Analytical Geometry; *Chemistry and Laboratory Practice; German.
2. Advanced Calculus; *Chemistry and Laboratory Practice; German.
3. Advanced Calculus and Spherical Trigonometry; Topographical Surveying; German.

THIRD YEAR.

1. Advanced Descriptive Geometry; Surveying; Mineralogy.
2. Analytical Mechanics; Physics; *Chemical Laboratory.
3. Analytical Mechanics; Physics; *Chemical Laboratory.

FOURTH YEAR.

1. Resistance of Materials and Hydraulics; Geology; *Chemical Laboratory, and Metallurgy.
2. Mining Engineering; Drawing or Constitutional History; *Chemical Laboratory and Metallurgy.
3. *Chemical Laboratory; Drawing; Political Economy; Graduating Thesis.

SCHOOL OF ARCHITECTURE.

OBJECT OF THE SCHOOL.

The school seeks to prepare students for the profession of architecture. For this a thorough knowledge of scientific principles applied to building, ability and correct taste in design, and some technical knowledge of the various building trades, with skill in the use of tools are necessary, and are prominent features of the course of instruction.

INSTRUCTION.

The technical instruction is given chiefly by lectures, illustrated by sketches, models or engravings, and practical application is made by the student.

*For explanation of chemical laboratory practice, see courses of laboratory work in school of chemistry.

Drawing is practiced throughout the course, and, as far as possible, original work is executed. Drawing from casts and modeling in clay, give facility in sketching details and correct knowledge of form.

In shop practice, designs are made by the student, to reduced scale, of roofs, stairs, etc., and worked out in wood.

The course in mathematics, mechanics, physics, etc., is nearly identical with that in the other schools of engineering.

TECHNICAL STUDIES.

Drawing from Casts—Outline sketches and finished drawings in pencil and crayon.

Modeling in Clay—From casts and original designs; weekly exercises in designing architectural ornaments.

Wood Construction and Drawing—Construction and finish of wooden buildings, roofs, ceilings, domes, towers, stairs, etc.

Iron, Brick and Stone Construction, and Drawing—Buildings of brick, stone and iron walls, arches, stone work, iron fronts, fire-proof floors, etc.

Two lectures and eight hours of drawing weekly.

Architectural Drawing—Preparation of full sets of finished drawings from sketches; weekly exercises in design of architectural details.

Architectural Designing—Working out of original designs for specified project and preparation of complete finished drawings.

History of Architecture—Daily lectures on history of architectural style; the construction and decoration employed; most important examples; ideas applicable to American architecture.

Æsthetics of Architecture—Three lectures and seven hours, designing weekly in Æsthetics applied to architecture; laying out grounds, planning buildings for various purposes, grouping their parts, external and internal decoration, harmonies of color: general principles of decoration by form and color, for wall paper, hangings, carpets, furniture, etc.

Estimates—Practice in measuring, valuing of material and labor for all kinds of builders' work and in making out full sets of estimates.

Agreements and Specifications—Lectures on, and preparation of complete sets.

Heating and Ventilating—The best modes of; fuels, and motion of air in flues.

SPECIAL EXERCISES.

Specimen plates will be required of each student at the close of each term in drawing, to form a part of his record. All such papers must be on paper of regular size, except when otherwise directed.

SHOP PRACTICE.

To give a practical knowledge of various kinds of work, a full course of instruction is arranged, filling three terms, which all architectural students are required to pursue unless they have already had equivalent practice. The system is similar to the Russian system, so much admired at the centennial exposition, but more comprehensive, and applied to building rather than mechanical engineering.

First Term—Carpentery and joinery.

Sharpening tools, planing flat surfaces, at right angles, uniform width and thickness, framing with single tenons, double tenons, paneling, splicing, dovetailing, sticking moulding.

Second Term—Cabinet making and stair building.

Paneling, chamfers, turning, fret sawing, veneering, buhl, reissner and inlaid work, carving, stairs, hinges, strings, setting balusters, squaring and moulding rails.

Third Term—Miscellaneous. Finishing in shellac, oil, wax and varnish, polishing, painting and ornamenting, gilding, metal work, filing, urning, drilling, cutting screws, ornamental work, casting soft metals, tempering.

Stone work in plaster, cutting ashler and moulded work, rusticated work, voussoirs for arches, domes and vaults, carving, relief and incised.

APPARATUS.

A collection of casts donated by the Spanish government, and another of casts of various architectural details, from Lehr, of Berlin, belonging to the schools of architecture and designing; models of roofs, trusses, stairs, etc. Models in stone cutting, of splices, joints, etc., made by Schroder, of Darmstadt.

The casts, photographs, etc., of the art gallery. A library containing many of the best English, German, French and American architectural works and periodicals, such as Daly's Motifs Historiques, Architecture Privee, Racinet's Ornament Polychrome, Builder, Civil Engineer's and Architect's Journal, Workshop, Skizzenbuch, Encyclopedia d' Architecture, Owen Jones' Grammar of Ornament, etc.

A large carpenter and cabinet shop, containing full sets of tools, six sets of model-making tools, foot lathe with slide rest, chuck, drills, etc. Cross and splitting saws, planer, moulding and tenoning machine, lathe, whittler, fret saw, etc.

BUILDER'S COURSE.

The trustees allow persons desiring to fit themselves for master builders to take a course of a single year, pursuing such technical studies of the course in architecture as they may be prepared to enter upon with profit, and as will be most advantageous to them.

Candidates for the Builder's course must pass the examinations in the common branches, but need not pass in the studies of the preliminary year unless they shall desire to pursue other studies than those marked in the following: (The figures denote the hours per week.) Fee, $10 per term.

1. Wood construction, 10; projection drawing, 10; shop practice (carpentry and joinery), 10.
2. Stone, brick and metal construction, 10; architectural drawing, 10; shop practice, (stair building), 10.
3. Agreements, specifications, estimates, heating and ventilation, architectural designing, 10; shop practice (cabinet making), 10.

ARCHITECTURAL COURSE.

Required for the degree of B. S. in school of architecture.

FIRST YEAR.

1. Projection Drawing, 10; Plane Trigonometry and Advanced Geometry; French.
2. Descriptive Geometry and Drawing, 10; Analytical Geometry; French.
3. Drawing and Modeling 10; Calculus; French.

SECOND YEAR.

1. Wood Construction, 10; Advanced Algebra and Analytical Geometry; Modeling or Drawing, 10.
2. Stone, Brick, and Metal Construction, 10; Advanced Calculus, Freehand Drawing and Designing.
3. Shop Practice, Architectural Drawing, Modern History.

THIRD YEAR.

1. Architectural Drawing, 10; Descriptive Geometry and Drawing, 10; Chemistry and Laboratory Practice, 10; Vacation Journal.
2. History of Architecture, Analytical Mechanics, Physics.
3. History of Architecture, Architectural Designing, 10; Physics.

FOURTH YEAR.

1. Æsthetics of Architecture, 10; Resistance of Materials and Hydraulics, Geology, Vacation Journal.
2. Architectural Designing, 10; Constitutional History; Water Color Sketching, 10.
3. Estimates, Agreements and Specifications, Heating and Ventilation, 10; Physical Laboratory, 10; Political Economy, Graduating Thesis.

COLLEGE OF NATURAL SCIENCE.

FACULTY.

The REGENT,
Prof. S. W. ROBINSON,
Prof. WEBER,
C. I. HAYS,
M. A. SCOVELL,
Prof. BURRILL, Dean.
Prof. TAFT,
Miss LOU C. ALLEN,
I. O. BAKER,
J. E. GREGORY,
GEORGE A. WILD.

SCHOOLS.

School of Chemistry.
School of Natural History.
School of Domestic Science.

ADMISSION.

Candidates for the college of natural science must be at least fifteen years of age, and must pass satisfactory examinations in the common school branches and in the studies of the preliminary year.

Their preparation should be specially good in the scientific studies of the preliminary year. Some knowledge of drawing of natural objects will also greatly facilitate the student's progress. A knowledge of the Latin language is a good preparation for the mastery of the scientific names which must be learned in this course.

SCHOOL OF CHEMISTRY.

This school aims to impart such knowledge of chemistry as will enable the student to apply the principles of the science to the related arts, and to fit him for the field of original research, or for the practical business of the druggist, pharmaceutist and practical chemist.

INSTRUCTION.

Text-book instruction in the principles of chemistry and chemical physics, occupy six weeks of the first term of the first year. The remainder of the year the recitations alternate with laboratory practice. During the next three years each student is expected to work two hours daily in the laboratory, five days in the week. In order to graduate, each is required at the close of his course, to make an original investigation, and present a thesis.

Students who pursue chemistry as a part of other courses work at least two consecutive hours daily during such time as their specialty may require.

Text-Books.—Roscoe's Chemistry; Douglas & Prescott's Analysis; Fresenius' Analysis; Miller's Chemistry; Rose's Analysis.

Books of Reference.—Gmelin's Handbook of Chemistry; Graham-Otto's Ausfuehrliches Lehrbuch der Chemie; Watt's Dictionary of Chemistry; Lehmann's Physiological Chemistry; Percy's Metallurgy; Mitchell's Practical Assaying; Wormley's Micro-Chemistry of Poisons; Taylor on Poison.

Four courses of laboratory work have been arranged as follows:

CHEMICAL COURSE.

FIRST YEAR.

First Term.—Qualitative analysis, tests and separation of the alkalies, alkaline earths, (N H 4) 2 S Group, and 1st and 2d division of H 2 S group.

Second Term.—Qualitative analysis completed, tests, and separation of 3d division of H 2 S group, and the acids, analysis of 20 simple salts, and 20 compound substances.

Third Term.—Quantitative analysis of sodium sulphate, dolomite, ammonium alum, potassium chloride, bone ash, iron ore.

SECOND YEAR.

First Term.—Quantitative analysis of Calamine (zinc carbonate), copper pyrites, galena, spathic iron ore, nickel ore, clay, soil, determination of iron, copper, etc., both volumetrically and gravimetrically.

Second Term.—Volumetric analysis, alkalimetry and acidimetry, preparation of standard solutions, analysis of sodium carbonate, sodium hydroxide, potassium hydroxide, pearl ash, cream of tartar, sulphuric, hydrochloric, oxalic and citric acids, analysis of corn or other grain.

Third Term.—Preparation of salts, acids, etc.; electroplating with silver, gold, copper, nickel.

THIRD YEAR.

First Term.—Ultimate analysis, determination of carbon, hydrogen, oxygen, nitrogen chlorine, phosphorus and sulphur in organic compounds, analysis of urine.

Second Term.—Blow pipe analysis, determination of a collection of minerals representing over thirty of the metals. Assaying in both the dry and wet way of gold, silver and lead ores.

Third Term.—Photography, preparation of ether, absolute alcohol, gun cotton, cadmium iodide, ammonium iodide, glacial acetic acid, silver nitrate, collodion, taking negatives, printing positives, toning and mounting.

FOURTH YEAR.

First Term.—Gas analysis, calibration of eudiometers, analysis of air from lungs, atmospheric air, marsh gas, illuminating gas and crude coal gas, analysis of mineral waters.

Second Term.—Toxicology, micro-chemistry of poisons, testing for mineral and vegetable poisons, separation from organic mixtures.

Third Term.—Original researches, thesis.

PHARMACEUTICAL COURSE.

FIRST YEAR.

Same as in chemical course.

SECOND YEAR.

First Term.—Quantitative analysis of commercial drugs, white lead, red lead, paris green, sodium nitrate, oxalic acid, tartar emetic, commercial hydrochloric, nitric and sulphuric acid.

Second Term.—Analysis of mineral waters, preparation of tinctures, solid and fluid extracts, reading and compounding prescriptions.

Third Term.—Isolation of alkaloids, atropine, strychnine, quinine, nicotine, aconitine, morphine, preparation of salycilic acid, examination of alcoholic liquors, reading and compounding prescriptions.

THIRD YEAR.

First Term.—Same as second term, second year of chemical course.

Second Term.—Same as first term, third year of chemical course, without analysis of urine, reading and compounding prescriptions.

Third Term.—Preparation of salts, perfumes, flavoring extracts, cosmetics, electroplating with gold, silver, copper and nickel.

FOURTH YEAR.

First Term.—Same as second term, fourth year, of chemical course.
Second Term.—Analysis of urine, normal and pathological, reading and compounding prescriptions.
Third Term.—Original researches, thesis.

AGRICULTURAL COURSE.

FIRST YEAR.

Same as in chemical course.

SECOND YEAR.

First Term.—Quantitative analysis of feldspar, soil, ashes of plants and grains.
Second Term.—Analysis of commercial fertilizers, manures, and minerals used for fertilizers.
Third Term.—Preparation of organic and inorganic salts, starch from potatoes, corn, wheat, etc., sugar, dextrine, alcohol.

THIRD YEAR.

First Term.—Same as in chemical course.
Second Term.—Analysis of milk, corn, wheat, potatoes, fruits, etc.
Third Term.—Silt analysis of soils, analysis of mineral waters.

METALLURGICAL COURSE.

FIRST YEAR.

Same as in chemical course with the quantitative analysis of brass, solder and type metal in third term.

SECOND YEAR.

First Term.—Analysis of pig iron, wrought iron, steel, furnace slags, rolling mill slags and cinders.
Second Term.—Same as in chemical course, with analysis of mineral waters in place of assaying.
Third Term.—Same as second term, fourth year, of chemical course, with analysis of coal in place of mineral waters.

APPARATUS.

The facilities offered for obtaining a practical knowledge of chemistry are believed to be unsurpassed by those of any other institution in the west. A large laboratory building, 75x120 feet, and four stories in height, has just been erected, at an expense, including furniture, of $40,000. It includes five laboratories, a milling and metallurgical room, a photographic atelier and chemical maufacture room. The apparatus includes a large platinum retort for the preparation of hydrofluoric

acid; a Dove's polarizer, with a complete suit of accompanying apparatus; a Geissler's mercurial air pump; Hoffman's apparatus for illustrating in the lecture-room the composition of compound gases; a Soliel-Scheibler's saccharimeter of the most recent and approved construction; an excellent set of areometers; a Hauy's goniometer; a camera with Ross' lenses; a Ruhmkorff's coil; galvanic batteries of Grove and Bunsen; also a potassium dichromate battery, a galvanometer and a thermo-electric pile, a spectroscope and a large binocular microscope; two additional chemical balances, peculiar in the shortness of their beams, and remarkable for their accuracy and rapidity. Also an extensive set of metallurgical apparatus, consisting of models of furnaces, etc., and a full set of photographic apparatus.

The library of the school is rich in complete sets of standard scientific works; the Annalen der Chemie und Pharmacie; the Jahresbericht ueber die Fortschritte der Chemie; Dingler's Polytechnic Journal; the Handwœrterbuch der Chemie; Percy's Metallurgy; Silliman's Journal. See table of contents for the list of periodicals taken.

SCHOOL OF CHEMISTRY COURSE.

Required for degree of B. S. in school of chemistry.

FIRST YEAR.

1. Chemistry and Laboratory Practice; Trigonometry and Advanced Geometry; British authors or French.
2. Chemistry and Laboratory Practice; Analytical Geometry; American authors or French.
3. Organic Chemistry and Laboratory Practice; Calculus or Free-hand Drawing; Rhetoric; French (optional).

SECOND YEAR.

1. Laboratory Practice; Physiology; German.
2. Laboratory Practice: Zoology or Botany; German.
3. Laboratory Practice; Zoology; German.

THIRD YEAR.

1. Laboratory Practice; Mineralogy; German.
2. Laboratory Practice; Physics; German.
3. Laboratory Practice; Physics; German.

FOURTH YEAR.

1. Laboratory Work; Mental Science; Meteorology and Physical Geography.
2. Constitutional History; Laboratory Work; Logic.
3. Political Economy; Geology; Laboratory work and Thesis.

SCHOOL OF NATURAL HISTORY.

The aim of this school is to educate practical geologists, collectors and curators of cabinets and museums of natural history, and superintendents of scientific explorations and surveys. It acquaints the student with the latest researches in respect to the structure of the earth and to the origin and distribution of its organic products; teaches him to collect and preserve specimens and arrange them for study, and to conduct original investigations.

INSTRUCTION.

The instruction is given by lectures and text-books, and excursions, when practicable, made under charge of the professors.

Botany.—Candidates for admission are examined upon Gray's "Lessons in Botany," or an equivalent, and are expected to be able to analyze readily common wild flowers. Beginning with the fall term of the second year, systematic and structural botany is continued by illustrated lectures and laboratory work upon fresh, dried and alcoholic specimens. Students, throughout the course, are required to observe for themselves, and to make notes and drawings of their investigations. A series of these drawings, upon a uniform scale, together with the accompanying descriptions, are deposited in the library of the laboratory.

Each student provides himself with suitable pencils, drawing pens and paper, needles in handles, glass slides for mounting objects, and razor for making thin sections. For the first term, a manual of botany (Gray's or Wood's) is required. Microscopes and other apparatus are furnished by the University, for which a deposit of three dollars is required, but no charge is made except for damage and material used.

The first six weeks are devoted to the study of the natural orders of flowering plants. About twelve lectures are given upon the characteristics of the prominent orders—their geographical distributions, importance, etc., together with the history of a few special plants and their products. During this time, two hours per day, three days per week, students analyze, in the laboratory, flowering plants of the more difficult orders, compositæ, graminæ, etc., especially such as are best obtained in autumn. The seventh week is devoted to practical instruction in the use of the compound microscope, and in the preparation of objects. For this, students are furnished with printed directions, and have individual instructions. During the five weeks following, the general morphology of plants, including vegetable anatomy and histology, is studied, there being about ten lectures, and thirty hours of laboratory work. Tests are made from time to time, by the use of disguised vegetable substances. Two weeks are taken for review, finishing drawings and examination. The special morphology of the great divisions of cryptogamic and phænogamic plants, their chief characteristics, their classifications, and the identification of species of cryptogams, or flowerless plants, constitute the work of the second term. Special attention is given to injurious fungi, from specimens in the herbarium, or grown in the laboratory. Aquaria furnish numerous kind of fresh water algæ, and the green houses supply specimens in

nearly all the groups studied. During the term, there are about twenty lectures, and fifty-four hours of laboratory work, besides review and examination.

The most important books of reference in the English language are Sach's "Text-book of Botany," LeMaout & Decaisne's "Botany," Gray's "Structural Botany," Lindley's "Introduction to Botany," Berkley's "Cryptogamic Botany and Fungology," Cooke's "Fungi," and "Hand-book of British fungi."

Vegetable Physiology is studied the third term of the first year. The botanical part of Johnson's "How Crops Grow" is made the basis of this work, supplemented by lectures and references to other publications, and experimental practice. Respiration, assimilation, the circulation of fluids, the influence of light and temperature, growth and reproduction, are some of the topics treated, and sufficiently show the magnitude and importance of the study. Throughout the course, the attempt is made to introduce the students to the literature of the various subjects, and to acquaint them with the authority for the facts stated.

Anatomy and Physiology.—This study commences the first term of the second year, and the anatomy is taught by lectures, aided by works of reference. The human skeleton and manikin are made the basis of comparison in the more extended zoological researches. The physiology taught by means of Dalton's unabridged work, accompanied by familiar lectures, in which especial attention is given to the subjects of food, digestion, dress, circulation, respiration, ventilation, etc. The senses will be carefully studied, accompanied with suggestions for prolonging their greatest efficiency—the practical and useful always taking the precedence of the merely theoretical, that the controllable powers of the body may be preserved with their most efficient activities, to avoid preventable suffering and death, and secure vigor and happiness.

Zoology continues two terms. In the first, invertebrate zoology is studied, unfolding the cardinal facts exemplified in the sub-kingdoms, protosia, cœlenterata, anuloida, anuloso and mollusca, together with the general principles of respiration, circulation, special methods of reproduction and development; geographical and geological distribution; principles of natural classification, depending upon morphological type and specialization of the functions, etc.

Vertebrate zoology follows, embracing embryology, modification of plan by which animals are adapted to the various conditions of existence, as manifest in their comparative anatomy; systematic zoology, so that the orders may be recognized at sight, etc. Nicholson's manual of zoology will be used as a text book.

Geology.—In geology, Dana's manual is used; commencing with dynamical geology, which explains the forces known to produce observed phenomena in the crust of the earth; as life, in the formation of lime-stone, coal, peat; water, in eroding, transporting and depositing material for strata; heat, as manifested in consolidation, metamorphism and crystallization, as well as mountain folds on the surface of a shrinking globe.

Lithological geology is the next term's work. This treats of the kinds, nature and material of rocks, stratified and unstratified; their mineral constituents; structure, original or induced; concretions, veins,

dykes, etc.; methods of determining the chronological order of the strata. Also the historic development of the earth as revealed by

Paleontology, or the entombed fossils of the previous inhabitants, through the silurian and devonian ages. The third term explains the carboniferous age with its coal, the reptilian and mammalian ages, with their wonderful inhabitants; the glacial period with its continent of ice, and through to the present time. Here also are discussed the elements of time, the system of life, the origin of species, the climax of man.

Physical Geography and Meteorology.—The principles of the phenomena manifest in the life of the earth bear the same relation to geology that physiology does to anatomy. This subject, a result of the facts of geology, with an application of the laws of physics, is taught by lectures and works of reference. It explains how the solid earth, influenced by winds and waters, driven by heat and electricity, aided by light, constitutes a fit abode for man, the last link of terrestrial being.

Entomology..—The time given to this study is eleven weeks After three or four introductory lectures upon the most useful literature, and the methods of collecting and preserving specimens, about five weeks are devoted to the special anatomy of insects and the outlines of classification,—four lectures, and one review or two hours of practical work per week. During this time students make collections as fast as possible, reserving, however, the determination of species until the last half of the term. During this latter portion of the term three lectures per week are given upon injurious and beneficial insects, methods of exterminating, etc., and four hours per week are taken for laboratory work, naming species, noting habits observed, making detailed descriptions, etc. A careful and complete description of some one species, illustrated by drawings of important parts, is made by each student and deposited in the library of the school. The large collection of named species, the ample reference library, the drawings and other illustrations to which students have access, are invaluable aids in the study. The most important reference books are Westwood's "Introduction to the Modern Classification of Insects," Packard's "Guide to the Study of Insects," Harris' "Insects Injurious to Vegetation," and the publications of the Smithsonian Institute, entomological societies, and the reports of the state entomologist.

Students are required to provide themselves with collecting nets and bottles, pins, and lined boxes, and books for notes. Microscopes and other required apparatus are furnished by the University.

Microscopy and Fungoloy.—Eleven weeks. Students have in this study further practice in the use of the compound microscope, the management of light for particular purposes, the testing of lenses, measurement of magnifying powers and angles of aperture, drawing and photographing objects, preparation and mounting of material, etc. The application, as indicated above, is mainly, but not exclusively, devoted to minute fungi, including those of the different fermentations and putrefactions. Such fungi as are known or supposed to be injurious to plants or animals are studied as carefully and thoroughly as circumstances permit, cultures being made for the purpose, and specimens obtained from various sources.

APPARATUS.

In *Botany*, the school has a collection of about one thousand species of the plants indigenous to the state of Illinois, including a very nearly complete set of the grasses; a collection of Rocky Mountain and western plants; a collection of plants from Dr. Vasey, botanist of the department of agriculture, Washington, D. C., and others obtained by exchange from various parts of the United States. A collection of the fungi of the vicinity has been begun and already contains numerous species. The green-houses and out-door plantations furnish a large amount of illustrative material for the classes. Enlarged *papier-mache* models of flowers and fruits by Dr. Auzoux, exhibiting structure and development, are in the cabinet. Sections of wood from one hundred and seventy species of trees and shrubs indigenous in Illinois were exhibited at the Centennial and exchanged for foreign specimens. The native specimens now largely duplicated are to be replaced as soon as possible.

In Entomology, numerous species have been contributed by the state entomologist, who is required by law to deposit his first series of specimens in the cabinet of the University. Local collections and exchanges have further increased this number, amounting now to about three thousand species.

The University now has first-class microscopes of four different styles from European makers, one by a prominent American maker, and others, of which the glasses were made to order in Europe, and the stands, a new pattern, manufactured in the shops of the University. These latter have a firm iron base with joint for inclining, coarse adjustment by rack and pinion (Jackson model), fine adjustment attached to stage, glass sliding stage and wide range of power.

In *Zoology*, the cabinets contain: a human skeleton, purchased in Paris, and a manikin made by Dr. Auzoux; skeletons of the different orders of mammals, and of birds; stuffed preparations of a large number of birds, mammals, fishes, reptiles, etc., a dissected horse's leg and hoof, a dissected eye, trachea and vocal apparatus, in *papier-mache*, by Dr. Auzoux; collections of shells, fossils and insects.

The geological cabinet has been immensly improved the past year. In addition to the specimens from the state geological survey and other illustrative specimens, mineral and fossil, the cabinet has been the recipient of Prof. Ward's celebrated college series of famous fossils, so essential in elucidating the various phases of life in geological history. This set was the munificent donation of Emory Cobb, Esq., president of the board of trustees.

A valuable and extensive collection of the leads of the state, and accompanying mineral, was donated by Gen. J. C. Smith and other gentlemen, of Galena.

COURSE IN SCHOOL OF NATURAL HISTORY.

Required for Degree of B. S. in School of Natural History.

FIRST YEAR.

1. Chemistry; Free Hand Drawing, (optional); Trigonometry and advanced Geometry; French.

2. Chemistry; Free Hand Drawing, (optional); Analytical Geometry; French.
3. Vegetable Physiology; Chemistry, or Free Hand Drawing; Rhetoric; French, (extra).

SECOND YEAR.

1. Advanced Anatomy and Physiology; Botany; German.
2. Zoology; Botany; German.
3. Zoology; Economic Entomology; German.

THIRD YEAR.

1. Geology; Mineralogy; German; Ancient History, (optional, extra).
2. Geology; Physics; German; Mediæval History, (optional, extra).
3. Geology; Physics; Modern History, or Astronomy.

FOURTH YEAR.

1. Meteorology and Physical Geography; History of Civilization; Mental Science.
2. Constitutional History; Microscopy and Fungology; Logic.
3. Political Economy; Physical Laboratory; Laboratory Work and Graduating Thesis.

SCHOOL OF DOMESTIC SCIENCE.

OBJECT OF THE SCHOOL.

It is the aim of the school to give to earnest and capable young women an education, not lacking in refinement, but which shall fit them for their great duties and trusts, making them the equals of their educated husbands and associates, and enabling them to bring the aid of science and culture to the all-important labors and vocations of womanhood.

This school proceeds upon the assumption that the housekeeper needs education as much as the house-builder, the nurse as well as the physician, the leaders of society as surely as the leaders of senates, the mother as much as the father, the woman as well as the man. We discard the old absurd notion that education is a necessity to man, but only an ornament to woman. If ignorance is a weakness and disaster in the places of business where the income is won, it is equally so in the places of living, where the income is expended. If science can aid agriculture and the mechanic arts to use more successfully nature's forces and to increase the amount and value of their products, it can equally aid the house-keeper in the finer and more complicated use of those forces and agencies, in the home where winter is to be changed into genial summer by artificial fires, and darkness into day by costly illumination; where the raw products of the field are to be transformed into sweet and wholesome food by a chemistry finer than that of soils, and the products of a hundred manufactories are to be put to their final uses for the health and happiness of life.

The purpose is to provide a full course of instruction in the arts of the household, and the sciences relating thereto. No industry is more important to human happiness and well-being than that which makes

the home. And this industry involves principles of science, as many and as profound as those which control any other human employment.

TECHNICAL STUDIES.

Food and Dietetics.—This study extends through two terms. The first term is devoted to the consideration of the simple aliments, such as sugar, starch, the albuminoids, fats, etc. In the second term, the studies include the compound aliments: chemical structure of the cereals, especially the wheat; the chemistry of bread-making, care of milk and butter; the nature, uses, preservation and preparation of animal and vegetable food, for the healthful, and for the invalids; the chemistry of cooking; chemical composition, preparation and physiological effects of the beverages, such as tea, coffee, chocolate, etc., and the effects of alcoholic drinks.

Domestic Hygiene.—Location of dwelling houses, importance of drainage, uncleanliness as a source of disease; necessity of ventilation and sunlight; uses, construction, material and hygiene of dress; principles of nursing and care of the sick.

Household Esthetics.—Principles of taste as applied to ornamentation, furniture, wall and ceiling decorations, carpets, pottery, clothing and landscapes, harmony of colors, forms, proportions, etc.

Household Science.—Principles of heating and ventilation, chemistry of illumination, materials of culinary utensils, tin, iron, brass, etc.; adulterations of foods.

Domestic Economy.—Econony of time, management of servants, government and instruction of children, household expenditures. Usages of society. Laws of etiquette, social customs, etc.

Home Architecture.—Principal architectural styles, as Grecian, Roman, Gothic, Renaissance, modern gothic, etc.; exterior of the house; general characteristics; interiors, chief requisites, convenience, light, warmth, etc.; requirements of different apartments, programmes for designs, as of cottages of various styles and capacity, farm houses, villas, etc.; internal decoration and construction; sanitary requisites, cellars, walls, water supply, etc.

Landscape drawing and green-house work, see school of horticulture.

For other studies see the proper schools.

HEALTH AND PHYSICAL TRAINING.

A spacious gymnasium for young women has been fitted up in the library wing, and instruction in calisthenics is given to two or more classes daily. Lectures on health, and its conditions, and on other important topics, will be delivered to these classes, at suitable intervals, and great pains will be taken to secure, to the utmost possible extent, physical vigor, robust health, and a graceful carriage, and to prepare young women to take enlightened care of their own health, and the health of others under their charge.

The materials for the calisthenic uniform must be made up under the direction of the instructor of this department.

The trustees desire that all female students shall participate in these exercises unless excused for good cause. They have been witnessed

and heartily approved by some of the most eminent medical men in the state.

COURSE IN DOMESTIC SCIENCE.

Required for Degree of B. S. in School of Domestic Science.

FIRST YEAR.

1. Chemistry; Trigonometry and Drawing; British authors.
2. Chemistry; Designing and Drawing; American authors.
3. Chemistry; Designing and Drawing; Rhetoric.

SECOND YEAR.

1. Botany; Physiology, German and English Classics.
2. Food and Dietetics, (simple aliments) Botany and Green-house; German or English classics.
3. Food and Dietetics, (compound aliments and principles of cooking, etc.) Zoology; German or English Classics.

THIRD YEAR.

1. Domestic Hygiene; Ancient History; German or French.
2. Physics; Mediæval History, German or French.
3. Physics or Landscape Gardening; Modern History; German or French.

FOURTH YEAR.

1. Household Esthetics; Mental Science; History of Civilization.
2. Household Science; Constitutional History; Logic.
3. Domestic Economy; Usages of Society, etc.; Political Economy; Home Architecture; Graduation Thesis or Oration or Essay.

COLLEGE OF LITERATURE AND SCIENCE.

FACULTY.

The REGENT,
Professor PICKARD,
Professor SHATTUCK,
Professor WEBER,
Professor ROBINSON,
Professor BAUMGRAS,

Professor SNYDER, Dean,
Professor CRAWFORD,
Professor BURRILL,
Professor TAFT,
F. A. PARSONS,
CHAS. I. PICKARD,

Major DINWIDDIE.

SCHOOLS.

English and Modern Languages. Ancient Languages and Literature.

ADMISSION.

Candidates for the school of English and modern languages will be examined in the studies mentioned on page 12, including the Latin but not the Greek. Those desiring to enter the school of ancient languages will be examined also in the Greek but not in the elements of botany, physiology and natural philosophy. The examinations in Latin and Greek will be as follows:

LATIN.

Latin grammar including prosody. (Harkness' or Allen and Greenough's.) Latin prose composition. (Forty-four exercises, to the passive voice, in Arnold's Latin prose composition, or parts one and two, to page 166, of Harness' Introduction to elementary Latin prose composition, or an equivalent in Allen and Greenough's Latin composition), four books of Cæsar's Commentaries, six orations of Cicero, and six books of Æneid. Real equivalents for any of the above mentioned works will be accepted. The so-called Roman method of pronunciation of Latin is recommended, as found in Allen and Greenough's, or in the last edition of Harkness' grammar.

GREEK.

Greek grammar (Goodwin's or Hadley's) Greek prose composition (Jones' exercises in Greek prose composition or an equivalent in Arnold's), and four books of Xenophon's Anabasis Writing Greek with the accents will be required. The Greek Etymology must be thoroughly learned.

OBJECT OF THESE SCHOOLS.

The object of these schools in this college is to furnish a sound and liberal education to fit students for the general duties of life, and especially to prepare them for those business pursuits which require a large measure of literary and scientific knowledge and training. They meet the wants of those who wish to prepare themselves for the labors of the press as editors or publishers, for teachers in the higher instructions, or for the transaction of public business.

Students in the agricultural and other technical schools, desiring to educate themselves as teachers, writers, and professors in their special departments, require a knowledge of the ancient as well as the modern languages, to give them a full command of all the instruments and facilities required for the highest proficiency in their studies and proposed work. The University seeks through these schools to provide for this important part of its mission—the furnishing of teachers to the industrial schools of the country, and investigators and writers for the arts. The large liberty allowed in the selection of the special studies of his course will permit the student to give such direction to his education as will fit him fully for any chosen sphere or pursuit.

INSTRUCTION.

The plan of instruction embraces, besides the ordinary text book study, lectures and practical exercises in all the departments, including original researches, essays, criticism, proof reading, and other work intended to illustrate the studies pursued, and exercise the student's own powers. It is designed to give to all the students voice culture and a training in elocutionary practice.

A prominent aim will be to teach the right use of books, and thus prepare the student for self-directed investigation and study, which will extend beyond the curriculum of his school and the period of his graduation. With this view, constant use of the already ample and continually enlarging stores of the library will be required and encouraged. As a farther aid in this direction, members of the advanced English classes are expected to act as assistant librarians. In this service they are able to obtain much valuable knowledge of the various departments of English literature, of prominent authors, and the extent and scope of their writings. Of special value as an incentive to, and the means of practice in, English composition, should be mentioned THE ILLINI, a monthly paper edited and published by the students of the several colleges, each of which is appropriately represented in its columns. A printing office has been provided for in the mechanical building, and a press with the requisite supply of type.

The Library is well supplied with works illustrating the several periods of English, American, French and German literature, as also those of ancient literature. It contains at present over ten thousand well selected volumes, and is constantly growing by purchase at home and abroad. Valuable American and foreign periodicals are received regularly in the reading room, a list of which is given on page 8.

SCHOOL OF ENGLISH AND MODERN LANGUAGES.

ENGLISH LANGUAGE AND LITERATURE.

Studies of the School.—In the arrangement of the studies the endeavor is to present a thorough and extended drill in grammatical and philological study, and in the authors and history of the English language, affording a training equivalent to the ordinary studies of the classical language. This drill extends through three years of the course, but may be shortened according to the ability and preparation of the student.

The first two terms of the first year are given to a general survey of the whole field of British and American literature from the middle of the sixteenth century to the present time. All the real representative writers come into notice, and representative specimens from the writings of each are carefully read in class. Moreover, each student is required each term to read the entire work of some classic author

making choice from a prescribed list. Frequent exercises in writing abstracts or original compositions on themes assigned are also required. The study of rhetoric occupies the third term.

During the second year some four or five of the great masters are studied, their work analyzed, the shaping forces of their times, and their influences upon succeeding times are investigated. Lectures are given from time to time on poetry, epic, lyric, dramatic, etc. Writing and reading required as in first year.

In the senior year attention is given to old English; to the Anglo-Saxon, for which the way has been prepared by the study of both English and German; to philology; to the philosophy of English literature, and to æsthetics. Essays, forensics, and orations are required.

French and German.—The modern languages taught in this school are confined to one year of French and two years of German, but the student may, at his option, substitute a second year of French for one of German. Abundant practical exercises are given both in composition and translation, and the diligent student gains the power to read with ease, scientific and other works in these languages, and may, with a little practice, write and speak them with correctness. A constant attention is also given to the etymologies common to these languages and the English, and thereby a large advantage is gained by the student in linguistic culture. "He who knows only one language," said Goethe, "knows not even that one properly."

In the first year, the student passes over a complete grammar and reader, acquiring a knowledge of the technicalities of the idiom, and a sufficient vocabulary for the use of books of reference within the course. The second year is devoted to a critical study of the languages and philological analysis, and to a course of select classic reading, composition and conversation.

Mathematics, Physics, and Astronomy.—For these studies, see school of mechanical engineering.

Natural Sciences.—See school of chemistry and natural history.

HISTORY AND SOCIAL SCIENCE.

The historical studies are designed to afford a general view of the history, social organization and progress of the race. They embrace also the history of the arts and sciences, and of civilization, the principles of civil polity and law, the philosophy of history, and the principles of political economy and constitutional law. The instruction is given chiefly by lectures, with readings of specified authors, and the study of historical geography and chronology.

The course occupies six terms in the third and fourth years of the University courses.

THIRD YEAR.

Ancient history of Greece and Rome, with notices of other nations; ancient geography; mediæval history; modern history; general European history; European geography.

FOURTH YEAR.

Constitutional history of England and the United States, five lectures a week; history of civilization, analysis of historical forces and phenomena, notices of the arts and of the inductive sciences; political economy.

PHILOSOPHY AND LOGIC.

The studies of this department are taught chiefly by lectures, with readings of specified authors, and written essays. These studies require much maturity of powers, and are therefore confined to the fourth year of the course.

Mental Philosphy.—Analysis and classification of mental phenomena; theories of perception, imagination, memory, judgment, reason; mental physiology, or connection of body and mind, healthful conditions of thought, growth and decay of mental and moral powers; philosophy of education; theory of conscience; nature of moral obligation; moral feeling; the right; the good; practical ethics; duties; formation of character; ancient schools of philosophy; modern schools of philosophy. Influence of philosophy on the progress of civilization, and on modern sciences and arts.

Principles of Logic—Conditions of valid thinking; forms of arguments; fallacies and their classification. Inductive and scientific reasoning; principles and methods of investigation. Practical applications of logic in the construction of argument, in the detection and answer of fallacies, and in the formation of habits of thinking, and the common judgments of life.

COURSE OF SCHOOL OF ENGLISH AND MODERN LANGUAGES.

Required for Degree of B. L.

FIRST YEAR.

1. Cicero de Amicitia, or British authors; French; Trigonometry and Advanced Geometry.
2. Livy, or American authors; French; Analytical Geometry.
3. Rhetoric; French; Calculus, or Drawing; Horace (optional, extra).

SECOND YEAR.

1. English Classics; German; Physiology or Botany.
2. English Classics; German; Zoology or Botany.
3. English Classics; German; Astronomy.

THIRD YEAR.

1. German; Chemistry; Ancient History or Geology.
2. German; Physics or Chemistry; Mediæval History.
3. German; Physics; Modern History.

FOURTH YEAR.

1. Anglo-Saxon; Mental Science; History of Civilization.
2. English Literature; Constitutional History; Logic.
3. Æsthetics; Political Economy; Chemistry of Geology; Graduating Thesis or Oration.

SCHOOL OF ANCIENT LANGUAGES AND LITERATURE.

In the School of Ancient Languages and Literature, the methods of instruction, without swerving from their proper aim, to impart a sufficiently full and critical knowledge of the Latin and Greek languages and writings, will make the study of these tongues subservient, in a more than usual degree, to a critical and correct use of the English. With this view, written translations, carefully prepared, with due attention to differences, equivalences and substitution of idioms, and the comparison and discrimination of synonyms, will form part of the entire course.

The study of Latin and Greek composition will constitute a weekly exercise through the first year, and will be continued, to some extent, through the course. Essays, historical and critical, will be required from time to time, in connection with the works read, and a free use of the library is urged. It is intended that each student completing the course in ancient language, shall have a clear knowledge of the history of Greek and Latin literature, and of the principal authors in both languages. As an aid to the appreciation of the literature of the two peoples, Greek and Roman history will form an important part of the course, and will be taken up in the beginning of the course, illustrating the works read. In the first term of the third year ancient history is taken up as a separate study, and especial attention is then given to the history of Greece and Rome, and the nations with whom they came in contact. Classes will be formed for students who wish to carry their classical study farther than the prescribed course, and every assistance will be given them.

For the studies in History, Philosophy, etc., see school of English and modern languages.

For the studies in Mathematics and Natural Science, see schools of mechanical engineering and natural history.

Course of School of Ancient Languages.

Required for Degree of B. A.

FIRST YEAR.

1. Cicero de Amicitia and prose composition; Iliad and prose composition; Trigonometry and Advanced Geometry.
2. Livy and prose composition; Boise and Freeman's selections from Greek authors and prose composition; Analytical Geometry.
3. Odes of Horace and prose composition; Memorabilla and prose composition; Calculus.

SECOND YEAR.

1. Satires of Horace, Thucydides or German; Physiology.
2. Terence; Sophocles or German; Zoology.
3. Tacitus; Demosthenes or German; Astronomy.

THIRD YEAR.

1. Juvenal or French; Chemistry; Ancient History or Geology.
2. Quintilian or French; Physics; Mediæval History.
3. De Officiis or French; Physics; Modern History.

FOURTH YEAR.

1. History of Civilization; Mental Science; Meteorology and Physical Geography.
2. Constitutional History; English Literature; Logic.
3. Æsthetics; Plato; Political Economy; Graduating Oration or Thesis.

ADDITIONAL SCHOOLS.

Not included in the Four Colleges.

SCHOOL OF MILITARY SCIENCE.

By the law of congress, and of the state, the University is required to teach military tactics to its students. All able-bodied male students of the college classes are enrolled in the companies of the University Battalion, and receive instruction according to the following programme, the exercises occupying from one to three hours each week (see figures in programme.)

The military organization of the University ranks in the state militia as the University Battalion, Illinois National Guard.

PROGRAMME.

FIRST YEAR.—*Fall Term*—School of Soldier, Manual of Arms, 3. *Winter Term*—School of Company, Firings, etc., 2. *Spring Term*—School of Battalion, 2.

SECOND YEAR.—*Fall Term*—Review of Company and Battalion Drill, 2. *Winter Term*—Bugle Calls and Skirmish Drill, 1. *Spring Term*—Skirmish Drill, and Battalion Evolutions, 2.

THIRD YEAR.—*Fall Term*—Review, Picket Duty, 1. *Winter Term*—Guard and Picket Duties, 1. *Spring Term*—Skirmish and Battalion Evolution, 1 to 2.

FOURTH YEAR.—*Fall Term*—Reviews, 1. *Winter Term*—Bayonet Fencing, 1. *Spring Term*—Battalion Evolutions, Target Practice, 1 to 2.

CLASS IN MILITARY SCIENCE.

A class is taught in military science and art, as far as is requisite for officers of the line. From this class are selected the officers of the several companies, for which they act as drill sergeants and instructors. The military instruction is now under the charge of Major W. A. Dinwiddie, an experienced officer of the regular army of the United States. A full supply of arms and ammunition is furnished by the war department, including 300 cadet rifles and accoutrements, two pieces of field artillery, 1,000 fixed cartridges and 1000 blank cartridges annually for target practice, with 200 rounds for artillery.

No student is eligible to the military class till he has reached the winter term of the second or sophomore year, and is in good standing in all his studies. The course of instruction is confined strictly to two years, terminating always with the first term of the fourth or senior year. No student will be permitted to retain a command who does not maintain a good standing in conduct and scholarship.

The instruction and exercises occupy two hours each week, arranged as far as possible so as not to interfere with any other courses of study, to allow the members of other courses to enter this. Students must be careful, however, to ascertain, before entering the military class, that the proper studies and exercises of their chosen courses will not be interfered with.

Commissions.—The governor of the state commissions as captains in the state militia, such students of the military class as complete the course thoroughly, and obtain the necessary experience in command, and whom the faculty of the University recommend for their high character both as students and as gentlemen.

University Uniforms.—Under the authority of the acts of incorporation, the trustees have prescribed that all male students, after their first term, shall wear the University uniform. The University cap is to be worn from the first. The uniform consists of a suit and cap of cadet gray mixed cloth, of the same color and quality as that worn at West Point, and manufactured by the same establishment. Students can procure them ready-made on their arrival here. The University cap is ornamented in front with the initials I. I. U., surrounded by a wreath. Students will always wear their uniforms on parade, but in their rooms and at recitations may wear other clothing.

The University library contains books on military science, military history and engineering.

Gymnasium.—The drill hall is furnished with a full set of gymnastic apparatus, and classes in gymnastic exercises are organized in the fall and winter terms under careful leaders. Fee $1.00.

Telegraphy.—In connection with the military department there is a telegraph office in the new University building with accommodations for learners, and connections with the mechanical and military building, the dormitory and several private houses, making about three miles of telegraph lines. The students form an association or class, and the members join the University main line, using their own instruments in their rooms. The class appoint their own officers, inspectors, etc., and pay a small contribution for maintaining batteries, etc. At present there are twenty-seven instruments on the line.

COURSE IN SCHOOL OF MILITARY SCIENCE.

SECOND YEAR.

2. School of the Soldier and Company; Bayonet Fencing, 2.
3. School of Battalion; Ceremonies and Reviews; Skirmish Drill.

THIRD YEAR.

1. Brigade and Division Evolutions; Sword Fencing, 2.
2. Guard Outpost and Picket duty; Sword Fencing, 2.
3. Military Administration; Reports and Returns; Theory of Fire-arms; Target Practice, 2.

FOURTH YEAR.

1. Organization, etc., of Armies; Art of War; Field Fortifications, 2.

SCHOOL OF COMMERCE.

The aim of this school is to teach those principles of business, and of accounts, which will enable the student to manage correctly his business affairs, to engage in the larger enterprises of trade and commerce, or to fit him for the work of a professional book-keeper.

The course of instruction will occupy at least one year. In the first term will be taught the principles of book-keeping in general, and forms of business paper in general use. In the second term the student will learn the application of book-keeping to special lines of business, and also special business forms and papers. The third term is devoted to banking and the higher operations of the counting-house, commercial law, political economy and the principles of trade. The course is designed to be as comprehensive and thorough as that of the best of commercial colleges, with advantages such as no mere commercial college can give.

ACTUAL BUSINESS.

The advantages to be gained in this school have been greatly increased by the addition of a course of practical business operations. In passing satisfactory examination in theoretical work, the student is furnished a capital of $2,000 in college currency with which to transact business. To secure its careful use, and to invest the student with some responsibility of actual gain or loss to himself, such as all business men must bear, a deposit of one-fourth per cent. of his capital in real money is required. At the close of the course all currency in good condition is redeemed at the same rate. Prices are regulated by gold quotations and goods are bought and sold by sample tickets in retail and wholesale trade. Commission business, in its various forms,

is also carried on between commission merchants and dealers in distant cities, located in different parts of the spacious hall. All the varied forms of paper by means of which business is conducted, such as bills, notes, drafts, checks, invoices, account sales, etc., are required to be carefully drawn and properly signed, endorsed or accepted before the transactions for which they are drawn are completed. Special attention is paid to business correspondence.

To facilitate these operations, and to furnish a means of teaching practical banking, the "Commercial Department Bank" has been built and equipped. Its capital is $200,000, from which students in actual business are supplied.

All business common in banks, except that of failure, is here conducted, and the student fills each different office in succession, performing the duties and keeping the books connected therewith.

Candidates for admission to this school, in full standing, must have the same preparation as that required for admission to the college of natural sciences. But those who wish simply to take the year's course in book-keeping may pursue the study through the preliminary year, and in connection with the studies of that year, paying the fees required of preparatory students.

The full course of the school is as follows:

FIRST YEAR.

1. Theoretical book-keeping in single and double entry, theory of mercantile accounts, the principal books and auxiliaries, cash book, bill book, invoice book and sales book, notes, drafts and checks, penmanship and letter-writing, British authors, chemistry or French.
2. Actual business, retail and wholesale, books kept by single entry, with and without invoice book and sales book, changed to double entry and continued by various methods. Bills, receipts, notes, drafts, checks, and accounts current; commercial calculations, American authors, drawing or French.
3. Actual business, agency, commission and shipping, importing and jobbing, invoice book, domestic and foreign, sales book, receiving book, commission sales book, business correspondence, invoices, account sales, bills of exchange, rhetoric, drawing or French.

SECOND YEAR.

1. Theoretical banking and practice in teaching book-keeping, German, English classics or physiology, history of civilization or French.
2. Banking by theory and practice, German, constitutional history.
3. Commercial law and forms of legal paper, German, political economy.

SCHOOL OF ART AND DESIGN.

This school is to subserve a two-fold purpose. 1. It affords to the students of the several colleges the opportunity to acquire such a knowledge of free-hand drawing as their chosen course may require. 2. It offers to such as have a talent or taste for art, the best facilities for pursuing studies in industrial designing or other branches of fine art. Schools of design, in Europe and in this country, have been found important aids to the higher manufactures, adding to the beauty of fabrics and to the skill and taste of workmen. The school is under charge of Professor Peter Baumgras, an artist of good reputation, and a graduate of the art school of Munich, Bavaria.

COURSE OF INSTRUCTION.

The course in industrial art and designing occupies two years, and if faithfully followed, will fit students to become efficient designers in the various branches of industry in which artistic skill and taste are indispensible to success. The course is divided into four stages, as follows:

STAGE A. Elements of form; analysis of compound forms; outline drawing on paper and blackboard; principles of shading; elementary designs; lectures on art; descriptive geometry.

STAGE B. Shading with pencil, chalk, pen, charcoal, ink and sepia; monochrome and distempera color; perspective; drawing from models and common objects; elementary designs from elements of plant and animal forms; designs for specified objects; lectures on art and its history.

STAGE C. Shading from models and casts; outlines from natural foliage; botany as applied to ornamentation; harmony and contrasts in color; optical and physical principles underlying color in nature; contrasts in design; styles and history of ornamentation; higher linear perspective and shadows; lectures on art.

STAGE D. Drawing from statuary, casts and models; drawing and sketching from nature; compositions in ornamental and industrial art; compositions in monumental and pictorial designs; analysis in ornamental art; æsthetics; water color and oil painting; lectures on art history.

ADVANCED COURSE IN ART AND DESIGN.

This course comprises the regular branches of figure, portrait and landscape painting; designing and illustrating on wood; modeling in clay, wax, etc. It is designed for those who wish to become teachers, or to pursue painting and designing as a profession.

Special art students will be received for this course, and allowed to devote their whole attention to the art studies.

Students completing the full course in Industrial Designing will receive a certificate from the school. Fee for special students, Ten Dollars the term.

MUSICAL DEPARTMENT.

UNDER CHARGE OF MISS CHARLOTTE E. PATCHIN.

COURSE OF INSTRUCTION.

Instruction Book; Clementi's Sonatines. Op. 36, 37, 38; Kohler's Studies, Op. 50, Books 1 and 2; Schmitt's Finger Exercises; Clementi's Sonaten Studien, Op. 165; Czernie's Op. 500, Grand Exercises of the Scales; Czernie's Op. 299, School of Velocity, Books 1, 2, 3, and 4; Czernie's Op. 740, Fifty Finishing Studies, Books, 1, 2, 3, 4, and 5; Cramer's Studies, Book 1; Chopin's Op, 25; Thalberg's Studies, Op. 26; Clementi's Gradus and Parnassum; Selections from Bach's well tempered Clavicord; Johnstone's Thorough Bass; Palmer's Harmony.

The pupils take, during the course, such pieces as are adapted to their advancement.

During the last year Bethoven's Sonates, and other classical compositions, are studied.

Besides the private lessons, every one is required to attend class meetings every week, at which the pupils play in the presence of each other and the teacher.

Blackboard exercises in the varieties of time, accent, scales, modulation, and transposition are given to these classes, qualifying them to render and analyze music more intelligently.

The more advanced pupils have an opportunity to take part in public musical rehearsals, also in the public exercises given by the various societies connected with the university.

TUITION.

Piano and cabinet organ, per term of 20 lessons	$ 10 00
Practice on the piano, per term	5 00
Harmony and thorough bass, in classes	5 00

Twenty-six lessons are required in the fall term, that the work in this study may correspond with that in the other departments.

Terms, strictly in advance.

DEGREES AND CERTIFICATES.

The following system of degrees has been adopted for the University:

1. All studies will remain as heretofore, free. Each student may choose and pursue such studies as he may desire, subject to only such conditions as to preparation, times of study, and numbers of studies

as may be necessary to secure efficiency in classes and economy in teaching.

2. But students who wish to be candidates for any degree must complete fully the course of studies prescribed for such degree.

3. Students not candidates for any degree will be enrolled as special students, and will receive at the close of their attendance, if not less than a year, the certificate provided by law, with statements of work done and of credits attained.

4. It is designed that the requirements for all the bachelors' degrees shall be, as nearly as possible, equal in amount and value.

5. The degree of bachelor of science, B. S., wlll be given to those who complete either of the courses of studies in the colleges of engineering, agriculture, or natural science, or in domestic science. The name of the school will be inserted after the degree.

6. The degree of bachelor of letters, B. L., will be given to those who complete the course in the school of English and modern languages.

7. The degree of bachelor of arts, B. A., will be given to those who complete the course in the school of ancient languages.

8. The masters' degrees, M. S., M. L., and M. A., and the equivalent degrees of C. E., M. E., etc., will be only given to those who have pursued and passed examinations on a year of prescribed postgraduate studies, and presented an accepted thesis, or after a term of successful practice with a thesis.

EXAMINATION FOR ADMISSION.

To prevent loss to those who are not prepared to enter the University, but might come, hoping to pass the examinations for admission, the following arrangement has been made:

County Superintendent's Certificates.—County superintendents of schools will be furnished with questions and instructions for the examinations of candidates in the four common branches, arithmetic, geography, English grammar and history of the United States; those who pass creditably will, when they present the superintendent's certificate to that effect, be admitted to the preliminary classes.

Examining Schools.— The trustees have authorized the faculty to designate one or more high schools in each county of the state, of sufficiently high grade and good reputation, whose certificates of examination, in the branches required of candidates for the University, may be received in lieu of the usual examination of the University.

These must be graded, or high schools of good reputation, and of sufficiently extended course to prepare students for the University. The principal teachers of the schools selected for this class will be authorized to prepare questions and conduct examinations of any of their students desirous of entering the University, but the papers must be sent to the University for final decision.

The following is a list of the schools already accepted as

EXAMINING SCHOOLS:

Rockford West High School	J. H. Blodget,	Principal.
Tuscola " "	E. J. Hoenshal,	"
Buda " "	J. V. Wilkinson,	"
Kankakee " "	C. W. Rolfe,	"
Champaign, East Side School	Eugene De Burn,	"
Maplewood High School	S. F. Hall,	"
Sterling, 2d Ward High School	Alfred Bayliss,	"
S. Belvidere High School	J. W. Gibson,	"
Geneseo High School	B. F. Barge,	"
Belvidere High School	—— Sherrill,	"
Urbana " "	J. W. Hays,	"
Lanark " "	F. T. Oldt,	"
Gibson City " "	J. W. Mercer,	"

Accredited High Schools.—In addition to the examining schools above mentioned, the faculty are authorized, after personal examination, to appoint accredited high schools, whose graduates may be admitted to the University without further examination. These must be schools of first-rate character, whose courses of instruction include all the studies required for admission to some one of the colleges of the University. On application, a member of the faculty is sent to examine the school making the application, as to its facilities for teaching, its course and methods of instruction, and the general proficiency shown. If the report is favorable, the name of the school is entered on the published list of high schools, accredited by the University. The graduates of these schools are admitted to any of the colleges for which their studies may have prepared them. The appointment continues as long as the work of the school is found satisfactory.

ACCREDITED HIGH SCHOOLS.

Princeton High School	H. L. Boltwood,	Principal.
Lake View "	A. T. Nightingale,	"
Champaign, West High School	W. H. Lanning,	"
Tolono High School	O. C. Palmer,	"
Decatur, "	E. A. Gastman,	"
Salem High School	N. S. Scovell,	"

N. B.—Schools desiring to be placed on either of these lists will be furnished, on application, with the circular of instructions.

DORMITORIES AND BOARD.

There are in the University buildings about one hundred private rooms, which are rented to the students who first apply. Most of the rooms are of ample size for two students. All are without furniture.

There are many boarding houses near the University where either table board, or board and rooms can be obtained, with the advantages

of the family circle. Boarding clubs are also formed by the students, by which the cost of meals may be reduced to $2.25 per week. Some students prepare their own meals, and thus reduce expenses still farther.

Coal is purchased at wholesale and furnished to the students at cost.

For estimates of annual expenses, see page 173.

The Young Men's Christian Association of the University will aid new students in procuring rooms and boarding places.

LABOR.

Labor is furnished, as far as possible, to all who desire. It is classified into educational and remunerative labor.

Educational labor is designed as practical instruction, and constitutes a part of the course of several schools. Students are credited with their proficiency in it as in other studies. Nothing is paid for it.

Remunerative labor is prosecuted for its products, and students are paid for what their work is worth. The maximum rate paid for farm, garden and shop labor is *ten cents*, and for that about the buildings and ornamental grounds, *eight cents per hour*. Students of sufficient experience may be allowed to work by the piece or job, and thus by diligence or skill, secure more pay.

Some students, who have the requisite *skill, industry and economy*, pay their entire expenses by their labor; but, in general, young men cannot count upon doing this at first, without a capital to begin with, either of skill, or of money to serve them till a degree of skill is acquired. As the number of students increases it is found more and more difficult to furnish the labor needed, and students cannot count so certainly upon finding employment.

STUDENTS' GOVERNMENT.

For several years an experiment has been in progress, in self-government of the students of the University. By permission of the faculty the general assembly of the students was organized, and a constitution adopted providing for the election of a president, vice-president, secretary and marshal; for a senate of twenty-one members, a court consisting of a chief justice and two associate judges. Under this constitution, laws are enacted by the senate, which become valid only when approved by the regent of the University. All offenses against these laws are tried before the students' court, and punished by fines according to the class of the offense. Cases which require the severer penalties of suspension or expulsion from the University are referred to the faculty. Students refusing to pay the fines imposed by the students' government are suspended from university privileges. The government has thus far rendered important aid in maintaining good order in the dormitories and grounds, in preserving public property, in preventing the visiting of saloons, and in other matters requiring the intervention of authority.

Student's desiring only a winter's shcooling should go to some high school.

EXPENSES.

THE TUITION IS FREE in all the University classes.

THE MATRICULATION FEE entitles the student to membership in the University until he completes his studies, and must be paid before he enters. Amount.....$10 00

THE TERM FEE for incidental expenses is, for each student..... 5 00

Room rent in University dormitory, each student per term $2 to 8 00

Each student in the chemical and physical laboratories, and in the draughting and engineering classes, is required to make a deposit varying from 50 cents to $8, to pay for chemicals and apparatus used, and for any breakages or damages.

ALL BILLS due the University *must be paid, and the receipt* of the treasurer *shown* to the regent *before the student can enter* the classes.

The following are the estimated maximum and minimum annual expenses, exclusive of books and clothing, of a residence of thirty-six weeks at the University:

	MIN.	MAX.
Term fees and room rent for each student.....	$ 21 00	$ 27 00
Table board in boarding houses and clubs.....	72 00	144 00
Fuel and light.....	10 00	15 00
Washing, at 75 cents per doz.....	13 50	27 00
Total annual amount.....	$116 50	$213 00
Board and room in private houses, per week.....	4 00	6 00

FEES IN THE PRELIMINARY YEAR.

Tuition, per term.....	$10 00
Incidental fee, per term.....	5 00

SPECIAL FEES.

For music, for 20 lessons.....	$10 00
For painting and drawing to special students.....	10 00
Graduating fee.....	5 00

REPORT OF
ORIGINAL RESEARCHES

MADE AT THE CHEMICAL LABORATORY OF THE

ILLINOIS INDUSTRIAL UNIVERSITY,

FOR THE YEAR ENDING JUNE 5, 1878,

BY H. A. WEBER, - - - PROFESSOR OF CHEMISTRY.

SOIL ANALYSIS.

BY M. A. SCOVELL.

Six soils of this state, varying in their nature as much as possible, were analyzed to ascertain, if possible, by chemical analysis, whether the prairie soils were deficient in the quality or amount, or both, of food necessary for wheat.

The soils were collected near Erlville, Illinois, at the depth of five inches. They were never manured, and the grass had never been taken from the prairie soil. For convenience they were numbered 1, 2, 3, 4, 5 and 6.

No. 1. This soil was from the Mississippi second bottom everlasting wheat soil. It had been in cultivation forty-four years. For the last seventeen years it had been in wheat.

No. 2 was taken from timber land adjoining the prairie. It had been cultivated six years. Four wheat and two corn crops had been taken off from this soil.

No. 3. This was a prairie soil in cultivation twenty-eight years; six in wheat; eight in corn; one in oats; five in meadow; three in pasture; three in corn; and two in meadow.

No. 4 was in cultivation forty-two years. It was prairie land, and a crop had been taken off every year.

No. 5. This was a soil taken from a field ten rods from the virgin prairie. It was in cultivation thirty-one years; five in wheat; twenty-three in corn; one in oats; two in corn.

No. 6 was a specimen of virgin prairie collected near the place the others were gathered.

The method of analysis as adopted was as follows:

The air dried soil was thoroughly mixed to insure uniformity.

About 500 grains (one pound) were then passed through a sieve of fifty meshes to the inch. The sifted portion was then kept at a temperature of 100 c. for three days to completely dry it.

Of this portion forty grams were taken for the estimation of the soluble fixed *alkalies*; forty grams for general estimation; and one gram for the estimation of total *organic matter* and combined water.

Total Organic Matter and Combined Water.—The one gram of dried soil was moderately ignited in a platinum crucible until the organic matter was entirely consumed; moistened with carbonate of ammonia, then very gently ignited, allowed to cool, and weighed.

The forty grams weighed out for the general estimation was treated with 120 c. c. of hydrochloric acid of 1.15 sp. gr., and the mixture

allowed to stand forty-eight hours. It was then filtered and thoroughly washed and the washings added to the filtrate.

This divided the soil in two portions; *soluble* and *insoluble*. The object of this was to ascertain, first, the amount of each soil now serviceable to the crops; second to find out the desirability of the soils. Hydrochloric acid was taken as a solvent to separate the two portions, because it is believed that this reagent dissolves about the same amount of soil that a plant is capable of absorbing.

A.—Portion Soluble in Hydrochloric Acid.—The hydrochloric acid filtrate was concentrated, a few drops of nitric acid to oxidize ferrous iron present, and then the whole was brought strictly to dryness in a porcelain dish, on a water bath; the residue moistened with strong hydrochloric acid, and allowed to digest for some time, then water added and filtered and washed. The residue ignited and weighed showed the amount of silica present in forty grams of the soil.

Copper.—The filtrate obtained from the silicious matter was saturated with hydrosulphuric acid, to precipitate any copper present. The precipitate was collected upon a filter, then washed as far as possible from the filter into a porcelain dish; the filter reduced to ash, and the ash added to the contents of the dish. The whole was then evaporated on a water bath; the residue dissolved in nitric acid, then transferred to a beaker and treated with an excess of sodium hydroxide to precipitate the copper. The mixture boiled and filtered. The dried precipitate was separated as far as possible from the filter; the filter reduced to ash in a porcelain crucible, cooled, a drop of nitric acid added to dissolve any copper reduced, and the excess of acid expelled by heat. The precipitate was then added to the ash, and the whole ignited and weighed.

The filtrate obtained from the sulphide of copper precipitate was boiled to expel hydrosulphuric acid, iron oxidized with nitric acid, cooled, sodium carbonate added until the precipitate formed by the last drop of this reagent did not dissolve by agitation, then a few drops of acetic acid added, and the mixture boiled. To the boiling solution an excess of a hot solution of sodium acetate was added to precipitate the iron, aluminia, and phosphoric acid. The precipitate was allowed to subside, the clear liquid decanted, and the precipitate washed with hot water, first in the beaker, and then thrown on the filter and thoroughly washed. The filtrate and washings were reserved for the estimation of manganese, lime and magnesia.

The precipitate was dissolved in nitric acid and the solution diluted to exactly 250 c.c.

Of this well shaken solution there was taken for the estimation of:

Phosphoric acid	50 c.c.
Iron	25 c.c.
Alumina	25 c.c.

Phosphoric Acid.—The 50 c.c. reserved for this purpose was concentrated on a sand bath to about 5 c.c., and then the phosphoric acid precipitated by a nitric acid solution of molybdate of ammonium (1:35) and the mixture allowed to stand in a warm place for twelve hours. The yellow precipitate was then collected upon a filter and washed with water containing molybdate of ammonium. The filtrate was

tested with molybdate of ammonium to insure complete precipitation of the phosphoric acid. The precipitate was dissolved on the filter with diluted ammonia, and the beaker, in which the phosphoric acid had been precipitated, washed out with ammoniacal water, and the washings passed through the filter. The ammoniacal solution was then heated to the boiling temperature, the phosphoric acid precipitated by a magnesia mixture (nh4cl, nh4ho, and mg so4) and allowed to stand twenty-four hours. The precipitate was then collected on a filter and washed with water containing ammonia, dried, ignited and weighed as pyrophosphate of magnesia, and estimated as p.2o.5.

Iron.—The 25 c.c. measured out for this purpose was treated in a porcelain dish, with pure sulphuric acid, and the mixture evaporated until the chlorine was entirely expelled. The contents of the dish was then transferred to a flask containing a strip of platinum. Pure sulphuric acid and water was then added, and a piece of pure zinc suspended in the liquid by means of a platinum wire. The flask was then so stoppered as to allow the exit of the hydrogen without admitting air.

This reaction was allowed to go on for half an hour, the zinc was then washed with hot water and removed. More pure sulphuric acid was then added and diluted; the stoppered solution allowed to cool, then a solution of permanganate of potassium of known strength was added by means of a burette, until the last drop occasioned a coloration in the liquid. The amount of permanganate of potassium it took to oxidize the iron was noted and the per cent of iron determined from this data.

Alumina.—The free acid in the 25 c.c. measured off for this purpose was exactly neutralized with sodium carbonate and then a solution of hyposulphite of sodium (1-5) added until the liquid became colorless, a drop of sodium carbonate added, and finally an excess of hyposulphite of sodium. The mixture was then boiled for four hours, then filtered, washed, the residue ignited and weighed.

Manganese.—The filtrate reserved from the precipitate caused by sodium acetate was treated with a few drops of bromine and then boiled; the precipitate was collected on a filter, ignited, weighed and estimated as Mu3 O4.

Lime.—The foregoing filtrate was evaporated about 100 c.c. then a slight excess of ammonia added and the lime precipitated while the solution was still hot, with ammonium oxalate. The mixture was allowed to stand 24 hours. The precipitate was then collected upon a filter, dried and removed us much as possible from the filter; the filter reduced to ash in a platinum crucible, when cool, a drop of pure ammonium carbonate added to change oxide to carbonate, gently ignited to expel excess of ammonium carbonate; the precipitate removed from the filter added to the contents of the crucible and the whole heated to dull redness for five minutes, then cooled, weighed and estimated; enough estimated as Ca O to combine with the P2 O5 previously found, and the remainder as Ca CO 3.

Magnesia.—The filtrate from the calcium oxalate was concentrated, cooled, ammonia added in excess and the magnesia precipitated by hydrogen sodium phosphate; the mixture allowed to stand 24 hours,

collected on a filter, washed with ammoniacal water, dried, strongly ignited and weighed.

Sulphuric Acid.—The 40 grams weighed off for the estimation of the alkalies was digested in 120 c.c. of hydrochloric acid (sp. gr. 1.15) for 48 hours, diluted and filtered. The solution was concentrated, iron oxidized, and finally brought to dryness. The silica was removed. The solution was boiled, and then barium chloride in sufficient quantity to precipitate sulphuric acid present added. The precipitate thus formed was collected, after standing for some time on a filter, ignited and weighed.

Alkalies.—The above filtrate was treated with ammonium carbonate in excess, the mixture boiled and the precipitate filtered off and washed. The filtrate and washings were brought to dryness in a platinum dish, then ignited to expel ammonium salts. The residue was then treated with a concentrated solution of oxalic acid, dried, ignited to dull redness, water added and filtered. The solution was then acidulated with hydrochloric acid and brought to dryness in a platinum dish of known weight, gently ignited, cooled and weighed. This weight represented the amount of potassa and soda, as chlorides, in the soluble portion of 40 grams of soil. The weighed chlorides were dissolved in dilute hydrochloric acid, an excess of platinic chloride added and brought to dryness on a water bath ; the residue agitated with a mixture of alcohol and water, and finally filtered on a weighed filter, washed with alcohol and water, dried at 100 c. and the residue weighed as 2 k cl. pt cl. 4 and estimated as K. 20. To find the Na. 2 O subtract the weight of k cl. which the potassa will form from the sum of the alkaline chlorides, and the difference will equal the Na Cl. which is estimated as Na 2 O.

B. PORTION INSOLUBLE IN HYDROCHLORIC ACID.

The portion insoluble in hydrochloric acid was dried at 100 dg. c for several days. It was then taken from the filter as far as practicable, the filter ignited and the ash added to the rest. The whole was then weighed and the amount of insoluble matter ascertained.

Of the dried insoluble matter there was taken for:

General Estimation	2 grams.
Alkalies and Organic Matter	2 grams.

The portion for the estimation of the alkalies and organic matter was thoroughly ground in an agate mortar.

Silicicic Acid.—The two grams reserved for the general estimation were fused with four parts of an equal mixture of carbonates of potassium and sodium. While still hot, the crucible was set in water in a porcelain dish and thus allowed to cool. The fused mass was then digested with water in a porcelain dish on a water bath, and then an excess of hydrochloric acid was added and the whole brought completely to dryness; the residue moistened with hydrochloric acid, and finally water added and filtered. The residue thoroughly ignited and weighed as Si O 2.

The filtrate was diluted exactly to 200 c.c. Of this amount there was taken for the estimation of:

Phosphoric Acid	160 c.c.
Alumina	40 c.c.

Both solutions were neutralized with sodium carbonate, and then the alumina, phosphoric acid, and any iron precipitated with sodium acetate in the usual manner.

The filtrates were united and the manganese, lime and magnesia were taken from it and estimated as in the soluble portion.

The alumina was obtained from the 40 c.c. and estimated as before.

The phosphoric acid was estimated in the usual manner from the precipitate obtained by acetate of sodium from the 160 c.c. solution.

Organic Matter.—The two grams weighed off for this purpose were ignited in a platinum crucible, cooled and weighed.

Alkalies.—The foregoing residue was intimately mixed in an agate mortar with two grams of ammonium chloride, after which six parts of pure calcium carbonate were gradually added and the whole thoroughly mixed. The mixture was transferred to a long platinum crucible, the crucible gently heated to expel ammonium salts, then covered and the heat gradually increased until the portion of the crucible containing the mixture was heated to a cherry redness, at which temperature it was kept for one hour, when the crucible was allowed to cool. The sintered mass was transferred to a glass mortar, moistened with water and pulverized, washed into a beaker and the crucible and its cover washed and the washings added to the contents of the beaker. The mixture was then gently boiled on a water bath for half an hour and the filtered ammonium carbonate added to the filtrate and brought nearly to dryness, when a little more ammonium carbonate and a little ammonia were added to precipitate the last traces of lime, then filtered and the filtrate transferred to a platinum dish and brought to dryness on a water bath. The ammoniacal salts expelled by heat and the sum of the chloride found as in the soluble portion. They were separated as before.

The following table gives the results of the analysis of the six soils examined.:

COMPOSITION OF SOILS EXAMINED.

Soil.	No. 1.			No 2.			No. 3.			No. 4.			No. 5.			No. 6.		
Soluble in hydrochloric acid	6.09			5.27			4.76			6.02			5.32					
Organic matter and water		1.1690			1.2800			1.3300			1.7800			1.8300			2.4300	
Silicic acid		0.0632			0.0710			0.0660			0.1130			0.0770			0.0730	
Sesquioxide of iron		1.5150			1.6870			1.2375			1.5750			1.1250			1.1250	
Alumina		2.0600			1.3050			1.0850			1.3500			1.3350			1.5700	
Phosphate of calcium		0.5080			0.3540			0.3543			0.3281			0.5114			0.3490	
Carbonate of calcium		0.4280			0.1103			0.3342			0.4484			0.0738			0.0408	
Carbonate of magnesia		0.0880			0.1137			0.0320			0.0220			0.0230			0.0280	
Potash		0.0433			0.0550			0.0315			0.0421			0.0289			0.0254	
Soda		0.0116			0.0165			0.0085			0.0048			0.0076			0.0100	
Sulphuric acid		0.1335			0.2440			0.1845			0.1537			0.3419			0.3687	
Soluble matter found			6.0196			5.24			4.6635			5.8171			5.3536			6.0199
Insol'ble in hydrochloric acid	93.91			94.63			95.24			93.98			94.68					
Organic matter		4.5189			4.5800			4.5430			4.3607			4.4162			5.6118	
Silicic acid		75.5647			76.3522			77.5225			75.9359			77.2683			75.0872	
Alumina with trace of iron		9.9535			9.3589			9.1336			9.8632			10.1781			10.4340	
Lime		0.6495			0.2941			0.9147			0.5395			0.3467			0.3290	
Magnesia		0.3383			0.6095			0.3758			0.4398			0.4179			0.4945	
Potash		1.6847			2.2550			1.1191			1.5752			1.1912			1.1483	
Soda		1.1244			0.8942			0.6686			1.0655			0.6571			0.8142	
Phosphoric acid		0.1913			0.2080			0.1637			0.1315			0.1476			0.1165	
Insoluble matter found			94.0254			94.5119			94.501			93.9113			94.6231			94.0355
Totals	100.	100.045	100.045	100	99.75	99.75	100.	99.16	99.16	100.	99.73	99.73	100.	99.78	99.98	100.05	100.05	

ANALYSIS OF POTATOES—BY MARY LARNED.

Water	81.76
Fiber	0.87
Starch	17.60
Ash	2.21
Total	102.44

The variety analyzed was the early rose.

Among the very interesting analysis made at the chemical laboratory for the purpose of finding out the extent of adulterations in commercial drugs and articles of food, is the following series of analyses of commercial cream of tartar and baking powders, by A. H. Moore:

BAKING POWDER.

	CARBON DIOXIDE.	SODIUM CARB.	CREAM TART'R	IMPURITIES.
White Lilly	11.30	21.5	48.3	30.2
Price	7.72	14.5	32.4	53.1
Gillette	10.30	19.7	45.1	35.2
Arenal	8.87	16.9	37.8	45.3
Our own	9.14	17.4	38.9	43.7

CREAM OF TARTAR.

SAMPLES.	CREAM TARTAR FOUND	IMPURITIES.	TOTALS.
1	89.5	10.5	100
2	20.6	79.4	100
3	12.4	87.6	100
4	89.6	10.4	100
5	16.4	83.6	100
6	90.4	9.6	100
7	19.2	80.8	100
8	53.7	46.3	100
9	16.4	83.6	100
10	16.1	83.9	100
11	91.4	8.6	100
12	14.9	85.1	100

These samples were obtained from the different dealers in Champaign, Illinois; numbers 1, 4 and 11 coming from drug stores; the others from grocery stores.

ANALYSIS OF KANKAKEE LIMESTONE.

Silicious matter	2.71
Iron and alumina	2.60
Lime	28.32
Magnesia	20.48
Carbonic acid	45.19
Total	99.66

This is an average of several analyses made by the class in quanti tative analysis.

ANALYSIS OF IRON ORE FROM THE COAL MEASURES OF ILLINOIS.

Silica	10.09
Ferric iron	2.22
Ferrous iron	44.52
Manganese	2.60
Lime	1.83
Magnesia	1.40
Phosphoric acid	1.05
Sulphur	0.17
Carbondioxide	30.71
Water	2.70
Alumina	1.85
Total	99.15
Metallic iron (an average by the class.)	36.2

ANALYSIS OF MARL—BY C. C. BARNES.

A bed of marl was recently discovered on the University farm. The following analysis gives its chemical composition:

Silicious matter	30.52
Water	3.16
Calcium carbonate	53.18
Magnesium carbonate	3.91
Ferric oxyde	8.24
	99.01

ANALYSIS OF BEETS AND MANGOLDS—BY H. W. ZIMMERMAN.

The following analyses were made in order to ascertain the relative value of sugar beets and mangolds as food for cattle. It was stated, that the yield of mangolds per acre was three times as great as that of sugar beets.

	MANGOLDS.	SUGAR BEETS.
Water	92.32	90.17
Ash	0.99	0.93
Sugar	5.46	7.22
Starch, dextrine, etc		.72
Fiber	1.02	0.52
	99.79	99.56

COALS OF ILLINOIS.

GRADUATING THESIS, BY WILLIAM D. RUDY, CLASS OF 1878.

ILLINOIS INDUSTRIAL UNIVERSITY.

FOR THE DEGREE OF B. S.—SCHOOL OF CHEMISTRY.

Underlying the broad prairies of our state are stored at various depths, sufficient quantities of fossil fuel to supply the various and constantly increasing wants of our population for ages to come.

The coal area of the state of Illinois may be safely estimated in round numbers, at 35,000 square miles, an area three times as large as that of Pennsylvania or Ohio, and constituting one-fifth of the productive coal fields of the United States, not including what is termed the *lignite basins* of the western territories. The coal measures attain an aggregate thickness of fourteen hundred feet and may be divided into *upper* and *lower* measures, the latter of which, as a rule, contain the better coal.

Providence has thus fully compensated for the deficiency of timber in Illinois, which would otherwise be necessary to use for fuel, by providing inexhaustible stores of coal within the easy reach of man.

Aside from its great value as fuel, it has been ascertained by chemical research, the utility of coal in the manufacture of illuminating gas and oil, and its importance in the manufacture of iron. It is the object of our investigations to determine the relative value of the different coals examined for heating purposes, and more especially the means of determining from the results of the analysis, the particular application of the various qualities of the bituminous coals of the state.

A chemical analysis has been objected to, as a means of determining the qualities of coal, for the reason that each company being desirous of having their coal appear as well as possible, would present specimens above the general average, and for this reason no satisfactory result could be obtained. This objection is done away with by requiring from each mine a vertical section of the entire vein, or specimens of coal taken from the top, middle and bottom of the vein. In this manner it is obvious that a fair average of the whole may be obtained.

SECTION I: PROXIMATE ANALYSIS.

OBSERVATIONS ON MOISTURE.

The first column of our table shows the percentage of water or moisture mechanically retained by the coal, and which is given off at a temperature of 100 degrees c.—a temperature at which no decomposition of the coal occurs. It can be stated as approximately true, that the southern coals of the state contain, relatively, less moisture than those of the north. The highest per cent of moisture found was 15.60 and the lowest 6.12; the average of the seventeen coals examined being 9.66 per cent. The highest per cent of moisture found in the coals

of Ohio was about ten. It has been observed that the amount of water in any coal diminishes the heating power as well as the quantity of illuminating gas produced.

Analysis of Prof. Weber, in the Geological Report of Ohio, of the Youghiougheny coal of Pennsylvania and the Briar Hill coal of Ohio, both celebrated gas producing coals, show them to contain but little moisture.

Youghiougheny coal:	
Moisture	.90
Ash	3.35
Volatile combustible matter	28.90
Fixed earbon	66.85
	100.00
Briar Hill coal:	
Moisture	3.60
Ash	1.16
Volatile combustible matter	32.58
Fixed carbon	62.66
	100.00.

Ash.—The relative amount of ash found, varied from 2.70 per cent. present in a coal from Jackson county, to 17.10 per cent. found in a coal from Sangamon county. The mean average being 9.10 per cent. The Ohio coals ranged from .77 of one per cent. to the same limit as found in our state. If a coal contain a large amount of ash it is unfit for use in the manufacture of iron, since the per cent is about double in the coke. The tendency of a coal to "clinker," that is, the ashes fuse and form a "slag," is caused by the presence of certain substances in the ash. This glassy slag is formed by the combination of silica with potasium, sodium, calcium and iron. The amount of these substances can only be determined by a separate analysis of the coal ashes. The color of the different ashes estimated, was ascertained as nearly as possible, and the observations given in the table. From the color of the ash we may judge, relatively, of the amount of iron contained, and as it exists generally in the form of sulphide of iron (iron pyrites), it enables us to judge of the amount of sulphur contained in the coal. The nearer the color approximates to red, the greater the amount of iron; the fawn and gray ashes contain less, while the white have little iron pyrites, and are not liable to clinker.

VOLATILE COMBUSTIBLE MATTER.

The third column gives the percentage of volatile combustible matter contained in the coals. The amount varied from 23.54 per cent to 34.02 per cent of the coal. It is not by any means certain that the amount of *fixed gas* evolved, is in direct proportion to the amount of volatile combustible matter, although our analysis shows the coal possessing the highest amount of volatile combustible matter to have the greatest amount of fixed gas. A coal, however, from the

southern part of the state, with 10 per cent less volatile combustible matter, gave within three-tenths of a cubic foot as much fixed gas. There can be no doubt then, that the nature of bituminous matter is quite different in different kinds of coal. Our estimate in cubic feet of gaseous matter is considerably less than that obtained practically in the manufacture of illuminating gas. An average specimen of Youghoiugheny coal gave us about 3½ cubic feet per pound of coal, whereas, practically, from four to five cubic feet are obtained. This difference may be accounted for in the fact, that in the gas works a re-distillation of the tarry matter, which collects in the "stand-pipes," takes place, as it drips back into the retort. Again, the increased temperature at which the gas is usually measured will make an important difference, as a variation of five degrees will change the volume of gas about one per cent.

FIXED CARBON.

The percentage of fixed carbon varied from 44.56, in a coal from Vermilion county, to 66.50 per cent, present in a coal from Jackson county. The column designating the quality of the coke, gives an idea of the nature of the coal whether "caking" or "free-burning." The terms cellular and swollen, are applied to those cokes in which there has been a rapid rise of gas or vapor from the partially fused mass. Hence this coal is called a "caking" coal. The term "dry-burning" is given to those coals which burn freely and are not given to caking.

SULPHUR.

The lowest amount of sulphur found in any coal examined was .60 per cent, present in a Jackson county coal, while the highest limit reached was 4.62 per cent of the coal. It was formerly supposed that about one-half of the sulphur left the coal with the volatile matter, in the process of coking, but this is by no means certain. In some coals nearly the whole of the sulphur leaves the coke, while in others only a small proportion escapes with the volatile matter. In ascertaining the value of a given coal, for making gas or furnace purposes, it is not sufficient to know simply the amount of sulphur in the native coal, but we must also know the amount evolved in the process of coking. Thus, then, with reference to the sulphur alone, a coal may be well suited for furnace purposes but objectionable for gas-making, while another with even more sulphur may be better adapted for gas-making but quite unfit for use in the furnace.

We now add, in tabular form, the composition of the coals analyzed, with the counties from which they were obtained:—

TABLE I. PROXIMATE COMPOSITION.

INCLUDING SULPHUR IN COAL AND AMOUNT LEFT IN COKE, AND FIXED GAS EVOLVED.

DESIGNATION.	Water.....	Ash.....	Volatile combustible matter.....	Fixed Carbon..	Total.....	SULPHUR			Cu. ft. fixed as per lb coal...	Color of Ashes.	Quality of Coke.
						In Coal.....	In Coke.....	Forming pr ct. of coke.			
Bloomington, McLean County Coal Co	7.90	4.96	34.02	53.12	100	1.97	.76	1.30	2.40	Light gray	Cellular, swollen.
Briar Bluff, Henry county	12.60	9.90	28.96	48.54	100	4.62	1.51	2.58	1.60	Dark gray	Dry burning.
Barclay, Sangamon county	10.80	17.10	27.32	44.78	100	3.21	1.37	2.21	2.17	Gray	Dry burning.
Carbondale, Jackson county	6.36	7.40	26.40	59.84	100	.80	.48	0.71	2.30	Light gray	Dry burning.
Catlin, Vermilion county	7.80	12.70	31.08	48 42	100	3.46	.61	0.99	2.01	Mottled gray	Compact.
Danville, " "	9.60	14.64	31.20	44.56	100	2.72	.43	0.72	2.40	Fawn	Compact.
DuQuoin, Perry county	8.86	7.00	23.54	60.60	100	1.88	.99	1.46	1.93	Light fawn	Dry burning.
Elmwood, Peoria county	7.60	9.50	27.60	55.30	100	2.18	.77	1.18	1.92	Light gray	Cellular.
Farmington, Fulton county	8.52	11.72	29.28	50.48	100	3.28	.84	1.35	2.17	Light gray	Dry burning.
Grape Creek, Vermillion county	9.74	10.60	28.34	51.32	100	3.63	.97	1.57	1.79	Gray	Compact.
Kewanee, Henry county	15.60	7.14	27.60	49.66	100	2.22	.84	1.47	2.30	Fawn	Dry burning.
Lincoln, Logan county	10.92	14.84	27.60	46.64	100	4.99	2.43	3.95	1.47	Dove	Dry burning.
Lombardville, Bureau county	9.42	7.46	31.38	51.74	100	2 46	.71	1.19	1.66	Light gray	Cellular, slightly swollen.
Mt. Carbon, Jackson county	6.12	2.70	24.68	66.50	100	.60	.40	0.57	2.11	Nearly white	Dry burning.
Oglesby, LaSalle county, 2d vein	12.12	7.72	30.84	49.32	100	2.02	.68	1.19	1.98	Gray	Cellular.
" " " 3d "	10.06	3.72	30.34	55.88	100	2.27	1.42	2.38	2.24	Fawn	Cellular, swollen.
Peru, Union Coal Co., LaSalle county, 2d & 3d vein	10.30	4.54	33.90	51.26	100	3.05	.83	1.48	2.33	Fawn	Cellular, swollen.
Youghoiugheny coal, Prof. Weber's analysis	.90	3 35	28.90	66.85	100	.98	.66	0.81	3.36		

SECTION II. *Ultimate Analysis.*—By this analysis the complete separation of the elementary constituents of the combustible matter of the coal is effected.

It is of great value, from the fact that it is the only means of calculating the absolute *heating power* of the coal.

The samples are the same as those used in the proximate analysis.

TABLE II.

ULTIMATE COMPOSITION.

DESIGNATION.	Carbon....	Hydrogen.	Nitrogen..	Sulphur...	Oxygen ...	Ash	TOTAL ....
Bloomington, McLean Co. Coal company.....	68.36	5.94	1.59	1.97	17.16	4.96	100.
Mt. Carbon, "Big Muddy" Coal.....	72.98	5.39	1.68	0.60	16.65	2.70	100.
Carbondale, Carbondale Coal company.....	69.52	5.42	1.55	0.80	15.31	7.40	100.
Du Quoin, Enterprise Coal company.....	65.40	5.14	1.52	1.88	19.06	7.00	100.
Youghoiugheny Coal, Prof. Weber's analysis. ..	81.27	5.66	1.66	0.98	7.08	3.35	100.

TABLE III.

HEATING POWER.

	Calorific power, or No. of pounds of water rais' d in temperature 1 degree C., by 1 pound of full.	Calorific power compared with pure charcoal.
Bloomington.....	6575.	81.36
Mt. Carbon.....	6790.	84.03
Carbondale.....	6583.	81.47
Du Quoin.....	6029.	74.62
Youghoiugheny	7959.	98.50
Pure Charcoal.....	8080.	100.00

NOTE.—Owing to a want of time, the ultimate analysis of only these few specimens could be made.

THE LIBERAL EDUCATION OF THE INDUSTRIAL CLASSES:

AN ADDRESS

DELIVERED AT THE TENTH ANNUAL COMMENCEMENT

OF THE

ILLINOIS INDUSTRIAL UNIVERSITY,

ON THE OCCASION OF THE OPENING OF THE

NEW CHEMICAL LABORATORY,

BY

PRESIDENT EDWARD ORTON,

OF THE OHIO STATE UNIVERSITY.

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EDUCATION

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INDUSTRIAL CLASSES.

ADDRESS BY EDWARD ORTON,

PRESIDENT OF THE OHIO UNIVERSITY.

I invite your attention on this auspicious occasion, to a brief discussion of a well worn theme, viz: what kind of education was the land grant of 1862 designed to provide?

The land grant was given, to use its own words, "in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life," the objective point, let it be noted, towards which the whole scheme of public education in this country has been from the first directed, sometimes blindly and unconsciously, it is true, but with an ever clearer recognition of the end to be attained.

I. Who constitute the "industrial classes" of American society? The answer is not hard to find. They make up American society. From them all are derived, and to them all return. Our Puritan ancestors, in discarding the rights of primogeniture and in discouraging entailed estates, rendered it almost certain that all of their descendants would touch the earth at least in every third generation. Within that time, Fortune is pretty sure to have turned her wheel and lowered all the proud."

Two great sections of our people are expressly referred to in the act of endowment, viz: those devoted to agriculture, and those pursuing the mechanic arts.

Now, it is manifest that no lines can be drawn around these pursuits which will not enclose the whole field of business activity. The man who moves a bushel of grain to market, the man who sells it in market, belongs by every right to the same class with the man who raises it in the harvest field.

It is a mere question of the division of labor. "When Adam delved and Eve spun," agriculture and the mechanic arts were reduced to their lowest terms. Delving and spinning were the sole vocations of the industrial classes of that early day, but the same lines of work have been divided and subdivided by their descendants into scores of callings, each one of which is as necessary as any other to industrial life, and each one of which confers on him who follows it, full membership in the ancient and honorable order of the industrial classes.

The term can by no means be limited to the classes that live by manual labor. It may seem paradoxical, but it is nevertheless true that if any considerable section of our population is left out of account in the terms of the land grant, it is the class that lives by rude, manual labor at the great centers of population. No discrimination of course was exercised or intended, but this class is not American in origin and has not become so in character—and consequently the provisions that are made for American education fail to appeal to it, except in a very limited degree. The help that it is prepared to use in the way of education is of a similar and lower kind than that which the land grant is designed to supply.

It may seem paradoxical, again, to include the manufacturer, the builder, the engineer, the banker, in the industrial classes, but here they indisputably belong. They have, for the most part, been gathered from fields which beyond question pertain to industrial life, and having been found faithful in few things, they have been made rulers over many. Though they are no longer able to put their own hands to plow, or plane, or spindle, they are still carrying the heavier end of industrial life.

Certainly, the land grant does not divide our people into rich and poor, cultivated and industrial, and then undertake to provide an education expressly for the latter class—an education which should train them for a narrow sphere and hold them there. Such a scheme is utterly repugnant to our national character and traditions, and would never dare to lift its head in the light of an American day.

No such fatuity lies at the foundation of this great provision for national education. The act itself guards expressly against any narrow interpretation when it declares its purpose to be, to train the industrial classes *for the several pursuits and professions of life.*

The legislation, then, that undertakes to provide for the education of the industrial classes of American society must provide for the education of the American people, in its normal and characteristic conditions. It must adjust its scheme, not to the demands of a contented peasantry, who follow generation after generation the same humble round of care and labor that their fathers have trod, but rather to the varied necessities and privileges of the American freeman, who is not forbidden to covet for himself the best gifts of life and the state.

The aim of the grant was to make a large contribution to national education in its higher departments. Its purpose was to establish new centers of intellectual light and power throughout the land, and especially in those portions of the country that had not yet accumulated means for laying for themselves these foundations out on western prairies, upon the broad savannahs of the south, along the slopes of the Rocky Mountains. To the older states, it gave the opportunity of making a contribution of peculiar value to their educational resources.

To all, it meant the cheapening of higher education; it put a price into the hands of many who would otherwise lack it with which to buy wisdom. In the older colleges of the east, the student's expenses have been doubled or even trebled within the last thirty years, but here are endowments ample enough to leave tuition free. This tuition, too, is attainable at the student's door. He is no longer obliged to traverse half of a continent to begin his college work. These, then, were among the objects of the congressional grant, and

all of them have been measurably attained in the progress thus far of the institutions founded on it.

II. We have found for whom this education was designed.

Let us note some of the chief features by which it is to be distinguished.

1st. It is *higher education* which the grant provides. It presupposes the common school. This is distinctly involved in the very title of the bill—A bill for the endowment and support of *colleges.* The term college is an indeterminate quantity it must be confessed, especially west of the Alleghanies—but after all it means *something.* It stands not for Latin and Greek or advanced science, necessarily, but for a grade of work *distinct from, higher than,* and *supplementary to* the common school—and it is therefore a perversion of these endowments to use them in doing the work of the common school under whatever name. When the school has given to the student the training with which it is charged, when it has brought him to mastery of the common branches, then, certainly not till then, has he a right to knock at the door of the university or college that is established upon the land grant. Especially in a state like this, where common school education has been so munificently provided for, any trenching upon the pittance consecrated to higher education, in order to bring up the work of backwoods districts, would be an abuse of a sacred trust.

The state colleges may exercise a very salutary influence upon the lower grades of public education by maintaining a proper standard for entrance at their own doors, but when they gather into their halls an unsifted, unsorted horde of youths, in all phases of intellectual development, and bringing with them the whole range of educational necessities, they not only lose the power of doing their own work worthily and well, but they always ignominiously fail in their vicarious tasks. No—college and school are close enough to each other already. Let us not degrade and enfeeble both by blending them in an educational hybrid which can do the work of neither.

2. The core and center of this education must be *science.* There are other branches which it may not exclude, there are some things which it must include, but as to its *leading* branches it has no option.

The places of honor must be given to chemistry and physics, to mathematics, engineering and mechanics, to botany, zoology and agriculture.

If a new institution is created by the land grant, it is easy to determine the general order of its departments. If an institution already established becomes the recipient of the national bounty, the new wine is not to be put in the old bottles, but a school of science, with its laboratories and museums, springs up under the shadow of university towers. This education is differentiated thus from all that has preceded it. It differs in warp and woof from the traditional college course. It belongs to a new dispensation. To lay foundations for a large and generous scientific training was beyond question the chief purpose of the national grant. Other valuable ends were included—but without the clearly recognized and imperative demand for scientific training, the endowment would never have been made. All the facts that bear on the case lead to this conclusion.

The United States Commissioner of Education, in a recent report, gives to this view the weight of his emphatic endorsement—an en-

dorsement which is in some sense an official interpretation of the act under consideration.

There seems, he remarks, to be in the popular mind a misapprehension of the scope of the law of 1862, providing for the establishment of these institutions.

At the time of the passage of the act, there were in America very few instrumentalities for adequate instruction, in either theoretical or applied science, while in Europe the schools of science have already reached a high degree of development, and were exercising a far-reaching influence, not only on all of the professions outside of the theological and the legal, and in all departmenis of arts and manufactures, but also greatly modifying theories and methods of education in nearly all its phases.

The international expositions had opened the eyes of our educators and scientists to the inferiority of our country in almost all departments of applied science. Our students were resorting to the European schools of scientific training. Few original works of authority in science were produced or could be produced here from the lack of the requisite opportunities. The country abounded in material wealth; it was poor and provincial in the sciences and arts. What was demanded for our country, therefore, was a class of schools combining in their curriculum means for thorough education in the sciences, both theoretical and applied, and in all the elements of true modern culture. Such appears to have been the intention of the law of 1862.

There are some callings in life to which this kind of training is better fitted than to others, and to that extent the land grant limits and restricts the education which it offers, but it limits it in no other way. Such an education may be used if the recipient sees fit, in the way of preparation for theology or law. No obligation, expressed or implied, is violated in so using it, but to these callings, all the educational foundations hitherto laid, stand largely pledged. The older colleges are undoubtedly able to give better training for these fields than newer ones.

It would certainly be a great reproach to them if they were not, for this is their chosen ground.

The knowledge and discipline that the latter give, will find their amplest use in the varied phases of industrial and scientific work, in mining, in manufactures, in medicine, in engineering, in effecting the exchanges of civilization.

III. This education must be *practical*. A practical education is one that can be applied to the interests and necessities of every day life, that can be used in doing the work of the world. This demand matches exactly with the last, which requires the subject matter of this education to be science. Nothing is so practical as science, it concerns itself with known qualities and relations, and forces; it analyses, weighs, measures. But the demand concerns itself not only with the subject matter of the education given, but with the mode of giving it. Science may be taught in an unpractical way; it *is* so taught as often as any other line of subjects. The colleges built on these foundations must teach it in such a way as to give the student working power in every field which he enters. This science must be *applied*. To this end, laboratories and workshops and museums and collections are indispensable.

These institutions are never spending money more exactly in the line of their duty and their interest, than when they are using it in this way. The student is not to learn of instruments of precision, for instance, from the description and figures of foreign authors only; nor to rest content with merely seeing such instruments through glass doors. With his own eye he must see the miracles of organization, with his own hand he must repeat or make the measure of star or monad; he must be able to show the iron-master the value of the ore that looks worthless, or the worthlessness of the ore that looks valuable; he must save the farmer from falling a victim to the blunders of ignorance or the tricks of greed in the fertilizer which he buys; he must give to the engineer the limits of strength of bolt or beam, within which safety can be assured; he must save the community from the enormous tax which ill-judged or chimerical mining enterprises are forever imposing. These are examples of the practical services to be rendered by scientific education, but of these services there is no end. Modern life is covered from the cradle to the grave with the useful gifts of science.

But the work of the world cannot be carried on by brain and eye and tongue alone, it needs the *hand* as well. Has the practical education of which we speak anything to do with the hand? It certainly must have if it fully deserves its name—for the essence of much that is practical lies in hand-work. Here is a point of confessed difficulty and yet of vital importance. It is not concerned with college training only, but with our whole scheme of public education. The divorce between hand-work and head-work is so complete, and is maintained so long in the process of high school and college education, that those who finish courses of study in either find it hard ever to unite them again. Disuse of manual labor breeds distaste for it, and as a consequence, the callings that require it are shunned, while those in which it can be evaded, are so unmistakably overcrowded as to seriously disturb the balance of the body politic. This is the change most frequently and persistently urged against the colleges established to further industrial education, that the tracks between them and industrial life, all lead in one way, that many go from shop and farm, but that none return to them again. Much of this criticism is thoroughly unfair and unjust; but there is certainly good ground for dissatisfaction with the results that we are obtaining in these several phases of our public education. The great extension of the high school system of late years has called very general attention to this dangerous tendency, and thoughtful men have long been busy with the problem. The solution that is always first to suggest itself, is the manual labor school; but I think it may be said with truth that this scheme has been weighed in the balance and found wanting.

In its common form, it is an artificial combination of two incongruous elements—education that has no direct bearing on labor, and labor that has no connection with education. In the agricultural colleges that adopt compulsory manual labor, the case is somewhat better than in other institutions, for a small part of the labor required *is* educational. The student who expects to practice farming is learning in the best possible way a few of the things which he needs to know, and which he has not learned elsewhere.

But for nine-tenths of the work required of him there can be no

such claim. The object aimed at is avowedly moral rather than educational. It is to keep up the habit of manual labor that the system is enforced.

A measurable success can be secured for the scheme when it is made a central point, and when all the force of the institution is held tributary to it—but it may well be questioned whether the result is worth the price that is paid for it. For my own part I am convinced that it is not—and I should feel that if the manual element in education were linked to this scheme, to stand or fall with it, its fortunes were already lost. What is needed is a system that shall give manual training in an educational way, and that can justify its introduction into an educational course on educational grounds. There is no country in the world where such a system is needed as much as in our own, and at no previous time in our history has the demand been so imperative as it is to-day.

Light comes at last from an unexpected quarter—Imperial Russia leads the way in the establishment of a system of hand training that admits of being taught by the same methods by which chemistry and geometry are taught—in classes and by system.

Massachusetts, always the pioneer in the things that concern education, has already demonstrated the practicability of the system in American education. The practicability seems to me the only point involved—for the desirability of some system that shall reach this result, is beyond question.

I believe that the duty and interest of the institutions founded to promote industrial education, alike demand that they shall enter at once upon this work, even though it may still be counted in the experimental stage. The bearings of such training on American life are so numerous and so important, that we have no right to demand the pledges of assured success before making trial of it. Risks may well be pardoned here.

But is the practical education to be provided entirely embraced within the limits of such branches as have been already named? Are there not other branches that can be styled practical by as good a right—that show themselves practical by as many tests and that, therefore, make a just demand for a place in a practical curriculum?

What shall be said of the study of languages—especially of our own? Is not the power to make clear, accurate, intelligible statements of what we know or what we think a practical power? Does not our education show itself glaringly defective when it leaves us without this ability?

Men with knowledge and ideas, but without the power of adequate expression, like lumber wagons loaded with gold, never pass for what they are worth in the world. But this power to use language with precision and efficiency, and still more the ability to endue it with persuasive force, does not come to us in dreams. There is no royal road, no short cut to good English. It is one of the choice fruits of education. If obtained at all it must be bought with a price, the same price that is paid for solid attainments in any other departments of knowledge—patient and extended study. Can such study be left out of a practical curriculum?

Again, is not the training that enables us to detect a flaw in a definition, or a fallacy in an argument, as directly practical as the

ability to test the strength of iron or the purity of white lead? If we have this power, do we not use it in the daily management of our lives? And if we have it not, do we not suffer from the lack in person and estate?

Inductive logic has to do with the modes of reasoning employed in many branches of science—with the canons of evidence and the methods of proof—and especially with the proper construction of scientific experiments. In what respect is the power to construe an experiment less practical than the power to make one? Of how much use is an experiment unless its author knows what it proves? Nor let it be supposed that the ability to interpret experiments comes of itself. It not infrequently happens in the practical world that two contradictory or even diametrically opposite statements are made in regard to some practical subject by practical men, both statements being made in good faith and with equal confidence, and both being established as in thought, by decisive experiments. But nature is true, though every man is proved a liar. The error lies in the interpretation of the experiments. Like an unwilling witness that still is bound by the sanctity of his oath, Nature tells no more than she is obliged to tell. Point blank questions she answers truly, but to ambiguous ones she gives as ambiguous answers as ever the Delphic Oracle gave. How few there are who know how to shape their questions so as to draw out a categorical answer—and how full the world is of these ambiguous replies.

No, the limits of the practical are wider than we sometimes think. All true science is practical, for what is science but a knowledge of causes—or of the order of sequence in nature? With what else does practice deal? The difference between them is, that science finds the true order, marks it, correlates it with other facts, and is able to repeat it under different circumstances or extend it to new scenes—while practice learns the same true order in an empirical way and for a single field, without understanding its relations or gaining power to transfer it. For every successful process in agriculture or in the mechanic arts there is a reason. True science learns the process and deduces the cause. Practice stops with the process alone—for if it goes farther it too becomes science.

Now, in our zeal for the practical applications of science, must we forget the deep root from which they spring—scientific enthusiasm—the love of truth for its own sake. It is the theory of one generation which bears the practical fruit of the next. We marvel, as well we may, at the number and value of the contributions of science to human welfare which our own age has produced—and we glorify the authors of these practical applications—but let us not forget *their* forerunners and instructors, the men who without the inspiration of popular applause, and without the hope of material reward, maintained the lonely quest of truth—served science for its own sake, and, by their discoveries, made possible the career of the successful inventor.

The history of science is full of illustrations. Take, for instance, the magnetic telegraph. It belongs beyond contradiction to the practical world of to-day. By its agency fortunes are made and lost, wars between nations are precipitated or averted; the exchanges of the world are transacted on its wires, commerce waits for its signals before it spreads its white wings on the sea; the husbandman consults its bulletins before he begins to sow or reap. It renders still

humbler service. It summons the fire engine to the scene of disaster; it gives the alarm when the thief enters our dwelling to steal, or to kill, or to destroy. The practical men of our time are not slow to do honor to the inventor; but before a Morse could do his work a Faraday must have done his. When Faraday was pursuing his patient and searching investigations of the effects produced by the passage of an electric current around a bar of soft iron, a practical man, so called, questioned him as to the *use* which could be made of his discovery. The philosopher could give no good account of his work, and his questioner found in him a new and melancholy example of the waste of high endowments and great capacities of service on the barren and unfruitful problems which mere scientific curiosity could suggest; and yet without just those unpractical experiments the magnetic telegraph would have been impossible.

Perhaps in all England ninety years ago there was no labor that could have justified itself less in the eyes of that practical people, than the unpaid toil of William Smith, the founder of stratigraphical geology. He traveled on foot through the united kingdom, examining every quarry and every exposure of rock along his way, noted the mineral characteristics of each exposure, and, above all, the fossils which the different belts contained. It is easy to imagine the undisguised contempt with which such labors must have been viewed by the practical men of his time, especially when he was utterly unable to connect these labors directly with economical interests. "I am studying an unexplored department of nature," he might have said. "I am arranging, in proper chronological order, the crumpled leaves of the great stone-book, so that he who runs may read. How my discoveries shall be transmuted into gold, I know not; whether they shall be transmuted I care not. It is enough for me to be the first to trace the steps of creative wisdom, to deduce the grand history of the globe that fills with divine activity and life the ages of an immeasurable past." But when his work was done, and he gave to the world his geological maps and his geological column, he gave with them, or rather in them, the master key that fits all the wards of the subterranean world. We are not slow to give credit to the practical men who use this key in unlocking fountains of living waters for great cities—stores of long buried heat and light for the service of mankind—or the granite bound caskets in which gems and gold lie hidden; but let us not forget the services of him, who with no motive but the love of scientific truth, and no reward but its establishment, with patient but unappreciated toil, forged the key.

In the best interests of practical utility then, we must find a place on these foundations, for pure science as well as applied science; for original investigation as well as for successful use; for the patient study of those prolific principles which alone can make our age confer on the age which is to follow it, such advantages as it has inherited from its predecessor.

4. Finally, this education must be *liberal.* Strange blending of incongruous ideas and demands! The liberal education of the industrial classes! How can that be? That the industrial should be educated at all, involved the overthrow of the earlier civilizations of the world; that a limited, practical training shall be offered them, adapting them better to the narrow sphere in which they are doomed to live and labor,

is the largest and most generous view that has yet found expression in the old world. It was reserved for America to add a new and transforming element. In consonance with that recognition of the equality of human rights and privileges, which is the chief corner stone of our political institutions, the demand at last finds clear and full expression, that the education of a *nation* shall be made *liberal.* The crown of liberal culture is no longer the birthright of the few; it is set within the reach of all.

What is a liberal education? Aristotle first used the term which we thus translate, and by it he attempted to designate an education fit for a freeman. He might have justly included an education that should give freedom to its possessor, that should liberate him from the narrowness, and prejudice, and isolation—the slavery of an uneducated mind. Something, at least, of this meaning has always been retained, and to-day the conception of a liberal education that would be accepted by the largest number, would be found to include the education of man as man, rather than that which equips him for a particular post of duty; the education that concerns itself with the broad sub-stratum of general knowledge, rather than the special applications of knowledge to some isolated field; the education that aspires to a symmetrical and balanced culture of all human faculties, rather than that which selects one set of faculties for training, and leaves the rest to accident or atrophy; the education that imbues the mind with a generous sympathy for every department of knowledge, and that recognizes the contributions of each department as necessary to the perfect whole, rather than that which transforms its possessors into narrow and conceited specialists, mutually ignorant and intolerant of each other's, and of all other's work and claims. Can we, indeed, improve upon Milton's ideal of a liberal education: "I call, therefore, a complete and generous education, that which fits a man to perform justly, skillfully and magnanimously, all the offices, both private and public, of peace and war."

To serve such purposes, a liberal education must always be abreast of its time, must take in the best and amplest knowledge yet attained; and thus we see that it cannot be the same, yesterday, to-day, and forever. Some permanent characteristics it does indeed possess; but its actual contents vary for each generation. Its range of teaching widens with the process of the suns; its scheme requires readjustment from age to age. The true curriculum for one age is not sure to be the best for the next—indeed, we may almost say, is sure not to be the best. Three hundred years ago the liberal education of Europe consisted in what seems to us a fruitless threshing of the barren chaff of the scholastic philosophy and logic. The languages of ancient Greece and Rome, with their splendid literatures, with their models of composition in every department of letters, even yet unrivaled, were reclaimed from the oblivion of a thousand years, and in spite of conservative opposition, they gained a place for themselves in the scheme of liberal culture. They disciplined and inspired the mind of western Europe in a way unknown before, and their place in the work of education was widened until it covered almost all the field. Literature, and especially the literatures of two great nations that had been dead for more than a millenium, became synonymous with liberal culture.

But in our own day another readjustment, or rather a reconstruction, of the whole scheme of liberal education has been rendered altogether

imperative. The last century has witnessed the rise of modern science —most marvelous of the outgrowth of the human mind—with a method and a culture of its own. In the face of undisguised and powerful opposition, it has won its way, by its strong right hand, to universal recognition. It has divided with literature every approved course of study in school, college or university, and has taken for itself the lion's share. Great foundations, pledged to its exclusive service, are laid on every hand, and the stately halls of the new learning threaten to overshadow the temples of the old. Some of its more ardent disciples, with an intolerance that can be pardoned but not justified, would rule out literary studies altogether, save in their most elementary forms, from our courses of study. But in regard to the rival classes of literature and science in education, the world is coming to ask with Mill, "Why not both? Can anything deserve the name of a good education which does not include literature and science too? If there were no more to be said than that scientific education teaches us to think, and literary education to express our thoughts, do we not require both? and is not anyone a poor, maimed, lop-sided fragment of humanity, who is deficient in either?" But further, the advent of science marks and constitutes a new dispensation in the education of the world. Like all dispensations that can justify themselves, it comes not to destroy, but to fulfill. Its method and its spirit have passed their allotted bounds, but instead of sweeping away as with a flood the earlier culture, they have flowed over it and through it to restore and to renew. They have profoundly modified our study of language, literature, history, politics, philosophy and art. These great branches of human knowledge and thought, in losing their lives as cloudy speculations and disconnected facts, have gained a larger life as sciences. They were never more sure of the future than now. They will hold, too, their old rank in the liberal education that is to be. "I believe," says Prof. Atkinson, of the Massachusetts Institute of Technology, one of the best endowed and most effective of the schools of applied science in the land, "I believe that the old doctrine will still be found to hold true, even after physical science shall have at last found its true place in the new education, that the study of that wonderful world of matter which is the stage on which man plays his earthly part, wonderful as it is, is yet inferior in dignity and importance to the study of the being and doing of the actor who plays his part thereon. Scientific studies, though for the time being in the ascendant, yet, even when all their rights are accorded to them, will, in a well balanced system, take their place a little below ethical studies."

What then is a liberal education? I answer with Mill, it is an education that includes science and literature—literature itself being studied by the methods of science. I answer in the words just quoted, it is an education that embraces the study of this world of matter, physical science, and the study of man—his language, his literature, his history, his art, his relations to his fellow man and to his Maker. The day has gone by when a man shall be called liberally educated for knowing a little Latin and less Greek, while as ignorant of modern science, with its profound influence on human thought and action, as a Rip Van Winkle just awakened from the sleep of a century. Such a man's knowledge is not the best knowledge of his age. He has

missed the great ideas that have created anew those who have received them. He is a stranger to the new covenants of promise—an alien from the commonwealth of the modern Israel. There is no liberal education possible to-day, and there can be none in the future, that does not unite the study of these two great elements—man and nature. But such an education, you say, can have no popular adaptations—no direct connections with industrial life. It concerns itself with the smallest fraction of the race.

It is true, as Huxley has well remarked, that there are but few in any generation that aspire to great excellence. The work of the world is mainly common work, and it needs to be done in a common way. Certainly there are very few that are prepared either by taste or endowments to sweep the whole circle of human knowledge, but few that are fitted to make large and important contributions to the sum total of this knowledge, but it is a matter of infinite moment to the state that these few should find adequate opportunities and proper scope, for it is on this higher, this *highest* education, that the worth and value of each generation largely depends.

I beg leave to quote in this connection a few golden words from a recent address on education by Gov. Horatio Seymour, of New York:

"Nothing can be more mistaken," he remarks, "than the idea that the public has no interest in anything more than what is called primary education, and that all beyond this is a matter of individual concern."

If it is true that the intelligence, the virtue and the prosperity of society, demand that some be highly educated; if the interests of persons and property are promoted by this, then the public welfare calls for schools where they can be taught. If this education by its very nature makes the student through life, whatever his business may be, a living lighthouse, shining for the good of all, it is not unjust that such education should be in some degree at the public cost. If a man of science is through life, by his intercourse with others, an unpaid teacher of facts which give prosperity to our workshops and new value to every field of industry, it is fair that he should be helped by the public to gain that knowledge which is thus used for the public good. If common schools are demanded by the very nature of our government, then the interests of all the people demand that there shall be some so highly educated that they can by their influence keep alive in the public mind a sense of the value of such schools. When there are no men well trained in learning, there will be no schools fit to teach its first elements.

These institutions, then, must be able to train the few who can carry forward the knowledge and civilization of the race, but their office is not limited to these. They are able and willing to render a large service to the many—for the term *liberal* when applied to the education of the industrial classes of American society, must be used in a much more restricted sense than that which I have already given it. But when most restricted, I take it that it is applicable to a training that resolutely refuses to consider solely the station which a man expects to fill. That field, the term *practical* covers; but over and beyond the station liberal education recognizes the *man*, with capacities to touch more stations than one, with an intelligence derived from and kindred to the divine intelligence, and with an irrepressible desire

to read the secrets of nature, and to learn his own being's end and aim.

The education which seeks in any worthy way to meet these demands, is a liberal education—liberal in every one of the stages at which it may be considered.

There is a liberalizing power in large and well equipped educational institutions. The stay of the student in them may be short and his work elementary; but library and laboratory, lecture-room and museum, and, above all, contact with the masters and students of so many diverse branches of knowledge, leave an impression on his mind of the breadth and interest of the field of education that can never be effaced.

In rendering possible such foundations and equipments as these, the land grant is making a great contribution to the liberal education of the industrial classes.

Far be it from me to disparage or belittle the denominational or private colleges. All honor to them for the grand work which they have done and are doing in the education of our people. Let them lengthen their cords and strengthen their stakes. To maintain freedom and virtue on this continent, where all the winds of doctrine are let loose to blow, will cost the strenuous effort of all who love truth and virtue of whatever name.

But, after all, it is to *public* education that we must look for the chief power in welding and unifying the discordant elements of our national life—and of that public education the State University, properly expanded and equipped, is the summit and the crown.

THE DEVELOPMENT OF CHEMISTRY.

A HISTORICAL SKETCH,

DELIVERED AT THE OPENING OF THE

NEW CHEMICAL LABORATORY

JUNE 5, 1878.

By H. A. WEBER, - Professor of Chemistry.

THE DEVELOPMENT OF CHEMISTRY.

In the history of chemistry, peculiarities present themselves which are not met with in the case of most all other sciences. As a general thing every science has had a fixed object in view from the beginning, and all the historian had to do was to find this object and note all the means employed in the different ages for its accomplishment. Thus, medicine always had in view the healing of diseases. The descriptive natural sciences always sought the determination and classification of bodies occurring in nature. Chemistry, however, differs from these sciences, inasmuch as its object varied in different ages.

That the object of chemistry at one time was to make gold, is well known. At another time its object was to explain and heal diseases. The object of chemistry at the present time is to determine the ultimate composition of matter, and the laws which govern its combinations and decompositions.

Since chemistry did not pursue the same object at all times, an objection would naturally arise against considering its history that of a single science, since a science is chiefly characterised by its object. But on the other hand the question arises, how the pursuit of such heterogenous objects should be described under the same name, because the name of chemistry is over 1400 years old. This objection and question will best be conserved by the fact that the present object of chemistry, was always a means employed in searching for the objects of former times. This brings the history of earlier periods into intimate connection with that of the present time, and explains why the same name could be applied to purposes, so entirely different.

The point of time from which to date the beginning of the history of chemistry, has been a subject of controversy, many claiming that it should begin with the time in which chemistry became a science; but this point of time cannot be readily determined; for chemistry verged *gradually* from a mere empirical art to the rank of a science. The earliest times bear record of observations on certain facts belonging to chemistry, all of which had an influence upon its subsequent development. The history of chemistry, therefore, properly begins with our record of historical facts in general, and owing to the great space of time which it embraces, it may, for the sake of convenience, be divided into three parts; namely, the ancient, the middle, and the modern history of chemistry.

The first division extends from the earliest times to about the beginning of the 4th century. During this time individual chemical facts were observed; but they were not regarded as having any relation to each other.

The second division extends from the beginning of the 4th to the middle of the 17th century. During this time chemical facts and investigations were regarded as a whole; but they served purposes foreign to the true object of chemistry.

The third division begins with the middle of the seventeenth century, the time in which the true object of chemistry was recognized, and extends to the present time.

These three principal divisions of the history of chemistry may be further divided into periods, which would greatly facilitate the review of the various conditions of the science.

There was no essential change at any time in the chemical knowledge of the ancients, and our first division may constitute a single period.

It has already been stated that during the time of the middle history, chemistry served purposes foreign to its true object, and as these purposes were different, we have the means for a further subdivision.

From the beginning of the fourth century to the first quarter of the sixteenth century, the sole object of chemistry was to prepare gold artificially. This period is termed the period of *alchemy*.

From the close of this period to the middle of the seventeenth century, the object of chemistry was to heal diseases, and this gives us the period of *medical chemistry* or *Iatro-chemistry*.

Since the middle of the seventeenth century there has been no change in the views of the true object of chemistry; but during this time the conditions of the science underwent a remarkable change, and for this reason the modern history of chemistry is divided into the period of the *phlogistic theory*, which extends to the last quarter of the eighteenth century, and into the period of *quantitative investigations*, extending from that time up to the present day.

In regard to the first period, which comprises the chemical knowledge of the ancients, very little can be said in this hurried review of the subject. History bears record that certain chemical facts were known; but during this whole period these facts consisted of isolated observations, and a theoretical explanation of the nature of the bodies known is nowhere to be found.

The Egyptians, in very remote times, are known to have been expert in the arts. They must have carried the production and working of the metals to a comparatively high degree of perfection. They knew how to manufacture glass, to prepare dyes, and to preserve dead bodies from decay. Pharmaceutical preparations were also known to them.

What has been said of the Egyptians is also true of the Phœnicians.

The Israelites were especially acquainted with metallurgical operations. Of the metals; they knew gold, silver, copper, lead, tin and iron.

The Grecian philosophers, in very early times, were occupied with the study of the elementary nature of matter. Among their doctrines may be mentioned that of Aristotle, which was universally accepted, and played an important part in subsequent scientific investigations. He considered all forms of matter composed of four elements, namely: air, fire, water and earth. Very little was done by the Greeks in the discovery of new facts by observation or experiment. Their knowledge of the metals was about the same as that of the Israelites.

The chemical knowledge of the Romans dates from the time, in

which Greece came into their power. Having become familiar with the processes known to the Greeks they made many additional discoveries, and were soon far in advance of all other nations of ancient times in their store of chemical facts. Besides the metals already known, they were acquainted with mercury and prepared it by distilling cinnabar with iron—a process still in use. They manufactured a variety of alloys, and in these they knew how to incorporate zinc, although they never isolated the metal itself. Many metallic oxides and salts were known to them and employed for medical purposes. Glass they manufactured continually, and colored it by the addition of metallic substances. They knew how to prepare vinegar, sugar, starch, various organic coloring matters, soaps, etc. The tincture of galls was used by them as a reagent.

This short review gives an idea of the condition of chemistry to about the end of the first century after Christ. For the next 200 years there are no records known bearing upon this subject, and when about the beginning of the fourth century we again obtain accounts of a chemical nature, a new element has been introduced into the investigations, which determines the beginning of the second period of the history of chemistry, the period of alchemy.

This period is characterized by the object, which chemical labors pursue, the transmutation of the base metals into gold. It differs from the preceding period, in that all chemical facts are taken as a whole and studied, for the purpose just mentioned.

The labors of the alchemist were all concentrated upon the production by chemical means of a preparation, termed the "Philosophers' Stone," which was supposed by them not only to have the power of converting base metals into gold, but also of healing all diseases.

The search for the philosophers' stone gave rise to a great many important discoveries.

Of the celebrated workers of this period, we will mention but a few.

Geber, an Arab by birth, lived about the middle of the eighth century. He left numerous works, which bear evidence of his superior knowledge in chemical operations. He was well acquainted with many of the common salts and acids now known. He considered the metals as compounds of sulphur and mercury, and pointed out the way for obtaining the philosophers' stone without having isolated it himself. He was followed by many other Arabs, who worked diligently for the same purpose; but their labors grew of less and less importance, until about the beginning of the 13th century they ceased entirely. The ideas of the Arabian school, however, had been carried to Western Europe, and were promulgated there at this time by many celebrated alchemists, among whom may be noticed Albertus Magnus, of Germany, Roger Bacon, of England, and Arnold Villanovanus, of Spain. The labors of these and many other alchemists were of the highest importance to chemistry; but the chief object of their researches, the philosophers' stone, had not as yet been realized. Their followers, however, claimed to have been in possession of it; thus Raymond Lullus, a Spaniard, was not only acquainted with it but knew how to make gold and precious stones. Nicholas Flamel, of France, possessed it, and amassed enormous wealth by it and prolonged his life by its means. As other representatives of this class, we may mention Thos. Norton and John Ripley of England, John and Isaac Hollandus,

of Holland, and Bernhard Trevigo, of Italy. Although by this latter class of alchemists the condition of chemistry was not enhanced, they have the merit of keeping up an interest in chemical pursuits. They were by far excelled by another chemist of this time, Basilius Valentinus, a German monk, with whom this period properly comes to a close. He increased the list of known chemical compounds to a great extent, and obtained a remarkable skill in qualitative analysis. Although he believed in the mysterious power of the philosophers' stone, the secret of which he claimed to have confided to all his brother monks, he proved the error of certain false chemists, by showing through his analysis that many of the commercial metals contained gold and silver, and that the production of the noble metals from them was due to separation and not to transmutation. He challenged them to try their skill on other metals, which, according to his investigation, were free from gold and silver. The alchemists in general were far in advance of their times. Although they claimed, and endeavored to show that their operations were all natural, they were regarded by the illiterate public, and in many cases by the church, as being directly in communion with the evil spirit, and were shunned and persecuted accordingly.

The labors of the last named chemist of this period were not confined to chemistry alone. He was also a noted physician, and not only employed a great many of his chemical preparations for the purpose of healing diseases, but regarded the purification of the body from disease, and the purification of the noble metals from foreign contamination, as analogous chemical processes.

These views were taken up by Paracelsus, a physician of Switzerland, about the first quarter of the 16th century, and more fully developed. He established the theory that the vital functions were chemical processes, that the ingredients of organisms were composed of chemical elements, and that the excess of one or the other of these elements gave rise to peculiar chemical phenomena, which revealed themselves in the different conditions of health. He thus became the founder of the medico-chemical theory, and with his labors begins the third period in the history of chemistry, that of medical chemistry or iatrochemistry.

The object of chemistry during this period was to find the means by which the abnormal conditions of the body in disease could be removed. As a result of this tendency many new preparations were discovered, and the basis for the investigation of animal substances laid. Thus chemistry was enriched by many new discoveries, and its field of investigation extended. It was however of much greater importance to chemistry, that it passed into the hands of a highly educated class of men, who, contrary to their expectations, aided in a very high degree to make chemistry what it became in the following period, an independent science. Many of the iatro-chemists pursued chemical investigations further than their object demanded. They became deeply interested in chemistry itself, and soon the accumulation of chemical facts formed a structure too broad and heavy for its foundation. The medico-chemical theory was overthrown by the progress in knowledge which it had itself induced.

It must not be supposed from the general tendency of chemistry in this period, that the belief in the transmutation of metals and the ex-

istence of the philosophers' stone was given up entirely. There were more alchemists in this period than in the former; but as a general thing they were an ignorant class of men, who labored solely for the production of gold. In this respect they differed from the alchemists of the preceding period, and as far as the advancement of chemistry is concerned their attainments can not be compared with those of the iatro-chemists.

It would be impossible in this short review to mention even all the most celebrated researchers, who during this and the following periods blessed humanity by their untiring labors, and only those can be hastily noticed who have made epochs in the history of chemistry.

With Robert Boyle, of England, about the middle of the 17th century. this period came to a close, and a new era in chemical investigations began to dawn, which marks the beginning of the period of the *phlogistic theory*.

Boyle was the first to point out the true object of chemistry, which up to the present day has been the determination of the composition of matter and the laws which govern its combinations and decompositions. He freed chemistry from the subordinate position, which it occupied towards medicine, and elevated it to an independent study among the sciences. His knowledge of chemical compounds, and his skill in experimental manipulations, were by far greater than those of any of his predecessors. His attainments in this direction however were of little importance when compared with the results of his labors in other directions, which he realized through his fruitful mind and acute observations. Up to his time all testing for substances was performed in the dry way *i. e.* by the aid of heat, and the application of this method was very limited. But Boyle introduced many methods for testing substances in the wet way, and thus became the founder of analytical chemistry. His observations were in many cases made in the spirit of the present time, and the methods he employed are still in common use in our laboratories. He determined the characteristics of the two most important classes of chemical compounds, the alkalies and acids, by showing what the one class dissolved the other precipitated, that the properties of each were destroyed when they were properly mixed, and that the change of color, which one class effected on vegetable coloring matter, was restored by the other. For the latter purpose he employed paper, which was colored by vegetable coloring matter, just as we use it at the present time to detect the presence of an acid or alkali. He knew that ammonia was expelled from its combinations by lime, and that it produced white fumes when it came in contact with acids. This test is familiar to every student, who works in our laboratories. Many other examples of this kind could be mentioned.

The labors of Boyle were not confined to analytical chemistry. There is not a branch of the science, either pure or applied, in which his influence has not been felt.

In his explanations of chemical phenomena he was much less fortunate than in his experiments. He showed that the four elements of Aristotle (air, fire, water and earth), as well as those of alchemists (salt, sulphur and mercury), could not be regarded as established in chemistry. What should take their place, however, he failed to express.

The study of the process of combustion during this period, as will be shown further along, did more toward making chemistry what it now is than anything else. Up to this time the views of the ancients, that fire was an element, and that combustion was only the separation of this element from the combustible substance, had maintained themselves with but slight modifications. These modifications consisted in substituting for fire hypothetical substances, which at different times were called "sulphur," "moisture," "oil," etc.

In regard to the burning of the metals one fact had been casually observed, namely, that they increased in weight. Some chemists of this period, cotemporaries of Boyle, among whom were Rey, of France, and John Mayo, of England, explained this increase of weight correctly. But their views were not recognized by other chemists of their time.

To explain this phenomenon, Boyle, and with him Becher, of Germany, and Lemery, of France, assumed that fire contained ponderable igneous matter, and that the action of the air was merely passive. Boyle made a series of experiments in this direction; but his preconceived opinion that the increase of weight was due to ponderable igneous matter kept him from forming those correct conclusions to which otherwise his experiments might have led him. In one of his experiments he placed some lead into a retort, closed the neck hermetically, and then weighed the whole. He then heated the retort, by which of course the metal was partially burned. On opening the retort he found that the air rushed in violently, and on weighing it again he found as he expected, an increase in weight. The rushing in of the air he regarded merely as a confirmation that his retort was sealed perfectly tight, and hence concluded that the increase of weight could only have been caused by the absorption of igneous matter, this being considered so fine that it could penetrate the most dense substances. This same experiment in the hands of Lavoisier, a hundred years later, gave rise to a new theory of combustion, he having made the important addition of weighing the retort after heating, before as well as after opening it.

The immediate followers of Boyle denied the existence of ponderable igneous matter, and paid little or no attention to the change of weight attending chemical combination. One of these demands our notice more than any other chemist of this time, since he became the leader of those that followed him in this period, by establishing the first comprehensive theory of combustion, from which this period derives its name. This was George Ernst Stahl, of Germany.

Stahl assumed that all combustible substance contained a common constituent as the cause of their combustibility. This ingredient he named "Phlogiston," meaning combustible. With this hypothesis he explains the principal chemical processes known in his time. The oxides resulting from the burning of metals were at this time called limes. Stahl considered the metals compounds of metallic limes and phlogiston; sulphur and phosphorus compounds of sulphuric acid, phosphoric acid and phlogiston. If these compounds be deprived of their phlogiston, as is the case when they are burned, metallic limes, sulphuric and phosphoric acid are the result. If a body which has been deprived of its phlogiston be heated with another, which is rich in this substance, the latter gives off its phlogiston to the former;

thus when limes are heated with charcoal they are changed to the metallic state. In the same way sulphuric acid can be changed to sulphur, and phosphoric acid to phosphorus. The metals, sulphur, phosphorus, etc., he considered compounds; the metallic limes, sulphuric, phosphoric acid, etc., elements or simple substances.

These are the leading features of the phlogistic theory as established by Stahl. It corrolated the facts then known and showed their relation to each other, and thus elevated chemistry to the rank of a science. From this time on chemical investigations received a new impetus. Analytical chemistry was studied with the greatest zeal, and the definition, which Stahl gave to the science, that it was the art to decompose bodies into their constituents and from these constituents to reproduce them, has been true for chemistry to the present day. The lectures of Stahl, at Halle, were crowded with students, in whom he awakened a love for chemistry. Many of these became noted men, who aided in the divulgation of the phlogistic theory and the advancement of science in general. Through them Stahl's views were speedily spread over Germany. From here they were introduced into France, and later into England and Sweden.

The phlogistic theory as established by Stahl was false, and could only have been established by ignoring the quantitative relation entirely. For this reason it has been claimed that it was a barrier to the progress of the science; but that this is unjust is evident from the fact that the most important discoveries were made under its influence, and that the most brilliant minds in the history of chemistry labored for its development. That theory is the best which answers all the demands of the times, becomes universally recognized, and carries within it the germ for a new and better theory, the realization of which it hastens. The discoveries of Priestly, Cavendish and Scheele, in the latter part of the period of the phlogistic theory, men, who were the most zealous advocates of Stahl's views, were alone sufficient to give their opponents all the facts necessary for a better theory of combustion. All that was wanting was a man who could explain these facts correctly.

It has already been stated that before the establishment of the phlogistic theory, two or three chemists had a correct theory of combustion; but they failed to make them recognized, and these isolated opinions were of no importance to chemistry. As a genius was necessary at the beginning of the 18th century to establish the phlogistic theory, which for over seventy-five years answered all the requirements of chemical investigations, so another genius was needed at the end of the 18th century to overthrow this theory after it had gained a strong foothold all over the chemical world, and replace it by another, which at the same time was destined to be recognized as the true explanation of combustion, as long as chemical investigations should be made.

This latter genius was Lavoisier. He was the first to prove by experiment that combustion was combination with oxygen, and thus to lay the foundation of chemistry as it exists to day. Lavoisier made no new discoveries; his glory lies in giving true explanations for facts already known, and in overthrowing the phlogistic theory. This latter task was by no means an easy one. The followers of Stahl had become deeply attached to the phlogistic theory, and defended it with

all their power. As an example we may mention Priestly, who died in this country in 1804, a firm believer in phlogiston, notwithstanding he was the discoverer of oxygen, that most important of all chemical elements, whose true relation to chemical combination, as determined by Lavoisier, has made this science what it is to day.

With the labors of Lavoisier, which fall in the last quarter of the eighteenth century, the period of *quantitative investigations*, in which we now live, was introduced.

The general characteristics of this period are the same as those of the preceding one; but it differs from the latter, in that now quantitative relations are made the basis of all chemical investigations.

At first, Lavoisier stood entirely alone; even his own countrymen opposed his views; but through the precision, which characterized all his works, through the clearness of his demonstrations and conclusions, through the ingenuity with which he constructed new and improved apparatus to illustrate his experiments, and through his perseverance in overcoming the obstacles placed in his way from all sides, he forced his opponents one by one to become advocates of his cause. The first result of this new tendency was to overthrow the phlogistic theory; but soon the process of combustion was too narrow a field for research. The investigations of many celebrated chemists drifted into new and independent channels, which were finally united into one grand whole by Berzelius.

The innumerable applications of this science to the arts and industries have become so intimately connected with the daily needs of our present civilization, that we scarcely realize their existence.

In conclusion let me say, that on enquiring into the life and labors of the host of truly great men, whose names grace the pages of the history of chemistry, we will invariably find that their efforts were actuated by purely scientific motives. A few important discoveries, it is true were, made by accident; but all those broad principles, which have brought every form of matter, organic as well as inorganic, celestial as well as terrestrial, into the scope of chemical investigation, are the result of thorough scientific training and research. And if a teacher of this or any other science would profit by this lesson, he must guard against degrading the study of it to mere mercenary motives, and use his best endeavors to instil into the minds of the young, who are placed in his charge, that love for scientific knowledge and truth, by which the cause of humanity has been enhanced in so high a degree.

The friends and patrons of this institution owe a debt of gratitude to the governor and general assembly of our state, to our board of trustees, and to our regent, for that munificent tribute to science, our new laboratory, which is to be dedicated to-day to serve, as we most sincerely hope, the best interests of all who may partake of its benefits.

DESCRIPTION

OF THE

NEW CHEMICAL BUILDING

OF THE

ILLINOIS INDUSTRIAL UNIVERSITY,

BY

H. A. WEBER, PROFESSOR OF CHEMISTRY.

DESCRIPTION OF THE NEW CHEMICAL BUILDING.

The need of an appropriate building for the pursuit of the study of chemistry in the various branches, as taught at the Illinois Industrial University, had long been felt. The department of chemistry had been well provided with chemicals and apparatus through liberal appropriations by the legislature and the board of trustees; but the laboratories were fitted up in a building which was not designated or constructed for the purpose, and which could not have been remodeled in a suitable manner, even at the cost of an entirely new building.

Before the meeting of the last legislature, therefore, Dr. J. M. Gregory, regent of the Illinois Industrial University, requested N. C. Ricker, Prof. of Architecture, and H. A. Weber, Prof. of Chemistry, to get up plans for a new building, which should meet all the wants of the chemical department. The cost of the building was not to exceed $40,000.

With Dr. Gregory's valuable assistance and suggestions, the plans were agreed upon. These plans, with the elevations of the building, were carefully drawn up by Prof. Ricker, and after having been accepted by the board of trustees, were laid before the legislature. The legislature at the same time received an invitation to visit the institution, to which they responded in a body. After a thorough examination of the merits of the case, the majority were satisfied of the need of the proposed building, and accordingly an appropriation of $40,000 was made, of which $30,000 were to be expended on the building, and $10,000 on furnishing the same.

Several thorough revisions of the plans were made before they were finally accepted by the regent and the board of trustees.

The contract was let to Messrs. N. C. Terrill & Co., of Kankakee, and the work was executed under the supervision of Prof. Ricker, as architect, and Mr. Seeley Brown, of Champaign.

The working desks for students were made by Messrs. Walker & Stayman, of Champaign, and the rest of the wood work was done at shops of the University by the students of architecture.

The building is 126 feet long and 74 feet wide, and contains a basement, first and second stories, and a mansard story.

The basement is 12 feet high and contains the following rooms:

1st. Furnace room for assaying in the dry way and metallurgical operations. It is to contain a large smelting furnace, a forge, and the assay furnaces. The necessary blast is produced by means of a Sturtevant blower.

2d. Mill room for storing and crushing ores.

3d. A large room for the manufacture of chemicals and pharmaceutical preparations.

4th. Coal cellar.

5th. Boiler room. This room contains one large boiler for heating purposes; an engine with small boiler for running it; a large Sturtevant blower, which delivers 10,000 cubic feet of air per minute, for ventilating and heating; a smaller Sturtevant blower for supplying blast for blowpipes, forges, etc.

6th. Hot air chamber with about three miles of steam pipe. Through this chamber the hot air is forced all over the building by means of the large blower.

The first story is 14 feet high and contains:

1st. A large lecture room capable of seating 200 persons.

2d. Ladies' clothes room.

3d. Gentlemens' clothes room.

4th. Quantitative laboratory, which will accommodate 152 students when fully completed. The number of desks now fitted up are one hundred and four. Each desk has an evaporating hood and a wash bowl with constant supply of water. Near the middle of the room there is a spectroscope table, and a blowpipe table for general use. Large gas hoods and sinks are constructed at the sides of the room for the accommodation of larger apparatus.

5th. Store room.

The second story is 14 feet high and is designed for the use of advanced students only.

1st. A small lecture room with mineralogical cabinet.

2d. Store room.

3d. Laboratory for students in agricultural chemistry.

4th. Main laboratory for quantitative analysis. These two laboratories will accommodate 152 students when fitted up to their full capacity. Forty-eight desks are now finished, and furnished as those of the lower laboratory with gas hoods and wash bowls.

5th. Balance room.

6th. Pharmacy.

7th. Private laboratory for instructors.

8th. Gas analysis room. This room has no outside walls excepting to the north, and is entirely cut off from the system of heating and ventilating in order to avoid undue fluctuations of temperature during the analysis of gases.

On the mansard floor ample provision has been made for the study of photography. There is a large operating room, with side light and sky light of ground glass, a dark room and a toning room, the latter two of which are well supplied with soft water.

The work on the building was commenced in July, 1877, and was completed in April, 1878. It is an imposing structure, and one of which the University and state may well be proud, for it may be truthfully said, that it is unsurpassed in regard to size and facilities by any other building of its kind in the whole country.

CATALOGUE

OF THE

FLOWERING & HIGHER FLOWERLESS PLANTS

OF ILLINOIS,

NATIVE, INTRODUCED AND CULTIVATED.

PLANTS OF ILLINOIS.

NATIVE, INTRODUCED AND CULTIVATED.

This is simply an attempt to compile from such authorities as were accessible, the list of native, introduced and cultivated plants of Illinois. "Gray's Manual," and "Field, Forest and Garden Botany," have been gone through and the Illinois plants noted. Other authorities consulted have been: I. A. Lapham in 2nd volume transactions Illinois state agricultural society; Fred. Brendel and M. S. Bebb in the 3d volume; Geo. Vasey in the 4th volume; H. H. Babcock in the Lens; MS. list of Mr. Macauley, of Champaign, and others.

The compiler is no botanist, but simply working from the practical standpoint, and endeavoring to show the possibilities of plant culture, agricultural and horticultural, in Illinois.

W. C. FLAGG.

The species and varieties having the abbreviation of the author's name after them, have been added to Mr. Flagg's list. These additions—252 species and varieties—are from, for the most part, H. H. Patterson's catalogue of the plants of Illinois; otherwise as mentioned in the text. When no authority is named for the occurrence of a plant in any locality the undersigned is to be understood. The catalogue is believed to be almost complete, so far as the indigenous and commonly cultivated flowering plants are concerned. Corrections and additions will be thankfully received by the undersigned.

CHAMPAIGN, ILLINOIS, September 30, 1878. T. J. BURRILL.

RANUNCULACEÆ—CROWFOOT FAMILY.

CLEMATIS, *Virgin's Bower*—Mostly climbers.
- floi ida—cultivated from Japan. Not hardy.
- patens—cultivated from Japan. Hardy.
- viticella, *Vine Bower*—cultivated from Europe. Hardy.
- graveolens—cultivated from Thibet. Very hardy.
- viorna, *Leather Flower*—native, Lapham.
- pitcheri—native. Lapham.
- integrifolia—cultivated sparingly from Europe.
- erecta, *Upright Virgin's Bower*—cultivated from Europe.
- flammula, *Sweet Scented Virgin's Bower*—Europe.
- virginiana—native, Lapham. Cook county, Babcock.

HEPATICA, *Liverwort*—Stemless low perennials.
- triloba—cultivated from Europe and native, Lapham; Will county, Babcock; Champaign county.
- acutiloba—native, Vasey; Cook county, Babcock; Champaign county.

ANEMONE, *Wind Flower*—Erect herbs.
- caroliniana, Walt.—Ogle county, Bebb; and southward. Scarce.
- cylindrica, Gray—dry prairies, etc. Not common.
- virginiana, L.—not uncommon. Champaign county.
- pennsylvanica, L.—common. Champaign county.
- nemorosa, L.—woods, not uncommon. Champaign county.
- pulsatilla, pasque flower—cultivated from Europe.
- patens, var. nuttalliana—native, Bebb; Lapham.
- coronaria—cultivated from south Europe.
- hortensis—cultivated from south Europe.

THALICTRUM, *Meadow Rue*—Perennials.
anemonoides, *Rue anemone*—native. Cook county, Babcock; Champaign county.
dioicum, *Early Meadow Rue*—native, Bebb; Vasey; Cook county, Babcock; Champaign county.
purpurascens—native. Cook county, Babcock.
var. ceriferum—native. Cook county, Babcock,
cornuti—native. Cook county, Babcock.

TRAUTVETTERIA, *False Bugbane*—Perennial herb.
palmata—native. Lapham.

RANUNCULUS, *Crowfoot, Buttercup*—Annuals or perennials.
aquatillis—native. Cook county, Babcock: Champaign county.
multifidus—native. Cook county, Babcock; Champaign county.
var. terrestris, Gray—Hyde Park, Babcock.
flammula—native, Lapham.
oblongifolius—native. Marion county, Bebb.
abortivus—native. Cook county, Babcock; Champaign county.
var. micranthus—native, Lapham.
recurvatus—native, Lapham; Champaign county.
pennsylvanicus—native, Vasey.
fascicularis—native, Lapham; Champaign county.
repens—native, Lapham; Cook county. Babcock; Champaign county.
var. hispidus—Hancock and Washington counties.
cymbalaria—native. Cook county, Babcock.
rhomboideus—native, Bebb; North, Vasey.
asiaticus—cultivated from Levant. Not hardy.
aconitifolius, *Fair Maids of France*—cultivated from Europe.
divaricatus, Schrank—Ponds, central and northern part of state.
alismæfolius, Geyer—margins of ponds. Not uncommon in localities.
sceleratus, L.—Chicago, Munroe.
acris, L.—naturalized from Europe. Champaign county.

Cattle do not usually eat the buttercups on account of their acrid juice, which is lost when the plants are dry as for hay.

MYOSURUS—
minimus L.—Hancock county, Mead; Marion county, Bebb; Washington county, French.

ISOPYRUM, *False Rue Anemone*—Common.
bitternatum—T. and G.

HYDRASTIS, *Orange Root, Yellow Puccoon.*
canadensis—native, Lapham; Champaign county.

ACTÆA, *Baneberry*—Perennials.
spicata, var, rubra—native, Lapham, Bebb, Vasey; Champaign county.
alba—native, Cook county, Babcock; Champaign county.

CIMICIFUGA, *Bugbane.*
racemosa, Ell, black snakeroot—flower very fetid.

CALTHA, *Marsh Marigold*—Perennials.
palustris—native and European; Cook county, Babcock; Champaign county.

TROLLIUS, *Globe Flower*—Perennials.
europæus—cultivated from Europe.
asiaticus—cultivated from Siberia.

NIGELLA, *Fennel Flower*—Garden annuals.
damascena, *Ragged Lady*—cultivated from Orient.
sativa, *Nutmeg Flower*—cultivated from Europe.

AQUILEGIA, *Columbine*—Perennial, ornamental.
canadensis—native, Cook county, Babcock; Champaign county.
skinneri, *Mexican Columbine*—cultivated.
cærulea—cultivated from Rocky mountains.
vulgaris—cultivated from Europe.
glandulosa—cultivated from Europe.
sibirica, *Siberian*—cultivated from Europe.

DELPHINIUM, *Larkspur*—Garden annuals.
consolida—introduced from Europe. Vasey.
ajacis, *Rocket Lockspur*—cultivated from Europe.
grandiflorum—cultivated from Siberia and China.
cheilanthum—cultivated from Siberia.
azureum—native, Lapham.
tricorne—native, Lapham.
exaltatum—native of Washington county, Brendel.
elatum—cultivated from Europe.

ACONITUM, *Aconite, Wolfsbane, Monkshood*—Ornamental perennials.
variegatum—cultivated from Europe.
napellus—cultivated from Europe.
anthora—cultivated from Europe.

PÆONIA, *Pœony*—Perennials, large flowered, ornamental plants.
officinalis, common pæony—cultivated from Europe.
peregrina—cultivated from Europe
tenuifolia—cultivated from Siberia.
albiflora, *Chinese Pœony*—Siberia and China.
moutan, *Tree Pœony*—cultivated from China.

MAGNOLIACEÆ—Magnolia Family. Trees or Shrubs.

LIRIODENDRON, *Tulip Tree*--Useful timber.
tulipifera, *Whitewood, Poplar*, native.
This tree is found of large size and in great numbers in the southern portion of the state, as far north as Jackson county, on the Illinois Central railway and Wabash county on the Wabash river. One authority gives it in Stephenson, on the northline of the state. Robt Ridgeway, in the American Naturalist for November, 1872, gives the following dimensions of one near Mt. Carmel, Wabash county. Height 182 feet, height of trunk, 91 feet, circumference, 3 to 5 feet from the ground, 22½ feet. The timber of this species is made into strawberry, peach and other fruit boxes, and is rapidly disappearing.

MAGNOLIA—Ornamental Trees and Shrubs.
grandiflora—cultivated from south. as far north as Jonesboro.
glauca—"Never succeeding on limestone soil, unless budded on the acuminata." Ellwanger.
acuminata—native variety, and valuable for ornament or as a stock.
macrophylla—cultivated from Carolina, for ornament. Not hardy.
umbrella—native (?). Lapham.
conspicua—cultivated from China. Not hardy.
soulangeana—hybrid of last with next, hardy, one of the best, not large.
purpurea—cultivated from Japan. Hardy.

ANONACEÆ.—Custard Apple Family.

ASIMINA—Trees or Shrubs.
Tribola—common pawpaw, native as far north probably as the northern line of the state.

There is a Pawpaw grove in Lee county, according to the postoffice record, and in Van Buren county of Michigan. Bryant gives its northern limits as western New York to northern Illinois, but adds that it does not fruit in its northern boundary. Specimen trees measured by Prof. Swallow in Mississippi county, Missouri, attained a height of 30 feet and a diameter of 12 inches. I find it noted as occurring in Grundy county of our own state. A writer in the American Journal of Horticulture gives lat. 38 deg. and a deg. northward and southward of that parallel, as the most favorable for the production of its fruit. Prof. Gray notes this as one of our native fruits that, under improvement, thorough selection, etc., would give valuable results. The trees are not easy to transplant.

MENISPERMACEÆ—Moonseed Family.

COCCULUS—*Woody Climber*,
carolinus--native. Lapham; Champaign county.
MENISPERMUM--*Moonseed.*
canadense—native, Lapham, Cook county, Babcock, Champaign county. A good hardy climber.
CALYCOCARPUM--*Cup Seed*,
lyoni, Nutt, Jackson county, French, Forbes.

BERBERIDAEÆ—Barberry Family.

BERBERIS, *Barberry*--Shrubs.
vulgaris, common barberry—naturalized from Europe in eastern states, cultivated in Illinois for ornament, for fruit, and for low hedges. Several ornamental varieties.
canadensis—cultivated.
aquifolium. Mahonia—cultivated from Oregon, somewhat tender, evergreen.
repens—cultivated from Rocky Mountains. More hardy than last.
nervosa—cultivated from Oregon.
japonica--cultivated from Japan.
NANDINA—Japanese name.
domestica—cultivated in cool greenhouses.
EPIMEDIUM, *Barren-wort*—Low herbs. ornamental.
alpinum, of European Alps.
macranthum of Japar.
CAULOPHYLLUM, *Cohosh*—Herb.
Thalictroides, *Pappoose wood*—native, Lapham; Cook county, Babcock; Champaign county.
JEFFERSONIA, *Twin-leaf*—Herb.
diphylla, *Rheumatism Root*—native, Vasey. Sometimes cultivated for ornament.
PODOPHYLLUM, *May Apple or Mandrake.*
peltatum—native, Lapham; Cook county, Babcock ; Champaign county; common in southern counties; has been cultivated for its fruits and used medicinally.

NYMPHÆACEÆ—Water Lily Family. Aquatic Perennial Herbs.

CABOMBA.
Caroliniana, Gray—Wabash county, Schneck. In stagnant waters.

BRASENIA, *Water Shield.*
peltata—native, Lapham, Cook county, Babcock; also a native of Pugent Sound, Japan, Australia and Eastern India. Gray.

NELUMBIUM, *Nelumbo.*
luteum, yellow nelumbo or water chinquepin—native, Lapham; Cook county, Babcock. Tubers and seeds both edible.

NYMPHÆA, *Water Lily. Pond Lily.*
Odorata, sweet scented water lily—native, Lapham; Cook county, Babcock; cultivated.

NUPHAR, *Yellow Pond Lily or Spatter Dock.*
advena—native, Lapham; Cook county, Babcock; Champaign county; cultivated for ornament.
sagittifolia, Pursh; Wabash county, Schneck.

SARRACENIACEÆ—Pitcher-Plant Family. Perennials.

SARRACENIA, *Side-saddle Flower.*
Purpurea—native, Vasey: Cook county, Babcock.

PAPAVERACEÆ—Poppy Family. Herbs.

PAPAVER, *Poppy.*
somniferum—annual; adventitious from Europe, Vasey, and cultivated for ornament and for the drug.
rhæas, *Corn Poppy*—cultivated for ornament, from Europe; annual.
orientale—perennial, cultivated for ornament, from Europe.

STYLOPHORUM, *Celandine Poppy*—perennial, diphyllum, native, Lapham.

ARGEMONE, *Prickly Poppy*, annual.
mexicana—Mexican poppy, cultivated for ornament.

ESCHSCHOLTZIA—Annual.
californiaca, cultivated for ornament.

SANGUINARIA, *Blood-root*—Perennial.
canadensis—native; Lapham; Cook county, Babcock; Champaign county; cultivated for ornament.

BOCCONIA—Perennial.
cordata—cultivated for ornament, from China, Root hardy.

FUMARIACEÆ—Fumitory Family. Herbs.

DICENTRA—Perennials.
cucullaria, *Dutchman's Breeches*—native, Lapham; Cook county, Babcock; Champaign county; common, not cultivated for ornament.
canadensis, *Squirrel Corn*—native, Vasey; Cook county, Babcock.
eximia—cultivated for ornament.
spectabillis, *Bleeding Heart*—cultivated for ornament, from northern China.

ADLUMIA, *Climbing Fumitory.*
Cirrhosa—Cook county, introduced (?) Babcock.

CORYDALIS—Biennials.
aurea—native, Lapham; Cook county, Babcock; Western Illinois, Gray.
glauca, Pursh; Ogle county, Bebb. Rare.
flavula, Raf—Wabash county, Schneck.

FUMARIA—Annual.
officinalis—introduced from Europe, Lapham.

CRUCIFERÆ—Mustard Family. Herbs.

BRASSICA, *Cabbage, Mustard, etc.*
oleracea, *Cabbage*—cultivated from Europe, where the original is a sea-coast annual plant. The variations from cabbage are: broccoli, cauliflower, kohlrabi, kale.
campestris—also from Europe, and represented in cultivation by: colza, or rape, turnip, ruta baga. These plants are not so well adapted to the warm and dry climate of the greater portion of the United States as the moister and cooler cli-

mate of Europe. For their various variations and facile deterioration, see "Darwin's Animals and Plants, under Domestication," vol. 1, p. 389.
sinipastrum, *Charlock*—introduced from Europe. Lapham.
alba, *White Mustard*—cultivated from Europe, and adventitious.
nigra, *Black Mustard*—cultivated and adventitious, from Europe.

SISYMBRIUM, *Hedge Mustard*—annuals.
officinale—weed, naturalized from Europe, Lapham; Champaign county.
canescens—native, Lapham.

NASTURTIUM, *Water Cress, Horse Radish, &c.*
officinale, *Water Cress*—naturalized from Europe, Vasey, Babcock. Young plants eaten.
armoracia, *Horse Radish*—naturalized from Europe.
sinuatum—native, Vasey; Brendel, Peoria county.
palustre, *Marsh Cress*—native, Lapham,
sessiliflorum—native, Vasey; Peoria county, Brendel.
obtusum—native, Vasey.
lacustre—native, Lapham.

HESPERIS, *Rocket*—perennial.
matronalis—cultivated for ornament from Europe.

MALCOLMIA.
maritima. *Mahon stock*—cultivated for ornament from shores of Mediteranean.

MATTHIOLA, *Stock or Gilliflower*—Cultivated for ornament from Europe.
incana—*Common stock*—perennial.
annua—*Ten week stock*—annual.

CHEIRANTHUS, *Wall Flower*—perennial.
cheiri—cultivated from Southern Europe.

ERYSIMUM.
asperum, DC. *Western Wall Flower*, var., arkansanum, Nutt—biennial and perennial, native, Lapham; Mason and Cass counties, Mead, Wolf. Rare.
cheiranthoides, *Treacle Mustard or Worm seed Mustard*—annual, native, Lapham.

BARBAREA, *Winter Cress*—biennial and perennial.
vulgaris, *Common Winter Cress or Yellow Rocket*—introduced and perhaps native.
præcox, *Scurvy Grass*—cultivated for early salad.

ARABIS, *Rock-Cress.*
ludoviciana—native, Lapham; Cook county, Babcock.
lyrata—native, Lapham, Cook county, Babcock.
dentata—native, Lapham; Cook county, Babcock.
hirsuta—native, Vasey.
lævigata—native, Lapham; Cook county, Vasey.
canadensis—native, Lapham.
hesperidoides—native, Lapham.
perfoliata—native and introduced, Vasey.
drummondii—native, Vasey.
alpina—cultivated for ornament, from Europe,

CARDAMINE, *Bitter Cress*—perennial.
hirsuta—native, Lapham; Champaign county,
pratensis, *Cuckoo Flower or Ladies' Smock*—cultivated for ornament.
rhomboidea, *Spring Cress*—native, Lapham; Cook county, Babcock; Champaign Co.
var. purpurea—native, Vasey; Cook county, Babcock.

DENTARIA, *Toothwort.*
laciniata—native, Lapham; Cook county, Babcock; Champaign county.

LUNARIA, *Honesty, or Satin Flower.*
biennis—cultivated for ornament.

DRABA, *Whitlow Grass*—low herbs.
brachycarpa—native, Lapham.
cuneifolia—native, Lapham.
caroliniana—native, Lapham; Cook county, Babcock.
var. micrantha—native, Vasey.

CAMELINA, *False Flax*—biennial.
sativa—adventitious from Europe, Bebb, Vasey.

CAPSELLA, *Shepherd's Purse*—annual.
bursa-pastoris—naturalized from Europe, Lapham; Cook county, Babcock; Champaign county.

IBERIS, *Candy Tuft*—cultivated for ornament, from Europe. Low plants.
umbellata—biennial.
sempervirens, evergreen—perennial.

LEPIDIUM, *Pepper Grass*—annuals.
virginicum—native, Lapham; Cook county, Babcock; Champaign Co.
intermedium—native, Vasey; Cook county, Babcock.
sativum—cultivated as a cress.
campestre—naturalized from Europe, Champaign.

ALYSSUM, *Madwort*—cultivated for ornament, from Europe.
maritimum, *Sweet Alyssum*. Sometimes escaped from cultivation.
saxatile, rock alyssum.

ISATIS, *Woad*—biennial.
tinctoria—cultivated for a blue dye.

CAKILE, *Sea-Rocket.*
Americana—native, Vasey; Cook county, Babcock.

RAPHANUS, *Radish.*
savitus, *Garden Radish*—cultivated from Europe.
caudatus, *Rat-tail Radish*—cultivated from India, for the long pod, which is eaten when green.

CAPPARIDACEÆ—Caper Family.

CLEOME—annuals.
pungens—cultivated from South America, for ornament.
integrifolia—cultivated from Nebraska.
speciosissima, Deppe—sparingly escaped from gardens. Showy annual, cultivated from Mexico.
GYANDROPSIS.
pentaphylla—adventive in south part of state. Lapham.
SALANISIA.
graveolens—native, Lapham; Cook county, Babcock.

RESEDACEÆ—Mignonette Family.

RESEDA, *Mignonette*—herbs.
odorata, *Common Mignonette*—cultivated from Africa.

VIOLACEÆ—Violet Family.

SOLEA, *Green Violet.*
concolor—native, Vasey.
VIOLA, *Violet.*
odorata—cultivated from Europe, hardy but the Italian variety is tender northward.
cucullata, *Common Blue Violet*—native. Lapham; Cook county, Babcock; Champaign county.
var. palmata—native, Lapham, Champaign county.
sagittata—native, Lapham; Cook county, Babcock; Champaign co.
delphinifolia, *Larkspur Violet*—native, Lapham; Cook county, Babcock: Champaign county.
lanceolata—native, Vasey; Cook county, Babcock.
pedata, *Bird-foot Violet*—native, Lapham; Cook county, Babcock; Champaign county, Macauley.
var. bicolor, Gray—Henderson county, Patterson; Hancock, Mead; Peoria, Brendel.
blanda, *Sweet White Violet*—Cook county, Babcock.
pubescens, *Downy Yellow Violet*—native, Lapham; Cook county, Babcock; Champaign
var. eriocarpa, Nutt—Winnebago and Marion counties, Bebb. Rare.
var. scabriuscula, T&G—Kankakee county, Hill.
canina, var. sylvestries, Regelwoods, Hancock county, Mead; Peoria, Brendel; Cook, Babcock.
tricolor, *Pansy, orH eart's ease*—cultivated and naturalized from Europe.
var. arvensis, Gray—"native south." Vasey.
cornuta, *Horned Violet*—cultivated from the Pyrenees.

CISTACEÆ—Rock Rose Family. Low Shrubs or Herbs.

HELIANTHEMUM, *Frost-Weed.*
canadense—native, Lapham; Cook county, Babcock.
HUDSONIA—
tomentosa—Cook county, Babcock.
LECHEA, *Pin-Weed*—perennial herbs.
major—native, Lapham; Cook county, Babcock.
minor—native, Lapham.

DROSCERACEÆ—Sundew Family. Bog Herbs.

DROSERA, *Sundew.*
rotundifolia—Cook county, Babcock. Catches and digests insects in a very curious manner.
longifolia—Cook county, Babcock.

HYPERICACEÆ—St. John's-wort Family. Herbs or Shrubs.

ASCYRUM, *St. Peter's-wort.*
crux-andreæ, *St. Andrew's Cross*—native, Vasey.

HYPERICUM, *St. John's-wort.*
pyramidatum—native, Lapham.
kalmianum—native, Vasey; Cook county, Babcock.
prolificum—native, Lapham.
adpressum—native, Vasey; St. Clair county, Brendel.
dolabriforme—native, Vasey; St. Clair county, Brendel.
nudiflorum—native, Vasey; St. Clair county, Brendel.
sphærocarpon—native, Lapham.
ellipticum—native, Vasey, St. Clair county, Brendel.
perforatum—naturalized from Europe; Cook county, Babcock.
corymbosum—native, Lapham, Cook county, Babcock; Champaign, Macauley.
mutilum—native, Lapham, Champaign county.
var. gymnanthum, Gray—Kankakee county, Hill; Hancock, Mead; Mason and Menard, Bebb, Hill.
canadense—native, Lapham; Cook county, Babcock.
var. major, Gray—Hancock county, Mead; Kankakee, Hill, and north.
drummondii—native, Lapham.
sarothra, *Orange Grass or Pine Weed*—native, Lapham; Cook county, Babcock.

ELODES, *Marsh St. John's Wort.*
virginica—native, Lapham; Cook county, Babcock.
petiolata—native, Vasey; St, Clair county, Brendel.

ELATINACEÆ—Water-Wort Family. Little Marsh Annuals.

ELATINE, *Water-Wort.*
americana—native. Gray.

BERGIA.
texana, Seubert—St. Clair county, Engelmann. Described in King's report, vol. V.

TAMARISCINEÆ—Tamarisk Family. Shrubs or small Trees of the Old World.

TAMARIX, *Tamarisk.* Ornamental shrubs, etc.
Gallica—*French Tamarisk.* Barely hardy north.

CARYOPHYLLACEÆ—Pink Family.

DIANTHUS, *Pink.*
barbatus—*Sweet William* or *Bunch Pink*—perennial. Cultivated from Europe.
carthusianorum—perennial. Cultivated from Europe.
chinensis, China or India pink—cultivated from the east.
caryophyllus, *Clove Pink*—Perennial, parent of Carnations, not hardy.
plumarius, pheasants eye or plumed pink. Perennial.
superbus—perennial.
All the above are cultivated from abroad for ornament.

LYCHNIS—all foreign and all but first perennials.
githago, *Corn Cockle*—adventive, Vasey; Cook county, Babcock; Champaign county.
coronaria, *Mullen Pink*—cultivated for ornament.
flos-jovis—cultivated for ornament.
chalcedonica, *Maltese Cross*—cultivated for ornament.
grandiflora—cultivated for ornament, from China.
flosculi, *Ragged Robin*—cultivated for ornament.

ARENARIA, *Sandworts.*
stricta, Michx—not uncommon. Champaign county and northward.
lateriflora L.—Woods, Hancock, Mead; northward, rare.
vespertina—cultivated for ornament.

SILENE, *Catch-fly.*
stellata, Ait. Champaign county.
armeria, *Sweet William*—cultivated from Europe.
virginica, L.—near Chicago, Babcock.
antirrhina, L., *Sleepy Catch-fly*—native, Lapham; Cook county, Babcock; Champaign county.
nivea, DC—found in many parts of state, but rare.
inflata, Smith, *Bladder Campion*—naturalized from Europe, in wheat fields.
regia, Sims—St. Clair county, Brendel. Rare.

VACCARIA, *Cow herb*—annual.
vulgaris, adventive from Europe, Vasey; Cook county, Babcock.

SAPONARIA, *Soapwort*—perennial.
officinalis, *Bouncing Bet*—adventive from Europe, Vasey; Cook county, Babcock.

GYPSOPHILA, ornamental plants from Europe and east.
paniculata—perennial.
elegans—annual.

SIGINA, *Pearlwort.*
apetala—native, Vasey. Also European.
nodosa—native, Vasey; St. Clair county, Brendel.
subulata, Wummer—Jackson and Union counties, Vasey, Forbes.

CERASTIUM, *Mouse-ear Chickweed.*
vulgatum—naturalized from Europe. Cook county, Babcock.
nutans—native, Lapham; Cook county, Babcock; Champaign county.
oblongifolium—native, Vasey.
tomentosum—cultivated from Europe, for borders, etc.

STELLARIA, *Starwort Chickweed.*
media—naturalized from Europe. Vasey, Cook county, Babcock.
longifolia—native, Lapham; Cook county, Babcock; Champaign county.
crassifolia—native, Vasey. Also European

ANYCHIA, *Forked Chickweed*—annual.
dichotoma—native, Lapham; Cook county, Babcock.

MOLLUGO, *Carpet-weed*—annual.
verticillata—native, Lapham; Cook county, Babcock.
caroliniana, Michx—With last but rare.

PORTULACACEÆ—Purslane Family. Succulent-leaved Herbs.

PORTULACA, *Purslane*—annual.
Oleracea, *Common Purslane*—naturalized from Europe, Lapham. Everywhere.
grandiflora—cultivated for ornament, from South America.

TALINUM—perennial.
teretifolium—native, Vasey; Cook county, Babcock.

CLAYTONIA, *Spring Beauty*—perennial.
virginica—native, Lapham; Cook county, Babcock; Champaign county, Macauley.

MALVACEÆ—Mallow Family. Herbs or Shrubs.

MALOPE—garden annuals from Mediterranean.
trifida—annual, with rose-colored flowers.
malacoides—perennial.

MALVASTRUM—
angustum, Gray—Rock Island, Englemann.

SPHÆRALCEA—
acerifolia, Nutt—on an island in Kankakee river, Hill. Otherwise known on Pacific coast.

ALTHEA—tall herbs.
rosea, *Hollyhock*—biennial. Cultivated from Syria for ornament.

LAVATERA—cultivated for ornament from Europe.
trimestris, *Flowering Mallow*—annual.
thuringiaca, *German Lavatera*—perennial.
arborea, *Tree Mallow*—perennial.

MALVA, *Mallow*—from Europe and the Orient.
rotundifolia, *common Mallow*—naturalized from Europe. Lapham; Cook county, Babcock; Champaign county.
sylvestris—adventive from Europe, Vasey, Champaign county.
crispa—adventive from Europe, Vasey.
mauritiana—cultivated.
alcea—gardens.
moschata, *Musk Mallow*—gardens.

CALLIRRHOE—species somewhat cultivated.
triangulata—native, Lapham; Cook county, Babcock.
involucrata—cultivated from Nebraska.
papaver—sparingly cultivated from south.
pedata—cultivated from Texas.

NAPÆA, *Glade Mallow.*
dioica—native, Lapham, Gray,

ANODA—low herbs from Mexico, Texas, &c.
hastata—cultivated for ornament.
cristata—cultivated for ornament.

SIDA—small flowered or weedy herbs.
spinosa—annual weed, naturalized from Tropical America and Africa, Lapham, Brendel; Champaign county.

ABUTILON, *Indian Mallow.*
avicennæ—velvet leaf. Adventive from India. This is the somewhat troublesome weed that is being successfully utilized as a textile plant at Springfield, Ill.

HIBISCUS, *Rose Mallow*—shrubs.
syriacus—*Common Shrubby Althea of Gardens.* Cultivated for ornament in eonsiderable variety.
moscheutos, *Swamp Rose Mallow*—native, Lapham.
grandiflorus, Michx—river banks. Marion county, Bebb; Washington, French; Wabash, Schenck.

militaris—native, Lapham; Champaign county.
trionum, *Bladder Ketmia* or *Flower of an hour*—adventive from Europe, Vasey; annual.
esculentus, *Okra* or *Gumbo*—annual. Cultivated for soups.

GOSSYPIUM, *Cotton.*
herbaceum, common cotton—formerly considerably cultivated in Illinois. In 1860 the census gave 1,482 bales as the Illinois product, and in 1870, 465 bales, produced in 14 of our southern counties. More than half of this was grown in Jackson and Williamson.

TILIACEÆ—Linden Family.

TILIA, *Linden, Lime tree, Bass-wood.*
Americana, *American Linden, or common Bass-wood.* This tree is mentioned as growing in sixteen counties described in the geological report, and is probably as Dr. Vasey's map indicates, fonnd in about every county in the state. But it is a northern rather than a southern tree, and seems to affect the cooler grounds in the south part of the state. The largest specimen measured by Prof. Swallow was in Howard county, Mo.: circumference, 23 feet; height, 110 feet. The tree is valuable for shade, for its honey-bearing flowers, its soft, strong, inner bark, and to a certain extent, for its lumber.
heterophylla, Vent—Fulton county, Wolf; Wabash, Schenck.
var. pubescens is noted by Dr. Vasey as occurring in Illinois.
europæa, European linden—cultivated for ornament, from Europe. Mr. Bryant states that "it does not appear to thrive in the soil of our Illinois prairies."

LINACEÆ—Flax Family.

LINUM, *Flax.*
virginianum—native, Lapham; Cook county, Babcock.
sulcatum—native, Lapham; Cook county, Babcock; Champaign county, Macauley.
usitatissimum, common flax—cultivated from Old World, and running wild in fields, Vasey; Cook county, Babcock.

	POUNDS LINT.		BUSHELS SEED.	
	United States.	Illinois.	United States.	Illinois.
1850	7,709,676	160,063	562,312	10,787
1860	4,720,145	48,235	566,867	8,670
1870	27,133,034	2,204,606	1,730,444	280,043

perenne—cultivated from Europe, for ornament.
striatum, Walt—Washington county, Vasey.
grandiflorum—cultivated as an annual, from North Africa.

GERANIACEÆ—Geranium Family.

OXALIS, *Wood-Sorrel.*
siricta, yellow wood-sorrel—native. Laphan, Cook county, Babcock, Champaign.
violacea—native. Lapham, Cook county, Babcock, Champaign county.

LIMNANTHES—Annual.
douglasii—cultivated for ornament from California.

FLŒRKEA, *False Mermaid*—Annual.
proserpinacoides—native, Vasey; Peoria county, Brendel.

GERANIUM, *Cranes-bill.*
maculatum. Native, Lapham; Cook county, Babcock; Champaign county.
carolianum. Native, Lapham; Cook county, Babcock.

PELARGONIUM. The geranium, so-called, of the house and summer garden culture. Most of the numerous species, natives of Cape of Good Hope.

TROPÆOLUM, Many species tropaeolum, nasturtium or Indian cress, cultivated from South America for ornament and the pickled fruits.
majus.
minus.
tuberosum.
peregrinum, *Canary Bird Flower.*

IMPATIENS, *Touch-me-not, Jewel Weed Balsam*—annuals.
pallida.
fulva.
balsamina, *Garden Balsam*—from India.

RUTACEÆ—Rue Family.

RUTA, *Rue.* Perennial.
graveolens—*Common Rue.* Cultivated from the Old World.

DICTAMNUS, *Fraxinella.*
fraxinella—Cultivated from southern Europe for ornament.

ZANTHOXYLUM, *Prickly Ash.*
Americanum—*Northern Prickly Ash—Tooth-ache Tree.* Prickly shrub, or small tree. Native. Union, Wabash, Fulton, Champaign and Cook counties.

PTELEA—*Hop Tree*
Trifoliata. Native. Lapham, Fulton and Cook counties.

SKIMMIA—Low evergreen shrub.
Japonica. Cultivated from Japan. Hardy.

CITRUS—*Orange, Lemon, Lime and Citron.* Natives of India. Cultivated for ornament.

SIMARUBACEÆ—QUASSIA FAMILY.

AILANTHUS, *Chinese Sumach, Tree of Heaven.*
Glandulosus. Cultivated from China. Not entirely hardy. I have seen it injured by cold as far south as 39 dg. (in 1855-6.) It sprouts badly and smells offensively, but is approved as one of the best trees to resist drouth on the plains, and withstand smoke in cities.

ANACARDIACE—CASHEW FAMILY.

RHUS, *Sumach*—shrubs or small trees.
cotinus—*Smoke Tree or Venetian Sumach.* Cultivated from Europe for ornament.
toxicodendron—*Poison Joy—Poison Oak.* Native. Lapham, Fulton county; Cook county; Babcock, Champaign county.
var. radicans, ascends trees, etc., to great height, but may at once be known from the "American Ivy" by having three leaflets instead of five.
venenata—*Poison Sumach* or *Dogwood*, native, Lapham; Fulton county; Cook county, Babcock. The most poisonous species.
typhina, *Staghorn Sumach*—native, Lapham; Wabash county, St. Clair county, Brendel.
glabra, *Smooth Sumach*—native, Lapham; Cook, Wabash, Fulton and Champaign counties.
copalinna, *Dwarf Sumach*—native, Lapham; Cook county, Babcock.
aromatica, *Fragrant Sumach*,—native. Lapham; Fulton county, St. Clair county, Brendel; Cook county, Babcock.
Sumach is extensively used in tanning and coloring, and the staghorn and smooth sumach have been much generally sought for the purpose in America. (See report of department of agriculture, 1869, p. 230.) In 1872, 12,000 lbs were shipped from Missouri, and it is supposed that the growing and gathering of sumach may yet become an important industry in the United States.

VITACEÆ—VINE FAMILY.

VITIS, *Grapevine:*
vinifera—European grape. Some varieties nearly hardy under favorable conditions.
labrusca, *Northern Fox Grape*, Champaign county—the original of the catawba, Isabella, Concord, Hartford Prolific, cultivated from eastern states.
æstivalis, *Summer Grape*—the parent of the northern Virginian, Herbemont, Alvey, etc., native, Lapham.
var? cinerea, Engelm—River banks, Fulton county, Wolf; Menard, Hall, and Southward.
cordifolia. *Winter or Frost Grape.* Native, Lapham; Cook county, Babcock,
riparia—native, Lapham. Dr. Engelman believes this to be the parent of Taylor's bullet, Delaware and Clinton.
vulpina—*Muscadine, Bullace or Southern Fox Grape.* Native, Vasey. The original of the Scuppernong, etc. Can only be found in extreme south.
indivisa—native. Vasey.
bipinata—native. Vasey.
heterophylla. Cultivated from Japan for ornamental variegated foliage. Hardy.

WINE PRODUCTION—MOSTLY FROM THE GRAPE.

	UNITED STATES.	ILLINOIS.
1850—gallons	221,249	2,997
1860—gallons	1,627,192	50,690
1870—gallons	3,092,330	111,882

AMPELOPSIS, *Virginia Creeper.*
quinquefolia, *American ivy*—native, Lapham; Cook county, Babcock; Champaign county. Cultivated for ornament.
tricuspidata. Cultivated. One of the very best, hardy climbers, called vetchii.

RHAMNACEÆ—Buckthorn Family.

RHAMNUS—Trees and Shrubs.
alnifolius, L'Her.—swamps—Peoria county, Brendel, McHenry, Vasey. Rare.
catharticus, *Common Buckthorn*—cultiuated from Europe.
lanceolatus—native, Lapham; Fulton county, Peoria, Menard and St. Clair counties, Brendel.

CEANOTHUS, *New Jersey tea, Red Root.*
Americanus—native, Lapham; Fulton county, Cook county, Babcock; Champaign county. Leaves used for tea.
ovalis—native north. Rare, Bebb, Vasey. Champaign county.
intermedius—native, Vasey.

FRANGULA—
Carolina, Gray, *Alder Buckthorn*—river banks, south, Jackson county, Vasey, Union, Wolf, Pulaski, Burrill.

CELASTRACEÆ—Staff Tree Family.

CELASTRUS—
scandens, *Wax Work, Climbing Bitter Sweet*, native, Lapham; Cook county, Babcock; Champaign, Fulton county, Wolf. Cultivated for ornament.

EUONYMUS *Spindle Tree.*
atropurpureus, *Burning Bush, Wahoo*—native. Lapham; Cook county, Babcock; Champaign county. Cultivated for ornament.
americanus, *Strawberry Bush*—native. Lapham; Cook county, Babcock; Fulton county, Wolf.
var. obovatus—native. Lapham, Champaign county.

SAPINDACEÆ—Soap Berry Family.

STAPHYLEA, Upright Shrubs.
trifolia, *American Bladder Nut*—native, Lapham; Cook county, Babcock; Champaign county.

CARDIOSPERMUM, *Balloon Vine, Heart Seed.*
halicacabum—native. Lapham. Climbing herb, cultivated in gardens.

KŒLREUTERIA—tree.
paniculata—cultivated for ornament from Asia.

ÆSCULUS, *Horse Chestnut, Buckeye.*
hippocastanum—Small tree. Cultivated from Asia, for ornament. Does not thrive on the Illinois prairies, says Bryant.
rubicunda—cultivated for ornament from Asia.
glabra, *Fetid or Ohio Buckeye*—native, Lapham, Fulton county, Wolf; Champaign county. Of some value as an ornamental tree, only.
flava, *Sweet Buckeye*—native, Lapham. Of some value for ornament.

ACER, *Maple Trees and Shrubs.*
pseudo platatus. *Sycamore Maple*—cultivated for ornament from Europe. "Rather a coarse growing tree with stiff branches. The tree is not likely to be noticed by any but amateurs." Bryant.
platanoides—*Norway Maple.* Cultivated from north of Europe for ornament. "As an ornamental tree it has some advantages over the sugar maple; its foliage is more dense; its leaves appear earlier in spring and retain their verdure later in the fall, but in the production of sap and the quality of its timber, it is infetior to the American tree."—Bryant.
circinatum and macrophyllum are Oregon and California species, probably cultivated here, but I know of no experience in Illinois.
saccharinum—*Rock or Sugar Maple.* Fonnd native probably in all or nearly all the counties of the state. Maple sugar was returned in the census of 1870, from sixty counties, to the amount of 136,873 pounds, which was a slight increase over 1860, but less than was made by 15 other states. The counties producing the greatest quantity were Clark, Edgar, Hancock, Menard, Schuyler and Vermilion.

YEAR.	PRODUCTION.	UNITED STATES.	ILLINOIS.
1850	Maple sugar, pounds	34,253,436	248,904
1860	" " "	40,120,205	134,195
1870	" " "	28,443,645	136,873
1860	" molasses, gallons	1,597,589	20,048
1870	" " "	921,057	10,378

saccharinum var. nigrum, Gray. *Black Sugar Maple.* Hancock county, Mead and Southward. This tree comes into leaf in Champaign county ten days earlier than the ordinary sugar maple.
dasycarpum, *White or Silver Maple*—is also native throughout the state, and largely cultivated for ornament and its rapid growing timber, although it has some serious

faults in its liability to injury by the flat-headed borer, and by high winds, which shatter its brittle branches. But it propagates by seed easily, transplants readily, grows rapidly, and is valuable both for firewood and cheap lumber.

rebrum, *Red or Swamp Maple*—native. Lapham; Cook county, Babcock. Bryant says: "I have never found it in central or northern Illinois, although it is said to grow in some localities. Further south it is more common." A beautiful ornamental tree. Mr. Ridgeway measured one near Mt. Carmel 108 feet high and 11¼ in circumference.

NEGUNDO, *Ash-leaved Maple, Box-elder.*

aceroides—native and common in most parts of the state. Planted for ornament, wood, and perhaps for sugar.

POLYGALACEÆ—Polygala Family.

POLYGALA, *Milkwort.* Low plants.

incarnata—native. Lapham.
sanguinea—native. Lapham, Cook county, Babcock.
cruciata—native. Vasey, Cook county, Babcock.
verticillata—native. Lapham; Cook county. Babcock.
ambigua—native, Lapham.
senega, seneca snake root—native. Lapham, Brendel; Cook county, Babcock.
var. latifolia, T. and G.—native
polygama—native. Lapham, Cook county, Babcock.
paucifolia, Willd—Cook county, Hill. Rare.

LEGUMINOSÆ—Pulse Family.

LUPINUS, *Lupine*—mostly herbs.

perennis, wild lupine—native, Bebb, Vasey; Cook county, Babcock.
polyphyllus—cultivated for ornament from Oregon and California. Hardy perennial.
mutabilis—cultivated as an annual from South America.
densiflorus—cultivated from California.
albus—cultivated from Europe.
hirsutus—cultivated from Europe,
luteus—cultivated from Europe.

CROTALARIA, *Rattlebox.*—herbs.

sagittalis—native. Lapham, Brendel.

CYTISUS or SAROTHAMNUS.—*Broom.*

scoparius, *Scotch Broom.*—Shrub cultivated from Europe. Not hardy.

LABURNUM.—Low tree.

vulgare—*Common Laburnum—Golden Chain—Bean Trefoil Tree.* Cultivated for ornament. Not quite hardy at Alton.

MEDICAGO, *Medick.*

sativa—*Lucerne, Alfyfa* or *Spanish Trefoil.* Cultivated for green fodder. Perennial. This plant, though early introduced into the United States, for some reason, does not get into general use like the red clover in the northern states. It appears to be more cultivated in the south. Its value as a forage plant is about equal to that of red clover.

MELILOTUS, *Melilot, Sweet Clover.*

alba, *White Melilot, Bokhara or Tree Clover*—adventive. Sometimes cultivated in gardens and for green fodder. Annual or biennial.

TRIFOLIUM, *Clover, Tree Foil.*

arvense, *Rabbit-foot or Stone Clover*—native, Vasey; Tazewell county, Brendel.
pratense, *Red Clover*—short-lived perennial. Adventive from Europe, and cultivated for pasture, forage, hay and as a fertilizer. Especially valuable on the solvent soils in the southern part of the state.
reflexum, *Buffalo Clover*—annual or biennial. Native, Gray; Cook county, Babcock.
stonloniferum, *Running Buffalo Clover*—native. Lapham.
repens, *White Clover*—native. Lapham, Cook county, Babcock. "But this is generally introduced though indigenuous northward," says Gray.
procumbens—naturalized from Europe. Lapham.

PETALOSTEMON, *Prairie Clover.*

violaceus—native, Lapham. Cook county, Babcock. Champaign, Macauley.
foliosus, Gray—Kane county, Truesdell; Kankakee, Hill. But few specimens found.
candidus—native, Lapham. Cook county, Babcock. Champaign, Macauley.

DALEA—mostly herbs.

alopecuroides—native, Lapham. Cook county, Babcock.

AMORPHA, *False Indigo, Shrubs.*

fruticosa—*False Indigo.* Native, Lapham. Cook county, Babcock. Fulton county, Wolf.
canescens, Nutt—very common on prairies and barrens. Champaign county.

PSORALEA—perennial herbs.

onobrychis—native. Lapham.
melilotoides—native. Lapham.
floribunda—native. Lapham, Cook county, Babcock.

ONOBRYCHIS—*Sainfoin.*

sativa—cultivated from Europe as a fodder plant. Not hardy north.

STYLOSANTHES, *Pencil Flower*, perennial.
elatior, native. Gray.

LESPEDEZA, *Bush Clover*, perennials.
procumbens, native, Lapham.
repens, native, Lapham.
violacea, native, Lapham; Cook county, Babcock.
(The varieties divergens, sessiliflora and angustifolia are all found in the state.)
hirta, native. Vasey.
capitata, native Lapham; Cook county, Babcock; Champaign county.
(Var. augustifolia, Gray, Winnebago county, Bebb; McHenry, Vasey; Hancock, Mead.)

DESMODIUM, *Tick Trefoil*, perennial herbs.
nudiflorum, native, Lapham; Cook county, Babcock.
acumiuatum, native, Lapham; Cook county, Babcock; Champaign, Macauley.
pauciflorum, native, Lapham.
canescens, native, Lapham; Champaign county.
cuspidotum, native, Lapham; Champaign county, Macauley.
verihiflorum, native, Lapham.
dillenii, native south, Lapham.
paniculatum, native, South. Lapham; Champaign county, Macauley.
canadense. native, Lapham; Cook county, Babcock; Champaign, Macauley.
sessiflorum, native, Lapham; Cook county, Babcock.
rigidum, native, Lapham.
ciliare, native, Vasey; St. Clair county, Brendel.
marilandicum, native, Vasey; St. Clair county, Brendel.
rotundifolium, D. C., Jackson county, Vasey; Union, Forbes.
illinoense, Gray, Marion county, Bebb; and frequent northward, Patterson.

CORONILLA.—Perennial.
varia—cultivated from Europe for ornament. Hardy herb.

ARACHIS, *Pea-nut, Ground-nut.*
Hypogæa—cultivated from South America for the nut-like pods, and for forage further south. This plant can be and is grown in the south part of the state, but the climate seems to be too cold for its profitable production. Southern Virginia and Tennessee are more successful.

GALACTIA.
mollis, Michx. Jackson county and southward, Forbes.

TEPHROSIA, *Hoary Pea.* Perennial herbs.
virginiana *Goats Rice, Catgut*, native, Lapham; Cook county, Babcock.

ROBINIA, *Locust Tree*, trees and shrub.
pseudacacia, *Common Locust*, native south, Lapham: Randolph county, Brendel; Vasey; Champaign county. Native only in some of the southern counties, though introduced nearly everywhere. Cultivated for ornament and its rapidly grown durable wood; but has been to a considerable extent discarded on account of its destruction by the borer and its troublesome tendency to sprout. On our white or forest soils however, it seems to be nearly free from the attacks of the borer and will be grown as a timber tree.
hispida, *Rose Acacia*, ornamental shrub cultivated from the south.

COLUTEA, *Bladder Senna.*
arborescens, cultivated from Europe.
cruenta, *Oriental Bladder Senna*, cultivated for ornament. Not quite hardy.

ASTRAGALUS, *Milk Vetch*, perennials.
mexicanus, native, Lapham.
plattensis, native, Vasey; Bebb.
canadensis, native, Lapham; Mason county, Mead; Champaign county.
distortus, T. and G, Mason county, Mead, Bebb; Menard county, Hall.

WISTARIA, *Woody Twiners.*
frutescens, *American Wistaria*, native south, Lapham. Worthen describes one in Randolph county four inches in diameter of the stem. Prof. Swallow measured one in Mississippi county. Mo., four inches in diameter and seventy-five feet long.
sinensis, cultivated from China or Japan in considerable variety. Not quite hardy North.

APIOS, *Ground Nut, Wild Bean.*
tuberosa, native, Lapham; Cook county, Babcock; Champaign county, Macauley.

PHASEOLUS, *Bean, Kidney Bean.*
perennis, *Wild Bean*, native, Lapham.
diversifolius, annual, native, Lapham; Cook county, Babcock; Champaign county.
helvolus, perenial, native, Lapham; Cook county, Babcock.
pauciflorus, annual, native, Lapham.
vulgaris, *Common Kidney, String and Pole Bean*, cultivated for food, etc., from East Indies in great variety. Tender annual.
nanus, *Dwarf or Field Bean*, perhaps a variety of last.
lunatus, *Lima Bean, Sieva Bean*, etc.
multiflorus, *Spanish Bean, Scarlet Runner*, cultivated for ornament, but is edible.

Illinois produced in 1870, 115,854 bushels of peas and beans, ranking fourteenth as compared with other states. Franklin, Randolph, Hamilton and Perry counties stand first in their production; but this may include castor beans—very distant relations, botanically.

Year.	Production.	United States.	Illinois.
1850	Peas and beans, bushels	9,219,901	82,814
1860	" "	15,061,995	108,028
1870	" "	5,746,027	115,854

DOLICHOS, *Black Bean.*
lablab, *Egyptian, or Black Bean*, cultivated from India for ornament and food.
sinensis, *China Bean, Black Eyed Bean.*

AMPHICARPÆA, *Hog Peanut*, perennial twiner.
monoica, native, Lapham; Cook county, Babcock; Champaign county.

CLITORIA, *Butterfly Pea*, erect or twining perennials.
mariana, native, Lapham.

PISUM, *Pea.*
sativum, cultivated in variety from the Old World (Crimea?)

LATHYRUS, *Vetchling*, native perennials.
odoratus *Sweet Pea*, cultivated from Europe for ornament. Annual.
latifolius, Perennial Climber cultivated from Europe for ornament.
maritimus, *Beach Pea*, native, Vasey; Cook county, Babcock.
vernosus, native, Lapham; Cook county, Babcock.
ochroleucus, native, Vasey; Cook county, Babcock.
palustrii, *Marsh Vetchling*, native, Vasey, Bebb; Cook county, Babcock; Peoria county, Brendel.
var myrtifolius, Cook county, Babcock.

VICIA, *Vetch Tare.*
americana, native, Vasey; Cook county, Babcock: Peoria county, Brendel.
caroliniana, native, Vasey; Cook county, Babcock.
sativa, *Common Vetch or Tare*, sometimes cultivated for fodder. From the Old World.

FABA, *Bean of England, or Horse Bean.*
vulgaris, cultivated for the table from Egypt, but not much used in America.

LENS, *Lentil*, annual.
esculenta, cultivated from Europe for fodder and food, but only rarely.

CICER, *Chick Pea*, annual.
arietinum, called *Coffee Pea*, cultivated for food and used as substitute for coffee.

BAPTISIA, *False Indigo*, perennial herbs.
tinctoria, *Wild Indigo*, native, Cook county, Babcock; St. Clair county, Brendel.
australis, *Blue False Indigo*, native, Vasey.
leucantha, native, Lapham; Cook county, Babcock; Champaign county.
leucophæa, native, Lapham; Cook county, Babcock; Champaign county.

CLADRASTIS, *Yellow Wood*—tree.
tinctoria (also Virgilia lutea), cultivated for ornament from the south.

SOPHORA, tree.
japonica, cultivated for ornament from China and Japan. "Said to equal the locust in durability and to be as hard and compact as the box. Makes slow progress in the rich loam of the Illinois praries, its growth being checked by mildew on the young shoots. In favorable situations it grows rapidly." Bryant.

CERCIS, *Red-Bud, Judas-Tree.*
canadensis, *American Red-Bud*, native from Pope county to Cook, and probably throughout the state. [See Lapham and Babcock's lists, and the geological survey.] Planted for ornament. Prof. Swallow measured a specimen in Mississippi county, Mo., thirty feet high and two feet in diameter.
siliquastrum, *European Red-Bud* or *Judas-Tree*, "Much resembles the American species, but is said to be inferior in beauty. I have never seen it flower, as it is not hardy in Northern Illinois." Bryant.

CASSIA, herbs.
marilandica, *Wild Senna*, native, Lapham; Champaign, Macauley.
obtusifolia, native south, Vasey.
chamæcrista, *Large-flowered Sensitive* or *Partridge Pea*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
nictitans, *Wild Sensitive Plant*, native, Lapham.

GYMNOCLADUS, *Kentucky Coffee Tree.*
canadensis, native in Madison, Hancock, Jersey, Fulton, Cook and probably many other counties. I am puzzled to find it so little mentioned in the southern counties as a valuable ornamental tree, and if grown in quantity would be so probably for its timber.

GLEDITSCHIA, *Honey Locust.*
triacanthos, *Three Thorned Acacia* or *Honey Locust*, native in Randolph, St. Clair, Madison, Hancock, Hardin, Fulton, and probably most other counties of the State, cultivated for ornament and recommended in Iowa and elsewhere as a hedge plant. Its wood, in my observation, is not durable, but grows rapidly. Bryant says it sometimes attains a diameter of three or four feet and a height of eighty or one hundred. Prof. Swallow measured one in Howard county, Mo., 125 feet high and 13 feet in circumference.
sinensis, cultivated from China, for ornament.
monosperma, *One Seeded* or *Water Honey Locust*, native south, Lapham, Vasey; Wabash county, Ridgeway; 80 feet high and 8 feet around in New Madrid county, Swallow.

MIMOSA, *Sensitive Plant*, annual.
pudica, cultivated for ornament, from South America.
SCHRANKIA, *Sensitive Brier*, annual.
uncinata, native, Vasey.
DESMANTHUS, herbs.
brachylobus, native, Lapham,

ROSACEÆ—Rose Family.

PRUNUS, *Almond, Peach, Apricot, Plum, Cherry.*

(Amygdalus) nana, *Dwarf or Flowering Almond*, cultivated for ornament from Asia.

(Amygdalus) communis, *Common Almond*, the hard-shelled varieties are nearly as hardy as the peach, and produces nuts certainly as far north as 39 deg. in Illinois. Cultivated from Asia, and according to Darwin (see animals and plants under domestication, vol. 1, page 406) and others, is probably the parent of the peach.

(Amygdalus) persica, *Peach*, cultivated from Asia for its fruit and for ornament. Its native country is supposed to be China or Japan, and it is mentioned by Confucius in the tenth century before Christ. No wild type of it can be found, and it seems doubtful whether in the early part of the historical period it produced an edible fruit, and probable that it was cultivated for its ornamental blossoms rather than its fruit. It is now in general cultivation in nearly all parts of the world suitable for its growth. In Illinois, in the early settlement of the country, it was stated that the peach was grown, with considerable success, to the northern line of the state, and it is by no means uncommon when a succession of trees is kept up to secure a crop now as often as once in three years. The increased extremes of climate that seem to result from cultivation, and the consequent denundation of the surface of the country, have made the fruiting and even the life of the trees more precarious and only those more fond of the fruit. or persistent of success continue to plant trees.

var. lævis, *Nectarine*, is a variety of the peach with smooth skin and peculiar flavor.

armeniaca, *Apricot*, cultivated from Amenia for its fruit, and certain varieties for ornament. It is much less grown than it deserves to be, considering that the tree is as hardy and hardier than the peach, and the blossoms and buds not much more commonly killed.

domestica, *Garden Plum*, cultivated from Europe or Asia for its fruit. There are also ornamental varieties.

insititia, *Bullace Plum*, cultivated from Europe as a stock. Ornamental varieties.

spinosa, *Sloe* or *Blackthorn*—the supposed original of the two last, and like them, cultivated from Europe. It has ornamental varieties, highly prized in China and Japan, Loudon.

americana, *Wild Red* and *Yellow Plum*, native in most parts of the State. The hardiest of all plums, and more or less cultivated. Promises to become valuable in its selected varieties.

chicasa, *Chickasaw Plum*, native, Lapham, Vasey; and cultivated. This is the parent of the Wild Goose, Miner and other varieties. It is not exempt from the attack of the curculio, but is less injured by them than are the varieties of the garden plum.

cerasus, *Garden Red Cherry*, cultivated from Europe for its fruit, of which the Morello and Early Richmond are varieties. These succeed upon our prairie soils mainly, I believe, because they have more spreading roots and do not strike into the sub-soil so deeply and grow less rapidly than the sweet cherries.

avium, *Bird Cherry of Europe*, cultivated from Europe for fruit, and ornament in the double-flowered varieties. The progeniter of the sweet cherries and perhaps of the last named. The finer cherries that come under this class very generally fail on the rich prairie soils, and succeed best in the loose soil of the river bluffs of the Mississippi and Illinois.

pennsylvanica, *Wild Red Cherry*, native only in the north, says Dr. Vasey ; but I find it noted as in Wabash county. This is probably a mistake. The only wild cherry on which tame varieties will "take."

pumila, *Dwarf Cherry*, native, Vasey ; Cook county, Babcock. This variety is recommended for trial under cultivation, by Fuller. Described and figured in the Agricultural Department report for 1870 as a plum used by the Indians of the southwest for food. In the report of the American Pomological society for 1873, there is described as existing in Utah "a new hybrid cherry (a cross between the wild plum and Utah sand cherry)," which may be an improved variety.

serotina, *Wild Black Cherry*, native in many counties—Cook, Hancock, Wabash, Champaign, etc., and probably throughout the state. Cultivated for ornament, and valuable for lumber.

virginiana, *Choke Cherry*, native, Lapham; Cook county, Babcock ; Champaign county, Macauley ; Wabash county, Ridgeway ; Fulton county, Wolf.

padus, *Small Bird Cherry* of Europe. Sometimes cultivated.

SPIRÆA, *Meadow Sweet*, Hardy shrubs or perennial herbs. Ornamental. Great variety.
opulifolia, *Nine Bark*, native, Lapham; Cook county, Babcock.
salicifolia, *Common Meadow Sweet*, native, Lapham; Cook county, Babcock ; St.Clair county, Brendel.
tomentosa, *Hardhack or Steeplebush*, native, Lapham; Cook county, Babcock.
douglasii, cultivated for ornament from Oregon.
callosa, cultivated from Japan.
ariæfolia, cultivated from Oregon.
bella, cultivated from Nepal.
chamædrifolia, cultivated from Europe and Siberia.

trilobata, cultivated from Siberia.
lanceolata or reevesiana, cultivated from China.
hypericifolia, *Italian May* or *St Peter's Wreath.*
prunifolia, cultivated from Japan.
sorbifolia, cultivated from Siberia.
aruncus, *Goatsbeard*, native south, Lapham.
filipendula, *Dropwort*, cultivated from Europe.
ulmaria, *English Meadow Sweet*, cultivated from Europe.
lobata, *Queen of the Prairie*, native, Lapham; also in cultivation.

GILLENIA, *Indian Physic, American Ipecac.*
stipulacea, native, Lapham.

KERRIA, ornamental shrubbery plant.
japonica, *Corchorus*, not hardy.

GEUM, *Avens*, Perennials.
vernum, native, Lapham.
rivale, L., Kane county, Vasey; McHenry, Miss Holmes. Rare.
strictum, *Field Avens*, native, Bebb, Vasey; Champaign county, Macauley.
virginianum, native, Lapham, Champaign county.
album, native, Vasey; Cook county, Babcock; Champaign, Macauley; St. Clair Brendel.
macrophyllum, native, Vasey.
triflorum, native, Vasey, Bebb.

POTENTILLA, *Cinquefoil, Five Finger.*
norvegica, *Norway Cinquefoil*, native, Lapham; Cook county, Babcock; Champaign. Macauley.
arguta, Pursh, on prairies, Menard county, Hall, Champaign county and northward.
paradoxa, native, Lapham, Vasey.
recta, cultivated?, from Europe.
canadensis, native, Lapham; Cook county, Babcock; Champaign, Macauley.
anserina, *Silver Weed*, native, Vasey; Cook county, Babcock.
fruticosa, native, Lapham; Cook county, Babcock. Cultivated.
palustris, *Marsh Five Finger*, native, Vasey; Cook county, Babcock.
nepalensis, cultivated for ornament from the Himalaya.

FRAGARIA, *Strawberry.*
vesca, native, Vasey; Cook county, Babcock. Found only in the north, also European. Original of the wood and alpine varieties. Not much cultivated.
elatoir, *Hautbois*, the original of a few varieties. Not much cultivated, from south of Europe.
virginiana, native, throughout the prairies of the State, at least. Supposed original of the American Scarlet.
var. illinoensis, perhaps the original of Hovey's Seedling, Boston Pine, etc.
chilensis, cultivated from Pacific coast. Original of the pine apple and other varieties.

As in the case of other fruits, varieties under cultivation come to differ so much from any original species that they connot be referred.

RUBUS, *Bramble.*
idæus—*Garden Raspberry* cultivated from Europe, but generally not hardy. Adventive, Vasey.
triflorus, Richard; Kane county, Miss Holmes; Cook county, Vasey and Babcock.
hispidus, L. Kankakee county, Hill; Cook, Babcock.
strigosos. *Wild Red Raspberry*, native, Vasey; Cook county, Babcock; Champaign county.
occicentalis, *Wild Black Raspberry, Thimbleberry, Black Cap*--native in many, perhaps in all parts of the state, and under extensive cultivation for market at Collinsville and other points.
villosus, *High Blackberry*, native throughout the state, and in cultivation as new Rochelle or Lawton, Kittantiny and other varieties.
canadensis, *Low Blackberry or Dewberry*, native in most parts of the State. A valuable fruit that I have never known under cultivation. The Wilson's early blackberry is supposed by some to be a hybrid of the high and low blackberry.

AGRIMONIA, *Agrimony*, weedy perennials.
eupatoria, native, Lapham; Cook county, Babcock; Champaign county.
parviflora, native, Lapham; Champaign county.

POTERIUM, *Burnet*,
sanguisorba, cultivated from Europe.
canadense, native, Lapham.

ROSA, *Rose*, shrubs.
setigera, *Climbing Wild Rose, Prairie Rose*, native, Lapham; Fulton county, Wolf; Peoria and St. Clair counties, Brendel. Also cultivated, and partly the original of the Queen of the Prairie, Baltimore Belle, etc.
carolina, *Swamp Rose*, native, Lapham; Cook county, Babcock; St. Clair county, Brendel.
lucida, *Dwarf Wild Rose*, native, Lapham; Cook county, Babcock; Champaign county. Macauley; St. Clair county, Brendel; Fulton county, Wolf.
blanda, *Early Wild Rose*, native, Vasey; Winnebago, Peoria, St. Clair, Brendel; Cook county, Babcock.
rubiginoso, *Sweet Brier Rose*, naturalized from Europe, Vasey.
sempervirens, Ayrshire rose is a form of it. Cultivated from Europe.
moschata, *Muscat, or Musk Rose*, cultivated from Asia.
multiflora, cultivated from Japan and China. Probably not hardy in the north.
banksiæ, cultivated from China. Not hardy.
indica, India or China roses, includes the Tea, Perpetual or Bengal, Bourbon and

Noisette roses, and the Bengal pompons, etc., are minature forms of similar origin.
gallica, French, or Province red roses, cultivated from south of Europe. Very hardy.
centifolia, *Hundred-leaved, or Cabbage Rose*, perhaps derived from preceding. Pompon roses are miniature varieties. Moss roses are abnormal states. Used for rose water, essence of roses, etc.
damascena, *Damask Rose*, cultivated from Asia, and preferred for attar of roses, and rose water.
alba, *White Rose*, cultivated from Europe.
spinosissima, *Burnet or Scotch Rose*, cultivated from Europe.
sulphurea, cultivated from Asia.
"The greater part of the modern garden roses too much mixed by crossing and changed by variation to be subjects of botanical study." Gray.

CRATÆGUS, *Haw Thorn, White Thorn*, small trees or shrubs, with hard wood.
pyracantha, *European Thorn*, cultivated for ornament from Europe.
cordata, *Washington Thorn*, planted from the Atlantic States for ornament, and occasionally as a hedge plant.
oxyacantha, *English Haw Thorn*, cultivated for ornament from Europe.
arborescens, Union and Alexander counties, Wolf.
coccinea, *Scarlet Fruited Thorn*, native, Lapham; Vasey, Cook county, Babcock; Fulton county, Wolf; Wabash county, Ridgway; Champaign county.
tomentosa, *Black or Pear Thorn*, native, Fulton county, Wolf; Champaign county, Macauley; Cook county, Babcock; Wabash county, Ridgway. This species, Gray thinks, susceptible of valuable development. It is eaten fresh by the Indians, and mixed with choke cherries and service berries, which are bruised, then pressed into cakes for winter use.
var. flabellifolia—Wolf.
var. pyrifolia, Fulton county, Wolf.
var. punctata, Fulton county, Wolf.
var. mollis, Fulton county, Wolf; Champaign.
crus-galli, *Cockspur Thorn*—native, Lapham; Fulton county, Wolf; Wabash county, Ridgway; Champaign county.
flava, *Summer Haw*,, native, Wabash county, Ridgway.
"All the tribe are highly ornamental, small trees, whether considered in flower, fruit or foliage."—Thomas Meehan.

COTONEASTER, hardy shrub.
vulgaris, cultivated from Europe for ornament.

AMELANCHIER, *June Berry. Service Berry.*
canadensis, native, Lapham; Cook county, Babcock; Fulton county, Wolf; Wabash county, Ridgeway; Champaign county. The service berry is no doubt susceptible of improvement to the extent of becoming a valuable fruit. "This shrub grows in the mountains of California, Oregon, Utah and Alaska, and the berries are eaten both fresh and dried for winter use, by all the Indians. They are used by white settlers also, who call them shad berries. They are good when fresh, and when dry have an agreeable taste, are excellent for mixing with pemican (preserved meat) and when boiled in broth of fat meat, are a dainty dish and used in all the Indian feasts." Rep. Dept. Agr., 1860.
The varieties botryapium, oblongifolia, rotundifolia, and alnifolia all occur in this State.

PYRUS, *Pear, Apple, Chokeberry, Rowan, Quince.*
communis, Pear, cultivated from Europe for its fruit. In Minnesota, its existence, since the severe winter of 1871-2, has been precarious, and it can hardly be called hardy in Minnesota or southern Illinois. The Flemish Beauty is the hardiest of the well-known varieties. In southern Illinois, it blights worse from the more favorable conditions of fungus growth. The native habits and habitats of the pear are worth noticing. "The plant," says Loudon, "is always found on a *dry soil*, and more frequently on plains than on hills and mountains. * * According to Withering, it grows in hedges and woody wastes. It loves, he says, a fertile soil and sloping grounds, and will not thrive well in wet bottoms.
malus, *Common Apple*, cultivated from Europe. This is a hypothetical species; as, unlike the pear, the apple cannot be referred, with any confidence, to any wild original. It is commonly referred to the wild crab of Europe, but by some to the Asiatic sorts, and by some to several species.
spectabilis, *Chinese Flowering Apple*, cultivated for ornament from China.
prunifolia, *Siberian Crab Apple*, cultivated from Asia. for fruit and ornament.
coronaria, *American Wild Crab Apple*, native through all the prairie counties, and probably throughout the state. The Soulard Crab seems to be an enlarged and improved variety, I have heard of variations or hybrids in Madison, Mercer and Clark counties.
angustifolia, *Narrow Leaved Crab*, perhaps only a variety of the last, native, Washington county, Vasey.
arbutifolia, *Choke-berry* native. Cook county, Babcock.
Americana, *American Mountain Ash*, native. Tazewell county, Brendel; cultivated for ornament.
aucuparia, *European Rowan Tree*, or *Mountain Ash*—cultivated for ornament, from Europe.

CYDONIA, *Quince.*
vulgaris, cultivated from the Levant for its fruit. Not hardy in the north part of the state.
japonica, *Japan Quince*—cultivated from Japan for ornament and may be used for hedges. Tender north.

SAXIFRAGACEÆ—Saxifrage Family.

RIBES, *Currant, Gooseberry.*
grossularia, *Garden* or *English Gooseberry*, cultivated for fruit from Europe but liable to mildew in most of its varieties.
hirtellum, native, Vasey; Cook county, Babcock; Chambaign county. Houghton's Seedling is of this species. Fuller.
rotundifolium, native, Lapham; Cook county, Babcock; Fulton county, Wolf; Madison county. Champaign. Cultivated somewhat.
cynobasti, native, Vasey; north, Bebb.
lacustre, *Swamp Gooseberry*, native. Grundy county, Brendel; Champaign county.
rubrum, *Red and White Currant*, cultivated from Europe, but is native north of our state.
floridum, *Wild Black Currant*—native. Lapham; Cook county, Babcock; Fulton county, Wolf; Champaign county, Macauley.
nigrum, *Garden Black Currant*, cultivated from Europe.
sanguineum, *Red-flowered Currant*, cultivated for ornament from Oregon and California.
aureum, *Golden, Buffalo or Missouri Currant*, native, Vasey; or introduced, Gray; cultivated for ornament.

PHILADELPHUS, *Mock Orange, Syringa*, ornamental shrubs.
coronarius—cultivated for ornament, probably from Japan.
latifolius—cultivated.
gordonianus—cultivated from Oregon for ornament.

DEUTZIA, flowering shrubs from Japan and China. Cultivated for ornament.
gracilis, often found in green houses.
crenata, common in cultivation.
scabra, seldom cultivated. Not hardy north.

HYDRANGEA, house plants turned out for summer.
hortensia, *Common Hydrangea*, cultivated from China and Japan.
quercifolia, cultivated from Georgia.
aboresens, native. Lapham; Fulton county, Wolf; Peoria and St.Clair counties, Brendel.

PARNASSIA, *Grass of Pyrnassus*, perennials.
carolinana, native, Lapham; Cook county, Babcock; Champaign county.
palustris, native, Lapham.

HEUCHERA, *Alum Root*, perennial.
americana, *Common Alum Root*, native, Lapham.
hispida, native, Lapham; Cook county, Babcock.
rugellii, Shuttlew, Union county, Forbes; Jackson; French.

SAXIFRAGA, *Saxifrage.*
forbsii. Vasey, Jackson county, Forbes; Union, Vasey.
pensylvanica, *Swamp Saxifrage*, native, Vasey; north, Bebb; Cook county, Babcock.
crassifolia, cultivated from Siberia, for ornament.
sarmentosa, *Beefsteak Saxifrage Strawberry Geranium*, cultivated as a house plant, from China and Japan. Not quite hardy north.
japonica, perennial

MITELLA, *Mitre Work, Bishop's Cap.*
diphylla, native, Vasey; common, Brendel; Cook county, Babcock.

CRASSULACE—Orpine Family.

PENTHORUM, *Ditch Stone Crop*
sedoides, native, Lapham; Cook county, Baccock; Champaign county, Macauley.

SEMPERVJVUM, *House Leek.*
tectorum, cultivated from Europe.

SEDUM, *Stone Crop, Orpine*, perennials.
sieboldii, cultivated from Japan for ornament. Not hardy.
ternatum, native, Lapham.
telephium, *Garden Orpine, Live Forever*, cultivated from Europe.
acre, *Mossy Stone Crop* or *Wall Pepper*, cultivated from Europe for edging, etc.
pulchellum, native, Gray.
carneum variegatum, cultivated for borders, origin unknown.

HAMAMELACEÆ—Witch Hazel Family. Shrubs or Trees.

HAMAMELIS, *Witch Hazel.*
virginia, native, Vasey; north, Bebb; Wabash county, Ridgeway.

LIQUIDAMBAR, *Sweet Gum Tree* or *Bilsted.*
styraciflua. native, Lapham; Randolph, Johnson, Pulaski, Massac, Pope, Alexander, Union, Jackson, Perry, Jefferson and Wabash (Geological Report, &c.). Mr. Ridgeway measured a tree near Mt. Carmel, 144 feet high, with a trunk of 70 feet, and a girth of 17 feet. Prof. Swallow measured one in Cape Girardeau county, Mo., 130 feet high, and 15 feet in circumference. Cultivated for ornament. Grows as far north as Massachusetts on the Atlantic, but does not seem to extend north of Randolph county in Illinois.

HALORAGEÆ—Water Milfoil Family. Aquatic Plants.

MYRIOHPYLLUM, *Water Milfoil.*
heterophyllum, native, Lapham.
verticillatum, native, Vasey.
spicatum L., McHenry county, Vasey.
scabratum, Nutt; Henderson county, Patterson; Menard, Hall; Franklin, Forbes.
ambiguum, Nutt; Var. capillacium, Gray. Wabash county, Schenck.

PROSERPINACA, *Mermaid-Weed.*
palustris, native, Cook county, Babcock.

HIPPURIS, *Mare's Tail.*
vulgaris, native, Vasey.

ONAGRACEÆ—Evening Primrose Family. Herbs and Shrubs.

CIRCÆA, *Enchanter's Nightshade.*
lutetiana, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
alpina, native, Vasey; Cook county, Babcock.

GAURA.
lindheimeri, cultivated for ornament from Texas. Nearly hardy.
biennis, native, Lapham; Cook county, Babcock.
filipes, native, Vasey; St. Clair county, Brendel.
paniflora, Cook county, Babcock.

EPILOBIUM, *Willow Herb.*
palustre, native, Lapham; Cook county, Babcock.
var. lineare, Gray; Menard county, Hall and northward.
angustifolium, *Great Willow Herb* or *Fire Weed*, Champaign county, native, Vasey.
molle, native, Vasey.
colaratum, native, Vasey; Cook county, Babcock.

ZAUSCHNERIA, perennial.
californica, cultivated for ornament, from California.

CLARKIA, annual herbs.
pulchella, cultivated for ornament, from Oregon.

EUCHARIDUM, annual.
concinnum, cultivated for ornament, from California.

ŒNOTHERA, *Evening Primrose.*
bietnis, *Common Evening Primrose*, native, Lapham; Cook county, Babcock; cultivated for ornament in many varieties, the finest of which is lamarckiana.
rhombipetala, native, Lapham.
drummondii, cultivated from Texas.
sinuata, native, Lapham.
triloba, cultivated from Arkansas.
missouriensis, cultivated from Missouri and Texas.
taraxicifolia, cultivated from Chili.
speciosa, cultivated from Arkansas and Texas. Not hardy north.
albicaulis, native, Vasey. This and several other species beginning to be cultivated.
fruticosa, native, Lapham; Cook county, Champaign, Macaulay.
rosea, cultivated from Mexico.
purpurea, cultivated from California and Oregon.
rubicunda, cultivated from California and Oregon.
lindleyi, cultivated from California and Oregon.
amœna, cultivated from California and Oregon.

JUSSIÆA.
decurrens, native, Gray.
repens, native, Lapham; Vasey.

LUDWIGIA, *False Loose Strife.*
alternifolia, *Seed Box*, native, Lapham; Cook county, Babcock.
cylindrica, native, Pulaski county, Vasey.
polycarpa, native, Cook county, Babcock.
palustris, native, Lapham; Cook county, Babcock.

LOPEZIA, ornamental annual.
racemosa, cultivated from Mexico.

FUCHSIA, ornamental, tender, shrubby plants.
coccinia, scarlet flowers.
magellanica, from southern Chilli, etc., less tender.
macrostemma, from Chili, many colors.
fulgens, from Mexico.
corymbiflora, from Peru.
arborescens, from Mexico.

MELASTOMACEÆ—Melastoma Family.

RHEXIA, *Deer Grass, Meadow Beauty.*
virginica, native, Lapham; Cook county, Babcock.

LYTHRACEÆ—Loose-strife Family.

PUNICA, *Pomegranate*, house plant.
granatum, cultivated from Orient; tender.

LAGERSTRŒMIA, *Crape Myrtle.*
indica, cultivated from East Indies for ornament; tender.

LYTHRUM, *Loose-strife.*
alatum, native, Lapham; Cook county, Babcock; Champaign county, Macauley.

NESÆA
verticillata, H. B. K., *Swamp Loose-strife*, wet places; Cook county, Vasey; Wabash, Schneck; Franklin, Forbes; rare.

AMMANNIA
humillis, native, Lapham.
latifolia, native, Lapham; Champaign county, Macauley.
nuttallii, native, Lapham, Hall, Vasey.

CUPHEA.
viscosissima, native, Lapham,
silenoides, annual, cultivated for ornament, from Mexico.
platycentra, cultivated for ornamnnt, from Mexico; perennial.

LOSACEÆ—Loasa Family.

MENTZELIA, herbs, ornamental.
oligosperma. native, Lapham.
lindleyi, cultivated from California.
ornata, cultivated from Nebraska.
lodgipes, cultivated from Mexico and Texas.

BLUMENBACHIA, ornamental.
insignis, cultivated from Chili.
lateritia, cultivated from South America.

CACTACEÆ—Cactus Family.

OPUNTIA, *Prickly Pear, Cactus, Indian Fig.*
vulgaris, *Common Prickly Pear*, native, Lapham.
rafinesquii, native, Cook county, Babcock; LaSalle county.

MESEMBRYANTHEMACEÆ—Fig-marigold Family. Fleshy plants.

MESEMBRYANTHEMUM, *Fig Marigold.*
crystallinum, *Ice Plant*, cultivated for ornament from South Africa.

TETRAGONIA, *New Zealand, Spinach.*
expansa, cultivated occasionally as spinach.

PASSIFLORACEÆ—Passion Flower Family.

PASSIFLORA, *Passion Flower.*
lutea, native south, Lapham.
gracilis, cultivated from South America, annual.
cœrulea, *Common* or *Blue Passion Flower*, from South America; nearly hardy.
edulis, *Granadilla*, purplish edible fruit, cultivated from South America.
quadrangularis, *Large Granadilla*, cultivated from South America, does not form edible fruit here.

CUCURBITACEÆ—Gourd Family.

LAGENARIA, *Bottle Gourd.*
vulgaris, *Common Gourd, Calabash*, cultivated from Africa and Asia for vessels, dippers, etc.

CUCURBITA, *Pumpkin* and *Squash.*
pepo, *Pumpkin.* cultivated by the Indians before the coming of the whites.
ovifera, *Orange Gourd, Egg Gourd*, wild in Texas and probably the original of the group.
verrucosa, *Warty Long-Neck* and *Crook-Neck Squash, Vegetable Marrow*, etc.
maxima, *Great* or *Winter Squash*, and *Turban Squash.*

CITRULLUS, *Water Melon.*
vulgaris, cultivated from Asia, the so-called citron is a variety.

CUCUMIS, *Melon and Cucumber.*
melo, *Melon, Muskmelon,* the Serpent Melon or Serpent Cucumber is a variety cultivated from Asia.
sativus *Cucumber,* cultivated from Asia.

SICYOS, *Star Cucumber.*
angulatus, native, Lapham.

ECHINOCYSTIS
lobata, *Wild Balsam Apple,* native, Lapham; Cook county, Babcock; Champaign county, Macauley.
See Darwin's Animals and Plants under Domestication, vol. 1, p. 430, for remarks on classification of this family.

FŒNICULUM, *Fennel,* perennial.
vulgare, *Common Fennel,* cultivated from Europe, for the sweet aromatic foliage and fruit.

LEVESTICUM, *Lovage,* perennial.
officinale, cultivated from Europe for its medicinal properties, formerly as an esculent.

ARCHANGELICA, perennial.
atropurpurea, native, Vasey; Peoria and St. Clair counties, Brendel.
hirsuta, native, Lapham.

HERACLEUM, *Cow Parsnip,* perennial.
lanatum, native, Lapham; Cook county, Babcock; Champaign county.

PASTINACA, *Parsnip,* perennial.
sativa, adventive, and cultivated from Europe for the root.

POLYTÆNIA.
nuttallii, native, Lapham; Cook county, Babcock.

ARCHEMORA, *Cow Bane,* perennial.
rigida, native, Lapham; Cook county, Babcock.

ASTHUSA, *Fool's Parsley,* annual.
cynapium—adventive from Europe, Brendel.

THASPIUM, *Meadow Parsnip,* perennial herbs.
barbinode, native, Lapham
aureum, native, Lapham; Cook county, Babcock.
var. apterum, Gray; Winnebago and Marion counties, Bebb.
trifoliatum, native, Lapham; Cook county, Babcock. The varieties atropurpurem and apterum are found in the state.

ZIZIA, pereninal herb.
integerrima, native, Lapham; Cook county, Babcock.

BUPLEURUM, *Thorough Wax.*
rotundifolium, adventive, Lapham.

DISCOPLURA, *Mock Bishop Weed.*
capillacea var. costata, S. Illinois, Vasey.
nuttallii, D. C., Jackson and Union counties, Forbes.

CRYPTOTÆNIA, *Hone-wort,* perennial herb.
canadensis, native, Lapham; Cook county, Babcock; Champaign county.

CHÆROPHYLLUM, *Chervil.*
procumbens, native, Lapham; Cook county, Babcock.

EULOPHUS, perennial.
americanus, native, Vasey; Cook county, Babcock.

ERIGENIA, *Harbinger-of-Spring.*
bulbosa, native, Lapham.

ARALIACEÆ—Ginseng Family.

ARALIA, perennials.
spinosa, *Angelica Tree, Hercules Club,* native, Vasey, Union county. Prof. Swallow measured a specimen 9 inches in circumference and 25 feet high, in Cape Girardeau county, Missouri
racemosa, *Spikenard,* native, Lapham; Cook county, Babcock.
nudicaulis, *Wild Sarsaparilla,* native north, Lapham; Cook county, Babcock.
quinquefolia, Ginseng, native, Lapham; rich woods, becoming rare.

HEDERA, *Ivy.*
helix, *True* or *English Ivy,* cultivated from Europe, but tender. "It will thrive if you keep the winter's sun away from it."—Rand. Probably needs very deep planting.

CORNACEÆ—Dogwood Family.

CORNUS, *Cornel* or *Dogwood.*
canadensis, *Dwarf Cornel, Bunch-Berry,* native, Cook county, Babcock. Low herb.
florida, *Flowering Dogwood,* small tree, native, Lapham; Randolph, Jackson, Marion, St. Clair, Madison counties. Rather a southern tree. Planted for ornament.
mas, planted from Europe for ornament.

sanguinea, planted from Europe for ornament.
stonolifera, *Red Osier Dogwood*—native, Lapham; Cook county, Babcock; Champaign county. Shrub.
sericea, *Silky Dogwood* or *Kinnikinik*, native, Lapham; St. Clair county, Brendel; Fulton county, Wolf, Champaign county. Shrub.
asperifolia, native, Lapham; Fulton county, Wolf. Shrub.
paniculata, native, Lapham; Cook county, Babcock; Fulton county, Wolf; Champaign county. Shrub.
circinata, native, Vasey. Shrub.
alternifolia, native, Vasey; north, Bebb; Cook county, Fulton county, Wolf; Wabash county, Ridgeway.

NYSSA, *Tupelo Pepperidge, Sour-Gum*, Trees.
multiflora, *Common Tupelo* or *Sour-Gum*, native, Lapham; Cook county, Babcock; St. Clair county, Brendel; Randolph, Johnson, Pulaski, Massac, Pope, Alexander, Union and Jackson counties, geological reports. Planted for ornament but difficult to transplant.
uniflora, *Large Tupelo*, native, Wabash county, Ridgeway. Prof. Swallow, says: noted like the cypress for the peculiar form of its trunk. A specimen in Stoddard county, Missouri, 120 feet high, measured 30 feet in circumference at two feet from the ground and only 9 at 6 feet above.

CAPRIFOLIACEÆ—Honeysuckle Family. Shrubs and Herbs.

LINNÆA.
borealis, grows north of Chicago, Vasey.

TRIOSTEUM, *Feverwort, Horse Gentian*.
perfoliatum, native, Lapham; Cook county, Babcock; Champaign county.
angustifolium, native, Lapham.

SYMPHORICARPUS, *Snowberry*.
occidentalis, *Wolfberry*, native, Gray.
racemosus, *Snowberry*, native, Lapham; St. Clair county, Brendel; cultivated.
vulgaris, *Indian Currant, Coral Berry*, native, Lapham; St. Clair county, Brendel. Also cultivated.

LONICERA, *Honeysuckle, Woodbine*.
sempervirens, *Trumpet Honeysuckle*, cultivated for ornament, from New York, etc.
caprifolium, *Common European Honeysuckle*, cultivated from Europe, for ornament.
etrusca, *Italian* or *Perpetual Honeysuckle*, cultivated for ornament.
grata, *Sweet Wild Honeysuckle*, cultivated for ornament, from New York, etc.
flava, *Yellow Honeysuckle*, native, Lapham; Cook county, Babcock; Peoria county, Brendel; Fulton county, Wolf.
var. douglasii, native, Cook county, Babcock.
japonica, *Japan* or *Chinese Honeysuckle*, cultivated for ornament.
tartarica, shrub planted for ornament, from Europe

DIERVILLA, *Bush Honeysuckle*.
trifida, native, Lapham; Cook county, Babcock.
japonica, cultivated from China and Japan for ornament.

VIBURNUM, *Arrow Wood*, etc.
tinus, *Laurestinus*, cultivated for ornament. Not hardy north.
lentago, *Sheepberry*, native, Vasey; north, Bebb; Cook county, Babcock; Wabash county, Ridgeway.
prunifolium, *Black Haw*, native, Lapham; Peoria county, Brendel; Wabash county, Ridgeway; Champaign county.
obovatum, native south, Lapham.
dentatum, *Arrow Wood*, native, Vasey; Cook county, Babcock.
pubescens, native, Vasey; north, Bebb; Cook county, Babcock.
acerifolium, *Dock Mackie*, native, Vasey; Cook county, Babcock.
opulus, *Cranberry Tree*, native, Lapham; Cook county, Babcock. Also cultivated for its fruit, and in the variety snowball or guelder rose for ornament.

SAMBUCUS, *Elder*.
canadensis, *Common Elder*, native, Lapham; Cook county, Babcock; Fulton county, Wolf, etc.

RUBIACEÆ—Madder Family.

RUBIA, *Madder*, perennial.
tinctoria, *Common* or *Dyer's Madder*, cultivated from Europe for the red roots.

GALIUM, *Bed Straw* or *Cleavers*.
asprellum, native, Lapham.
trifidum, native, Lapham; Cook county, Babcock.
concinnum, T. and G., common, Champaign county.
triflorum, Michx. common.
lanceolatum, Torr., Wabash county, Schneck.
boreale, native, Vasey; north, Bebb; Cook county, Babcock.
aparine, *Cleavers* or *Goose Grass*, native, Lapham; Cook county, Babcock; Champaign county.
pilosum, native, Lapham; Cook county, Babcock.
circæzans, *Wild Liquorice*, native, Lapham; Cook county, Babcock.

DIODIA, *Button Weed.*
teres, native, Lapham.
virginica, L., river banks Marion county, Vasey; and southward.

SPERMACOCE, *Button Weed.*
glabra, Michx. river banks, Peoria county, Brendel; Fulton county, Wolf; and southward.

MITCHELLA, *Partridge Berry.*
repens, native, Cook county, Babcock,

CEPHALANTHUS, *Button Bush.*
occidentalis, native, Lapham; Cook county, Babcock; Fulton county, Wolf; Champaign county, Macauley; Wabash county, Ridgeway.

COFFEA, *Coffee Tree.*
arabica, cultivated in conservatories.

GARDENIA, *Cape Jessamine.*
florida, cultivated as a house plant, from China.

HOUSTONIA.
cærulea, *Bluets*, native, Lapham; Cook county, Babcock.
minima, native, Lapham.
purpurea, native, Lapham.
var. ciliolata, Gray; Marion county, Brendel.
angustifolia, native, Gray.

VALERIANACEÆ—Valerian Family. Herbs.

VALERIANA, perennial.
officinalis, cultivated from Europe, for its medicinal root.
phu, cultivated for same purpose.
pauciflora, native, Gray.
edulis, native, Vasey; north, Bebb; Cook county, Babcock. Root eaten by Indians.

CENTRANTHUS, *Spurred Valerian.*
ruber, *Red Spurred Valerian* or *Jupiter's Beard*, cultivated for ornament, from southern Europe.

FEDIA, *Corn Salad, Lamb Lettuce.*
radiata, native, Vasey; St. Clair county, Brendel.
umbilicata Sulliv. Kankakee county, Hill.

DIPSACEÆ—Teasel Family.

DIPSACUS, *Teasel.*
sylvestris, *Wild Teasel*, naturalized from Europe, Vasey; Champaign county.
fullonum, *Fuller's Teasel*, cultivated from Europe, for the teasel. Useful for carding woolen cloth.

SCABIOSA, *Scabious.*
atropurpurea, *Sweet Scabious* or *Mourning Bride*, cultivated for ornament.

COMPOSITÆ—Composite Family. Herbs, or few Shrubs.

CYNARA, *Artichoke*, perennial, cultivated from Europe.
scolymus, *True Artichoke*, for salad.
cardunculus, *Cardoon*, for cookery and salad.

CIRSIUM, *Thistle.*
lanceolatum, naturalized from Europe, common.
pitcheri, T. and G., lake shore near Chicago, Vasey; Babcock.
arvense, *Canada Thistle*, naturalized, Vasey; Cook county, Babcock. Reported to the state board of agriculture in 1872 and 1873 as occurring in Boone, Bureau, DuPage, Kane, LaSalle, McHenry, Sangamon and Winnebago. Perennial; not so much of a pest as in the soils of the eastern states.
pumilum, *Pasture Thistle*, native, Lapham; biennial.
muticum, *Swamp Thistle*, native, Lapham; Cook county, Babcock; perennial.
altissimum, native, Lapham; Cook county, Babcock. Champaign county. Biennia or perennial.
virginianum, native, Lapham; perennial.
var. philipendulum, southern Illinois prairies, Engelman.
discolor, native, Lapham; Cook county, Babcock; Champaign county; biennial.

LAPPA, *Burdock*, biennial weed.
officinalis, naturalized from Europe, common.

CARTHAMUS, *Safflower, Saffron.*
tinctorius, cultivated from the Orient for a dye.

CENTAUREA, *Star Thistle.*
cyanus, *Bluebottle*, adventive from Europe, Vasey; Champaign.
cineraria; or C. candissima, cultivated from southern Europe. Not hardy north; perennial.
americana, cultivated from Arkansas and Texas, annual.
cyanus, *Bachelor's Button* or *Cornflower*, cultivated from Europe, biennial and perennial.
montana, cultivated from Europe, perennial.
amberboa, *Sweet Sultan.*

odorato, *Sweet Sultan*, cultivated for ornament from Asia, annual.
moschata, *Musk Scented Sultan*, cultivated for ornament from Asia, annual.

XANTHIUM, *Cocklebur, Clotbur*, annual weeds.
strumarium, *Common Cocklebur*, naturalized from Europe.
var. echinatum, perhaps an immigrant from farther south; found north, Lapham.
spinosum, *Spiny Cocklebur*, introduced from tropical America; Vasey

AMBROSIA, *Ragweed*, annual weeds.
trifida, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
bidentata, native, Lapham.
artemisiæfolia, *Roman Wormwood, Ragweed, Bitterweed*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
psilostachya, native, Lapham.

MATRICARIA, *Wild Chamomile*.
discorida, native, Lapham; St. Clair County, Gray.

TANACETUM, *Tansy*, perennial.
vulgare, *Common Tansy*, cultivated from Europe as a medicinal herb and adventive. Vasey; Cook county, Babcock.
balsamita, *Costmary*, cultivated as a garden herb, from Europe.

ARTEMISIA, *Wormwood*, herbs or shrubby plants.
absinthium, *Common Wormwood*, cultivated from Europe and adventive, weed.
serata, Nutt; Winnebago county, Bebb; McHenry, Vasey,
vulgaris, *Mugwort*, adventive from Europe.
ludoviciana, *Western Mugwort*, native, Lapham; Champaign county.
biennis, *Biennial Wormwood*, native, Lapham; Cook county, Babcock; Champaign county.
dranenculus, *Tarragon*, cultivated from Enrope, for the aromatic leaves.
abrotanum, *Southernwood*, cultivated from southern Europe, for the scented foliage.
dracuculoides, native, south-west part of state, Vasey and Mead.
canadensis, native, Cook county, Babcock.
canadata, native, Lapham.

ERECHTHITES, *Fireweed*, annual.
hieracifolia, native, Lapham; Cook county, Babcock; Champaign.

GNAPHALIUM, *Everlasting, Immortelle, Cudweed*.
polocyphalum, native, Lapham; Cook county, Babcock; Champaign county.
uliginosum, *Low Cudweed*, native, Vasey.
purpureum, *Purplish Cudweed*, native, Lapham.
bracteatum, or Helichrysum bracteatum, cultivated for ornament, from Australia.
macranthum, cultivated from Australia.

ANTENNARIA, *Everlasting Immortelle*.
plantaginifolia, *Plantain Leaved Everlasting*, native, Lapham; Cook county, Babcock; Champaign county.
margaritacia, R. Br., Wabash county, Schenck.
divica, native, Lapham.

RHODANTHE, annual.
manglesii, cultivated from Australia for ornament.

AMMOBIUM, annual.
alatum, cultivated for ornament from Australia.

HUMEA, annual.
elegans, cultivated for ornament from Australia.

VERNONIA, *Ironweed*, perennial.
noveboracensis, *Common Ironwood*, native Lapham; Champaign county, Macauley.
fasciculata, native, Lapham; Cook county, Babcock; Champaign county.

ELEPHANTOPUS, *Elephant's Foot*.
carolinianus, native, St. Clair county, Brendel.

LIATRIS, *Button Snakeroot, Blazing Star*.
squarrosa, *Common Blazing Star*, native, Lapham; Champaign county.
cylindracea, native, Lapham; Cook county, Babcock.
scariosa, native, Lapham; Cook county, Babcock; Champaign county.
pycnostachya, native, Lapham; Champaign county.
spicata, native, Lapham; Cook county, Babcock; Champaign county.

KUHNIA, perennial herb.
eupatorioides, native, Lapham; Champaign county.

EUPATORIUM, *Thoroughwort, Boneset*.
purpureum, *Purple Thoroughwort*, or *Joe Pye Weed*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
perfoliatum, *Thoroughwort*, or *Boneset*, native, Lapham; Cook county, Babcock; Champaign county.
sessifolium, *Upland Boneset*, native, Lapham.
altissimum, native, Lapham.
serotinum, native, Lapham.
ageratoides, *White Snake Root*, native, Lapham; Cook county, Babcock; Champaign county.
aromaticum, native, Lapham.

MIKANIA, *Climbing Hemp Weed*.
scandens, L., Wabash county, Schenck.

CONOCLINIUM, *Mist Flower*.
cœlestinum, native, Lapham.

AGERATUM, annual, from tropical America.
conyzoides, var. mexicanum, cultivated for ornament.

PIQUERIA, annual, from Mexico.
trinervia, cultivated for winter blooming.

CACALIA, *Indian Plantain*, perennial.
suaveolens, native, Lapham
reniformis, *Great Indian Plantain*, native, Gray.
atriplicifolia, *Pale Indian Plantain*, native, Lapham; Cook county, Babcock.
tuberosa, *Tuberous Indian Plantain*, native, Lapham; Cook county, Babcock.

TUSSILAGO, *Colt's Foot*, perennial.
farfara, naturalized from Eur pe, Vasey.

SENECIO, *Groundsel*.
lobatus, *Butterweed*, native, Lapham.
aureus, *Golden Ragwort, Squaw Weed*, native, Lapham; Cook county, Babcock.
sonchifolia, *Tassel Flower*, cultivated for ornament from India, annual.
scandens, *German Ivy*, cultivated as house plant from Cape of Good Hope.
cineraria, or Cineraria maritima, *Dusty Miller*, cultivated for ornament from coast of Mediterranean.
kæmpferi, cultivated as Farfugium grande, probably from China and Japan, for ornament.
heretieri, or Cineraria lanata, cultivated from Teneriffe as house plant.
cruentum, *Common Cineraria*.
elegans, *Purple Ragwort*, cultivated for ornament from Cape of Good Hope.

CHRYSOGONUM.
virginianum, L., Gray's Manual credits Illinois with this.

INULA, *Elecampane*, perennial.
helenium, naturalized from Europe, Lapham; cultivated for medicine.

PLUCHEA *Marsh Fleabane*.
fætida, D. C., Wabash and Jackson counties, southward.

CHRYSOPSIS, *Golden Aster*, low herbs.
mariana, native, Lapham,
villosa, native, Lapham.

SOLIDAGO. *Golden Rod*, perennial herbs.
latifolia, native, Lapham; Cook county, Babcock.
stricta, native, Vasey; north, Bebb; Cook county, Babcock; Champaign county.
bicolor, L, McHenry county, Vasey; Union, Forbes.
cæsia, L, Champaign county; not common.
speciosa, native, Lapham; Cook county, Babcock.
var. angustata, native, Cook county, Babcock.
petiolaris, native, Lapham; southwestern Illinois, Engelmann.
virga-aurea, native, Cook county, Babcock.
var. humilis, native, Cook county, Babcock.
rigida, native, Lapham; Cook county, Babcock; Champaign county.
patula, Muhl, swamps; scarce.
altissima, L. Hancock county, Mead; Fulton, Wolf; Champaign and southward.
odora, Ait, Wabash county, Schenck.
ohioensis, native, Lapham; Cook county, Babcock.
riddellii, native, Lapham; Cook county, Babcock; Champaign county.
neglecta, native, Lapham.
arguta, native, Lapham; Champaign county.
muhlenbergii, native; Cook county, Babcock.
ulmifolia, native, Lapham; Cook county, Babcock.
drummondii, native; south, Lapham; St. Clair county, Gray.
nemoralis, native, Lapham; Cook county, Babcock; Champaign county Macauley.
radula, native, Lapham; Champaign county.
missouriensis, native, Lapham.
canadensis, native, Lapham; Cook county, Babcock; Champaign county.
serotina, native, Lapham.
gigantea, native; Cook county, Babcock.
lanceolata, native, Lapham; Champaign county.
tenuifolia, native, Lapham; Cook county, Babcock; Champaign county.

CALLISTEPHUS, *China Aster*, annuals.
chinensis. Cultivated from China and Japan in many varieties, for ornament.

ASTER, *Starwort Aster*, perennial herbs mostly.
corymbosus, native, Vasey.
macrophyllus, native; Peoria county, Brendel.
suculosus, var. gracilis, native, Lapham.
sericeus, native, Lapham; Cook county, Babcock; Champaign county.
concolor, native, Lapham.
patens, native, Lapham; Cook county, Babcock; Champaign county.
lævis, native, Lapham; Cook county, Babcock.
var. cyaneus, Gray, and var. lævigatus, Gray, are both common northward.
drummondii, Lindl., frequent.
turbinellus, native, Lapham.
azureus, native, Lapham; Cook county, Babcock; Champaign county.
shortii, native, Lapham; Champaign county.
undulatus, native, Lapham; Cook county, Babcock.
cordifolius, native, Lapham; Cook county, Babcock.
acuminatus, Michx. McHensy county, Vasey.
sagittifolius, native, Lapham; Cook county, Babcock.
ericoides, native, Lapham.
var. villosus, Ait. with the typical form. Frequent.
multiflorus, native, Lapham; Cook county, Babcock; Champaign county.

dumosus, native, Lapham.
tradnescanti, native, Lapham; Cook county, Babcock; Champaign county.
miser, native, Lapham; Cook county, Babcock.
aestivus, Ait, McHenry county, Vasey; Peoria, Brendel; Champaign county.
longifolius Larn. near Chicago, Babcock; Kankakee, Hill; Peoria, Brendel.
simplex, native, Lapham.
tenuifolius, native, Lapham.
carneus, native, Lapham.
puniceus, native, Lapham.
var. vimineus, Gray; Winnebago county, Bebb; Henderson, Patterson.
oblongifolius, native, Lapham.
amethystinus, native, Hall.
novæ-angliæ, Cook county, Babcock; Carroll county, Shimer; Champaign county.
anomalus, native, Lapham; St. Clair county, Englemann.
ptarmicoides, native, Vasey; north, Bebb; Cook county, Babcock.
macrophyllus, Cook county, Babcock.

DIPLOPAPPUS. *Double-Bristled Aster.*
linariifolius, native, Lapham; Cook county, Babcock; Champaign county.
umbellatus, native, Lapham; Cook county, Babcock.

ERIGERON, *Fleabane.*
speciosum, cultivated from Oregon for ornament. Perennial.
canadense, *Horse Weed, Butter Weed*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
divaricatum, native, Lapham.
bellidifolium, *Robin's Plantain*, native, Lapham; Cook county, Babcock.
philadelphicum, *Common Fleabane*, native, Lapham; Champaign county.
annuum, *Daisy Fleabane, Sweet Scabious*, native, Lapham, Cook county, Babcock; Champaign county.
strigosum, *Daisy Fleabane*, native, Lapham; Cook county, Babcock; Champaign county.

BOLTONIA, perennials.
asteroides, native, Lapham.
glastifolia, native, Lapham; Cook county, Babcock.
var, decurrens, T. and G. Perhaps a distinct species. Fulton county, Wolf.
diffusa, native; Marion county, Vasey.

BRACHYCOME.
iberidifolia, cultivated for ornament from Austria. Annual.

BELLIS, *Daisy.*
perennis, *English Daisy*, cultivated from Europe for ornament.

ACHILLEA, *Yarrow Sneezewort.*
millefolium, *Common Yarrow* or *Milfoil*, adventive from Europe, Lapham; Cook county, Babcock.

MARUTA, *Mayweed*, annual
cotula or Anthemis cotula, *Common Maywood*, naturalized from Europe. Lapham; Cook county, Babcock; Champaign county, Macauley. Fetid smelling weed common in lanes.

ANTHEMIS, *Chamomile.*
nobilis, *Garden Chamomile*, cultivated from Europe for medicine.
tinctoria, sometimes cultivated for ornament, from the old world.

CHRYSANTHEMUM.
leucanthemum, or Leucanthemum vulgare, *Whiteweed or Ox-eye Daisy*, naturalized from Europe, Lapham; Cook county, Babcock. A troublesome weed where well established. Perennial. Champaign county. Spreads slowly in latter locality. Not hard to exterminate.
parthenium, or Pyrethum parthenium, *Feverfew*, cultivated from Europe.
parthenioides, *Double-flowered or Parsley-leaved Feverfew*, cultivated for ornament from China. Variety of last.
roseum, cultivated for ornament from Persia and Northern Asia. Perennial.
indicum, parent of the Chinese chrysanthemums, cultivated for ornament from China and Japan. Perennial.
coronarium, *Summer Chrysanthemum*, cultivated for ornament from Northern Africa. annual

"For autumn blooming we have nothing that can fill their (the Chrysanthemum's) place; and we depend upon them for the decoration of the green house during the later months of the year."—*Rand.*

ACTINELLA, low herbs.
scaposa, native; Will county, Scammon

HELENIUM, *Sneeze Weed.*
autumnale, native, Lapham; Cook county, Babcock; Champaign county.

GAILLARDIA
pulchella, cultivated for ornament from Louisiana. Annual.
aristata, cultivated for ornament from Missouri.

CALENDULA, *Marigold.*
officinalis, *Garden Marigold*, cultivated for ornament from the old world. Annual.

POLYMNIA, perennial weeds.
canadensis, native, Lapham; Cook county, Babcock; Carroll county, Shimer.
var. discoidea, Gray; Carroll county, Shimer.
uvedalia, native south; Lapham.

SILPHIUM, *Rosin Plant*, perennial.
laciniatum, *Rosin Weed, or Compass Plant*, native, Lapham. Cook county, Babcock; Champaign county, Macauley.
trifoliatum, L. Cook county, Hill.
terebinthinaceum, *Prairie Cock*, native, Lapham; Cook county, Babcock; Champaign county.
integrifolium, native, Lapham; Cook county, Babcock; Champaign county.
var. laeve; McLean county, Hill
perfoliatum, *Cup Plant*, native, Lapham; Cook county, Babcock; Champaign county.

DAHLIA, perennial.
varabilis, cultivated for ornament from Mexico. In great variety.

PARTHENIUM.
integrifolium, native, Lapham; Cook county, Babcock; Champaign county

IVA, *Marsh Elder*, highwater shrub.
ciliata, native, Lapham.

ECLIPTA.
procumbens, native, Lapham.

COREOPSIS, *Tickseed*, many ornamental.
tinctoria, cultivated from Arkansas.
drummondii, cultivated from Texas.
coronata, cultivated from Texas.
lanceolata, native, Lapham; Cook county, Babcock. Cultivated.
auriculata, native, Lapham. Cultivated.
senifolia, native, Lapham.
palmata, native, Lapham; Cook county, Babcock.
tripteris, native, Lapham; Cook county, Babcock.
aristosa, native, Lapham; Cook county, Babcock; St. Clair county.
var. mutica, Gray. Low grounds; not common.
trichosperma, *Tickseed, Sunflower*, native, Lapham; Cook county, Babcock.
discoidea, native, Lapham; Kane county, Babcock.

BIDENS, *Bur Marigold, Beggar Ticks.*
frondosa, *Common Beggar Ticks.* native, Lapham; Cook county, Babcock. Champaign county. Coarse weed
cernua, C. Peoria, Henderson and Champaign counties, northward.
connata, *Swamp Beggar Ticks*, native, Lapham; Cook county, Babcock; Champaign county.
chrysanthemoides, *Larger Bur Marigold*, native; Cook county, Babcock. Champaign county.
beckii, *Water Marigold*, native, Lapham.
bipinnata, *Spanish Needles*, native, Lapham.
All the species here enumerated are very worthless and particularly disagreeable weeds, on account of barbed awns of the fruit, which cause it to adhere in great numbers to the clothing.—Darlington. A supposed hybrid between a Corypsis and Bidens, with the appearance of the former and the barbed awns of the latter, is very abundant in Champaign county.

HYMENOPAPPUS.
scabiosus, L. Her., Mason county, Mead, Hall.

LEPTOPODA.
brachypoda, T. and G., Hancock county, Mead and southward.

ACTINOMERIS, *Tall Perennials.*
squarrosa, native, Lapham.
helianthoides, native, Lapham; Cook county, Babcock.

KRIGIA, *Dwarf Dandelion.*
virginica, Wild, Fulton county, Wolf; Mason, Brendel Menard, Hall.

VERBESINA, *Crown Beard*, perennial herbs.
siegesbeckia, native, Lapham.
virginica, native, Lapham.

XIMINESIA, ornamental annual.
eucelioides, cultivated from Texas and Mexico,

HELIANTHUS, *Sunflower*, mostly perennial.
annuus, *Common Sunflower*, cultivated from tropical America.
argophyllus, cultivated from Texas for its heavy, white foliage, annual.
angustifolius, native, Lapham.
astrorubens, native, Lapham
rigidus, native, Lapham; Champaign county.
lactiflorus, native, Lapham; Cook county, Babcock.
occidentalis, native, Lapham; Cook county, Babcock.
mollis, native, Lapham; Cook county, Champaign county.
microcephalus, native, Lapham.
giganteus, native, Cook county, Babcock.
divaricatus, L., near Chicago, Babcock; Hancock, Mead; Champaign, Burrill; Wabash, Schneck.
doronicoides, Lam. bank of streams, common, Patterson; Champaign county.
grosseserratus, native, Lapham; Cook county, Babcock; Champaign county.
tomentosus, native, Lapham.
strumosus, native, Lapham.
hirsutus, native, Lapham.
tracheliifolius, native, Lapham; Cook county, Babcock.
decapaetlus, native, Lapham; Cook county, Babcock.
tuberosus, *Jerusalem Artichoke*, cultivated and escaped into fence rows. Gray re-

gards it as probably a state of a wild south-west species. "Very common on the river banks of the St Peters and St. Croix and is much eaten by the Dakota Indians." Rept. Dept. of Agr., 1870.

HELIPOSIS, *Ox Eye*, perennial.
læviss, native, Lapham; Cook county, Babcock; Champaign county.

RUDBECKIA, *Cone Flower*.
speciosa, native, Lapham; and cultivated.
hirta, native, Lapham; Cook county, Babcock; Champaign county.
triloba, native, Lapham; Champaign county.
subtomentosa, native, Lapham; Cook county, Babcock; Champaign county.
laciniata, *Common Cone Flower*, native, Lapham; Cook county, Babcock.

LEPACHYS, *Perennial Herbs*.
pinnatta, native, Lapham; Cook county, Babcock; Champaign county.

DACIOPIS, annual.
amplexicaulis, cultivated for ornament, from the southwest.

ECHINACEA, *Hedge Hog, Cone Flower*, perennials.
purpurea, native, Lapham.
angustifolia, native, Lapham; Cook county, Babcock.
The zinnia has been remarkably developed and improved through seedlings grown in India. See, Rand.

TAGETES, *French* or *African Marigold*, annuals, from South America and Mexico.
lucida, not common.
erecta, *Large Africa Marigold*.
patula, *French Marigold*.
signata.

DYSODIA,, *Fetid Marigold*.
crysanthemoides, native, Lapham; Cook county, Babcock, annual.

CICHORIUM, *Succory, Cichory* or *Chicory*.
intybus, *Common Chickory*, naturalized from Europe, Cook county, Babcock; perennial. Root used as substitute for coffee, though possessing few or none of its valuable properties.
endivia, *Endive*, cultivated from East Indies for autumn salad.

TRAGOPOGON, *Salsify*.
porrifolius, *Common Salsify* or *Oyster Plant*, cultivated from Europe for the edible tap root.

CYNTHIA, low perennial herbs.
dandelion, D. C., Washington county, Vasey; Wabash, Schneck; and southward.
virginica, native, Lapham; Cook county, Babcock.

TROXIMON, perennial herbs.
cuspidatum, native, Lapham; Champaign county.

HIERACIUM, *Hawk Weed*, perennials.
canadense, *Canada Hawk Weed*, native, Vasey.
scabrum, *Rough Hieracium*, native, Lapham
longiphylyum, *Long Leaved Hieracium*, native, Lapham.
gronovil, *Hairy Hieracium*, native, Lapham.

NABALUS, *Rattlesnake Root*, perennial herbs
altissimus, Hook. Boone counry, French; Wabash, Schneck; Champaign county.
albus, *White Lettuce, Rattlesnake Root*, native, Lapham; Cook county, Babcock.
virgatus, *Slender Rattlesnake Root*, native, Lapham
racemosus, native, Lapham; Cook county, Babcock; Champaign county.
asper, native, Lapham; Champaign county.
crepidenius, native, Lapham.

TARAXACUM, *Dandelion*, perennials or biennials.
dens-leonis, *Common Dandelion*, probably indeginous in the northern states; here native or introduced. Lapham; Cook county, Babcock; &c.

LACTUCA, *Lettuce*.
sativa, *Garden Lettuce*, cultivated from Europe for salad; annuals and biennials.
canadensis, *Wild Lettuce*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
integrifolia, native, Gray.
sanguinea, native, Gray.

MULGEDIUM, *False* or *Blue Lettuce*.
acuminatum, native, Lapham.
floridanum, native, Lapham.
leucophæum, D. C., Winnebago county, Bebb; near Chicago Munroe; Wabash, Schneck.

SONCHUS, *Sow Thistle*, Coarse Weeds.
oleraceus, *Common Sow Thistle*, naturalized from Europe, Lapham; Champaign county.
asper, *Spring-leaved Sow Thistle*, naturalized from Europe, Lapham; Cook county, Babcock.

LOBELIACEÆ—Lobelia Family. Plants with milky acrid juice.

DOWNINGIA, delicate little annuals, sparingly cultivated, from California.
elegans, older name Clintonia elegans.
pulchella, older name clintonia pulchella.

LOBELIA.
erinus, cultivated for ornament from the Cape of Good Hope; annual, or continued by cuttings.
laxiflora, cultivated in conservatories, from Mexico, perennial.
cardinalis, *Cardinal flower*, native, Lapham; Cook county, Babcock; Champaign, Macauley; Madison county.
syphilitica, *Great Lobelia*, native, Lapham; Macauley; Champaign county, Cook county, Babcock.
puberula, native, Gray.
leptostachys, native, Lapham; Champaign county.
inflata, *Indian Tobacco*, native, Lapham; Cook county, Babcock. Poisonous; Champaign county.
spicata, native, Lapham; Cook county, Babcock.
kalmii, native, Vasey; Cook county, Babcock; Tazewell county, Brendel.

CAMPANULACEÆ—Campanula Family. Herbs with milky juice.

SPECULARIA, *Venus' Looking Glass*.
speculum, *Garden Venus' Looking Glass*, cultivated for ornament from Europe; annual.
perfoliata, native, Lapham; Cook county, Babcock; Champaign county.

CAMPANULA, *Bell Flower, Hare Bell*.
rotundifolia, *Hare Bell*, native, Vasey; Cook county, Babcock; Champaign county.
var. linifolia, native, Cook county, Babcock.
aparinoides, *Marsh Bell Flower*, native, Lapham; Cook county, Babcock.
americana, *Tall Bell Flower*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.

PLATYCODON, perennial.
grandiflorum, cultivated for ornament from Siberia.

ERICACEÆ—Heath Family. Chiefly Shrubs.

GAYLUSSACIA, *Huckleberry*. American Whortleberry.
resinosa, *Common or Black Huckleberry*, native, Lapham; Cook county, Babcock.
Not common. "Furnishes the larger share of the black huckleberries of the northern markets." - Darlington.

VACCINIUM, *Cranberry, Blueberry, etc.*
canadense, Kalm, *Canada Blueberry*, Lee county, Vasey; Cook county, Hill.
macrocarpon, *Large* or *American Cranberry*, native, Vasey; Cook county, Babcock. Cultivated for berries in all Atlantic states, and to some extent in Wisconsin.
arboreum, *Farkleberry*, native; Jackson county, Vasey; Union county, Burrill.
pennsylvanicum, *Dwarf Blueberry*, native, Lapham; Cook county, Babcock. "The fruit of this species is highly prized on account of its earliness, but it is not so agreeable in flavor as some others."—Fuller. Gray and Darlington give it a better character.
vaccillans, *Low Blueberry*, native, Vasey.
corymbosum, *Swamp Blueberry*, or *Highbush Huckleberry* which Fuller pronounces "the best Huckleberry," does not appear to be native. "The Huckleberry is one of those fruits which have always been neglected. * * Why this neglect I am at a loss to understand, for the Huckleberry possesses naturally better qualities than even the currant and gooseberry."—Fuller.
var. accrocum, Gray; Lee county, Vasey.

ERICA, *Heath*.
carnea, cultivated from Europe in form of Erica Herbacea for ornament.

ARCTOSTAPHYLOS, *Bearberry*.
uva-ursi, *Common Bearberry*, native, Vasey; Cook county, Babcock. Leaves used in medicine.

GAULTHERIA, *Aromatic Wintergreen*.
procumbens, *Creeping Wintergreen*, Cook county. Occurs at Miller's station, in Indiana, a few miles east of the line, Babcock.

CASSANDRA, *Leather Leaf*.
calyculata, native; Cook county, Babcock.

ANDROMEDA.
polifolia, native, Vasey.
speciosa, cultivated for ornament.
mariana, *Stagger Bush*, cultivated for ornament.

KALMIA, *American* or *Mountain Laurel*, not native west. Cultivated for ornament.
latifolia, *Large Mountain Laurel, Calico Bush, Spoon Wood*. "It is said not to live long in limestone clays."—Bryant.
angustifolia, *Narrow-leaved* or *Sheep Laurel*.
glauca, *Pale Laurel*.

RHODODENDRON, *Rose Bay*, ornamental shrubs. None grow naturally in the state.
maximum, *Great Rhododendron* or *Wild Laurel*. "It is not always practicable to give it the moist atmosphere and shade which seem to be indispensible."--Bryant.
catawbiense, *Catawba Rhododendron*. "Will not grow in soils impregnated with lime." Bryant.

ponticum, cultivated from Pontus.
punctatum, *Dotted Rhododendron*.
dauricum, cultivated from Siberia.

AZALEA, *False Honeysuckle*, ornamental shrubs.
indica, cultivated from China and Japan. Strictly a Rhododendron.
viscosa, *Clammy Azalea*. White flowers.
nudiflora, *Purple Azalea* or *Pinxter Flower*. Pink flowers; Union county, Burrill.
calendulacea, cultivated in hybrid form.
pontica, cultivated from the Caucacus.

PYROLA, *Wintergreen. Shin-leaf*, Low perennial herb.
chlorantha, Swartz; McHenry county, Vasey.
rotundifolia, native; Cook county, Babcock.
elliptica, *Shin-leaf*, native, Vasey; Cook county, Babcock.
secunda, native; Cook county, Babcock.

CHIMAPHILA, *Pipsissewa*.
umbellata, *Princes Pine, Pipsissewa* native; Cook county, Babcock.

MONOTROPA, *Indian Pipe, Pine Sap*.
uniflora, *Indian Pipe, Corpse Plant*, native, Lapham; Cook county, Babcock.

AQUIFOLIACEÆ—Holly Family.

ILEX, Trees and shrubs.
aquifolium, *European Holly*, cultivated for ornament, but not hardy north.
opaca, *American Holly*, not hardy in the northwest, but planted for ornament.
decidua, native, Lapham; St. Clair county, Brendel.
verticillata, *Black Alder, Winter Berry*, native, Lapham; Cook county, Babcock; St. Clair county, Brendel.
glabra, *Ink Berry*,, native; Cook county, Babcock.

NEMOPANTHES, *Mountain Holly*, shrub.
canadensis, native, Cook county, Babcock.

EBENACEÆ—Ebony Family. Trees or Shrubs.

DIOSPYROS, *Date Plum, Persimmon*.
virginiana, *Common Persimmon*, native as far north as Fulton and Hancock counties and cultivated successfully by Mr. Bryant in Bureau county. "This fruit grows abundantly in the Indian Territory and in Arkansas. The Indians consume large quantities of it when ripe. It is prepared for future use after the manner of making apple butter."—Rept. Dept. Agr., 1870. Prof. Sallow describes a specimen of this tree in Mississippi county, Missouri, as eighty feet high and three feet in diameter The persimmon varies greatly in time of ripening, size, and quality of fruit, and some varieties are nearly seedless It offers great encouragement for attempts at its improvement. Mr. Balsigee, of Madison county, has succeeded well in top-grafting scions of choice varieties into barren trees by the ordinary process and use of grafting wax. Diospyros kaki, a valuable Japan species, was said by Fuller to be hardy at New York, and it has been stated recently (1875) that its cultivation has been introduced into California. Diospyros lotus, from the Caucacus, is also said to be hardy, but is, I believe, of inferior quality.

SAPOTACEÆ—Sappodilla Family. Trees or Shrubs mostly with Milky Juice.

BUMELIA.
lycioides, *Southern Buckthorn*, native, Vasey; Pulaski county, Burrill. Recommended as an ornamental shrub or tree. South.
lanuginosa, native, Lapham; St. Clair county, Brendel.

STYRACACEÆ—Storax Family. Shrubs or Trees.

HALESIA *Snowdrop* or *Silverbell Tree*.
tetraptera, *Four-winged Halesia*, native, as near the line as Evansville, Indiana, and may be an Illinois species. Cultivated for ornament. "Hardy in Illinois as far north as latitude forty-two degrees, and probably beyond."—Bryant.

PLANTAGINACEÆ—Plantain Family.

PLANTAGO, *Plantain Ribgrass*.
major, *Common Plantain*, naturalized from Europe, Lapham, etc.; but indigenous, says Gray, in the high north. A weed, but used as an application to blisters, etc.
sparsiflora, native; Pulaski county, Vasey.

cordata, native, Lapham; Cook county, Babcock.
lanceolata, *Ribgrass, Ripplegrass, English Plantain*, naturalized from Europe, Lapham; Cook county, Babcock. Champaign county.
virginica, native, Lapham.
pusilla, native, Lapham.
patagonica, var aristata, native, Lapham; Adams county, Mead and Southward.

PLUMBAGINACEÆ—LEADWORT FAMILY.

ARMERIA, *Thrift*, perennial.
vulgaris, cultivated from Europe, for edgings in gardens.

PRIMULACEÆ—PRIMROSE FAMILY. Herbs.

PRIMULA, *Primrose. Cowslip*, perennials. Introduced.
sinensis, *Chinese Primrose*, house plant. Tender.
grandiflora (or acaulis), *True Primrose*, cultivated for ornament from Europe.
officinalis (or veris), *English Cowslip*. The polyanthus are cultivated varieties. Hardy.
auricula, cultivated from Southern Europe. Not hardy north.

ANDROSACE.
occidentalis, native, Lapham.

DODECATHEON, *American Cowslip, Shooting Star.*
meadia, native, Lapham; Cook county, Babcock. Cultivated for ornament.

TRIENTALIS, *Chickweed, Wintergreen.*
americana, *Star Flower*, native, Lapham; Cook county, Babcock.

CYCLAMEN, house plants, tender.
europaeum, *Common Cyclamen.*
persicum, *Persian Cyclamen.*

LYSIMACHIA, *Loose-strife.*
thyrsiflora, *Tufted Loose-strife*, native, Vasey; Cook county, Babcock.
stricta, native; Cook county, Babcock.
quadrifolia, native, Lapham.
ciliata, native, Lapham; Cook county, Babcock. Champaign county.
lanceolata, native, Lapham; Cook county, Babcock.
longifolia, native, Vasey; Cook county, Babcock; Woodford county, Brendel.

ANAGALLIS, *Pimpernel.*
arvensis, L., *Poor Man's Weather Glass*. A weed in gardens and sandy fields. Naturalized from Europe.

CENTUNCULUS, *Chaffweed.*
minimus, native, Lapham.

SAMOLUS, *Water Pimpernel, Brook Weed.*
valerandi, native, Lapham; Cook county, Babcock.
var. americanus, native; Cook county, Babcock.

HOTTONIA, *Featherfoil, Water Violet.*
inflata, Ell., pools and ditches. Wabash county, Schneck; Union, Forbes. Rare.

LENTIBULACEÆ—BLADDERWORT FAMILY.

UTRICULARIA, *Bladderwort.*
vulgaris, *Greater Bladderwort*, native, Lapham; Cook county, Babcock.
minor, *Smaller Bladderwort*, native, Lapham.
gibba, native, Vasey; Cook county, Babcock.
intermedia, Hayne, pools. Peoria county, Brendel; McHenry, Vasey.
cornuta, native, Cook county, Babcock.
subulata, native, St. Clair county, Brendel.

BIGNONIACEÆ—BIGNONIA FAMILY.

ECCREMOCARPUS.
scaber (or Calampelis scaber), cultivated for ornament from Chili. Tender.

BIGNONIA.
capreolata, native, south, Lapham.

TECOMA, *Trumpet Flower*, woody climbers.
radicans, *Trumpet Creeper*, native south, Lapham; Champaign county Macauley. cultivated for ornament north as well as south.
grandiflora, cultivated from China and Japan. Not hardy north.
capensis and jasmioides are conservatory and greenhouse species.

CATALPA, *Indian Bean.*
bignonioides, *Common Catalpa*, native south, Lapham; Marshal county, Ridgeway. Pulaski county, where according to Judge A. M. Brown, it makes a large tree. Prof. Swallow measured one in Dunklin county Missouri, ten feet in circumference

and ninety feet high. He states that "many of the trees in the new Madrid country which were killed by the earthquake of 1811, are still standing and quite sound," (1866). It is said by Mr. Bryant to be hardy in cultivation at Princeton, Illinois, (41 dg. 30 min.) but probably cannot be grown much furthes north.
var. speciosa, Warder. Hardy throughout the state and more upright than the typical form. Very valuable for planting.
kaempferi, from Japan.

MARTYNIA, *Unicorn Plant*, annuals.
proboscidea, *Common Unicorn Plant*, native, Lapham; Champaign county, Macauley.
fragrans, *Sweet-scented Unicorn Plant*, cultivated from Mexico.

OROBANCHACEÆ—Broom Rape Family.

EPIPHEGUS, *Beech Drops*, *Cancer Root*.
virginiana, Bart. Union county, Vasey. Parasitic on the roots of beech trees.

PHELIPAEA, *Broom Rape*.
ludoviciana, native, Lapham, Hall.

CONOPHOLIS, *Squaw Root*, *Cancer Root*.
americana, Wallroth; Menard county Hall; Marion, Bebb.

APHYLLON, *Naked Broom Rape*.
uniflorum, *One-flowered Cancer Root*, native, Lapham; Cook county, Babcock.
fasciculatum, native north, Vasey; Cook county, Babcock.

SCROPHULARIACEÆ—Figwort Family. Chiefly Herbs.

BRUNFELSIA, conservatory shrubs from Brazil.

BROWALLIA.
Demissa, cultivateed from South America for ornament. Annual.

SALPIGLOSSIS.
sinuata, cultivated from Chili as ornamental annual or biennial.

SCHIZANTHUS.
pinnatus, cultivated for ornament from Chili.

PAULOWNIA.
imperialis, cultivated as ornamental tree from Japan. "In the rich soils of northern Illinois it makes a rank, succulent growth, which is invariably killed to the ground the following winter."—Bryant. It is not hardy as far south as Alton, though sometimes attaining large size.

VERBASCUM, *Mullein*, tall, usually wooly, biennial herbs.
thapsus, naturalized from Europe, Lapham; Cook county, Babcock. Champaign county, Macauley, etc. Troublesome weed.
blattaria, *Moth Mullein*, naturalized from Europe, Lapham; Champaign county, Macauley. "Hybridizes with last."—Darlington.

CELSIA, biennial, ornamental
cretica, cultivated from Mediterranean.

ALONSOA, ornamental annuals from South America.
incisæfolia.

VERONICA, *Speedwell*.
americana, Schw., American Brooklime, Peoria county, Brendel.
speciosa, salicfolia, and lineleyana are shrubby, tender, very leafy species from New Zealand.
serpyllyfolia, L., *Thyme-leaved Speedwell*, Fulton county, Wolf. Scarce.
spicata and sometimes paniculata, or hybrids between them, are cultivated for orna-
virginica, *Culver's Root*, *Culver's Physic*, native, Lapham; Cook county, Babcock; Champaign county, Macauley,. Perennial.
angallis, *Water Speedwell*, native, Lapham; Cook county, Babcock; Champaign county, Macauley. Perennial.
scutellata, *Marsh Speedwell*, native; Cook county, Babcock. Perennial.
peregrina, *Neckweed Purslane Speedwell*, native, Lapham, Vasey; Cook county. Babcock, Champaign county, Macauley. Annual.
arvensis, *Corn Speedwell*, introduced from Europe, Lapham; Cook county, Babcock.

BUCHNERA, *Blue Hearts*, perennial.
americana, native south, Lapham; Cook county, Babcock.

CALCEOLARIA, tender South American herbs or shrubs, cultivated as house and bedding plants.
integrifolia, called also rugosa and salviæfolia.
corymbosa.
crenatiflora.
scabiosæfolia.

SYNTHYRIS.
houghtoniana, native, Lapham, Mead. Scarce.

COLLINSIA, annuals and biennials.
verna, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
bicolor, handsome garden annual from California.

LINARIA, *Toad Flax.*
canadensis, *Wild Toad Flax*, native, Vasey.
vulgaris, *Toad Flax, Butter and Eggs*, naturalized from Europe, Vasey, Brendel; Cook county, Babcock; Champaign county, Macauley.
triornithophora and cymbalaria, cultivated from Europe.

ANTIRRHINUM, *Snapdragon.*
major, *Large Snapdragon*, cultivated for ornament from Europe.
orontium, *Small Snapdragon*, cultivated in some gardens.
maurandioides, cultivated for ornament from Texas and Mexico, as Maurandia antirrhiniflora. Perennial.

MAURANDIA, *Mexican Climbers*, cultivated for ornament.
barclayana.
semperflorens.
erubescens.
scandens.

DIGITALIS, *Foxglove.*
purpurea, *Purple Foxglove*, cultivated for ornament from Europe. Perennial.

GERARDIA, "handsome but uncultivated plants,"—Gray.
purpurea, *Purple Gerardia*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
aspera, native, Lapham.
tenuifolia, native, Lapham; Cook county, Babcock.
setacea, native, Vasey.
flava, *Downy False Foxglove*, native, Macauley.
quercifolia, *Smooth False Fox Glove*, native, Lapham; Cook county, Babcock.
integrifolia, native, Lapham.
pedicularia, native, Lapham; Cook county, Babcock.
auriculata, native, Lapham; Cook county, Babcock; Champaign county, Macauley.

SEYMERIA, erect branching herbs.
macrophylla, *Mullein Foxglove*, native south, Lapham; Cook county, Babcock.
grandiflora, Benth. McHenry county, Vasey; Winnebago, Bebb; Peorio, Brendel; Menard, Hall. Rare.

MIMULUS, *Monkey Flower.*
ringens, native, Lapham; Cook county, Babcock; Champaign, Macauley. Common.
alatus, native, Lapham. Southward.
jamesii, native, Lapham Northward.
glutinosus, cardinalis and moschatus are cultivated for ornament chiefly in conservatories from western shore of North America.

TORENIA.
asiatica, hot house plant from India.

ILYSANTHES, small, smooth annuals.
gratioloides, *False Pimpernel*, native, Lapham; Cook county, Babcock. Common.

GRATIOLA, *Hedge Hyssop*, low herbs, mostly perennials.
virginiana, native, Lapham; Cook county, Babcock.
sphærocarpa, native, Vasey.
missouriana and anagalloidea are noted as native by Lapham.

SCROPHULARIA, *Figwort*, rank herb.
nodosa, native, Lapham; Cook county, Babcock; Champaign county Macauley.

CHELONE, *Turtle Head, Snake Head, Balmony.*
glabra, native, Lapham; Cook county, Babcock; Champaign county, Macauley.

PENSTEMON, *Beard Tongue*, perennials.
pubescens, native, Vasey; Cook county, Babcock. Sometimes cultivated.
digitalis, native, Vasey; Cook county, Babcock. Sometimes cultivated.
gracilis and lanigatis, noted by Lapham.
grandiflorus, from Minnesota; cobæa, from Nebraska and Missouri; ovatus from Oregon, and barbatus from Mexico are cultivated for ornament. Also hartwegi and campanulatns from Mexico, which are not hardy north.

RUSSELLIA, perennial house and bedding plants.
juncea, cultivated from Mexico.

CASTILLIA, *Painted Cup.*
coccinea, *Scarlet Painted Cup*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
sessiliflora, native, Vasey, Bebb.

PEDICULARIS, *Lousewort*, perennials.
canadensis, *Common Pedicularis* or *Wood Betony*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
lanceolata, native, Lapham; Cook county, Babcock. Champaign county.

MELAMPYRUM, *Cow Wheat*, annual.
americanum, native; Cook county, Babcock.

HERPESTIS, *Low Herb.*
rotundifolia, native, Lapham; Champaign county, Macauley.

CONIOBEA, *Low Branching Herbs.*
multifida, native, Lapham; Champaign county, Macauley.

ACANTHACEÆ—Acanthus Family. Chiefly a Tropical Family.

THUNBERGIA,, showy flowers.
alata, cultivated as an annual, from Africa.

ACANTHUS.
mollis, occasionally cultivated from southern Europe.

DIANTHERA, *Water Willow.*
americana, L., borders of streams and ponds.

RUELLIA.
ciliosa, *Pursh*, dry grounds. Common.
strepens, L., Woods.

VERBENACEÆ—Vervain Family.

PHRYMA, *Lapseed*, annual.
leptostachya, native, Lapham; Cook county, Babcock; Champaign county, Macauley.

VERBENA, *Vervain*, many hybrids.
angustifolia, native, Lapham; Cook county, Babceck.
hastata *Blue Vervain*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
urticifolia, *Nettle Leaved* or *White Vervain*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
stricta, *Hoary Vervain*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
officinalis, *European Vervain*, naturalized from Europe, Vasey.
bracteosa, native, Lapham; Cook county, Babcock.
aubletia, native, Lapham. Also cultivated.
chamædrifolia, *Original Scarlet Verbena*, also named phlogiflora. tweediana, incisa, teucroides, erinoides or multifida,, and pulchella or tenera, are South American species, cultivated for ornament and "variously and greatly mixed."

LIPPIA.
lanceolata, *Fog Fruit*, native, Lapham; Cook county, Babcock.
citriodora, (or Aloysia), *Lemon Scented* or *Sweet Verbena*. Shrub from Chili.

LANTANA, tropical or sub-tropical plants, mostly shrubby, planted out in summer.
camara, from tropical America.
mixta, from Brazil.
nivea, from Brazil.
involucrata, from West Indies.
sellowiana, of southern Brazil. "Among bedding plants the lantana holds the foremost rank; indeed, it is only as a bedding or summer blooming plant that it is deserving of cultivation."—Rand.

LABIATÆ—Mint Family. Chiefly herbs with aromatic herbage.

TEUCRIUM, *Germander*, perennial.
canadense, *American Germander*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.

TRICHOSTEMA, *Blue Curls*, annual.
dichotomum, *Common Blue Curls* or *Bastard Pennyroyal*, native.

ISANTHUS, *False Pennyroyal*, low annual.
cæruleus, native, Lapham.

OCIMUM, *Sweet Basil.*
basilicum, cultivated as sweet herb from India.

COLEUS, tender tropical plant.
blumei, cultivated from Java for ornamental foliage, especially its variety verschaffeltti. "We tave no plant its superior for a mass of color."—Rand.

LAVANDULA, *Lavender*, low under-shrub.
vera, garden lavender, cultivated from southern Europe for its medicinal and other properties.

PERILLA, annual from China and Japan.
ocimoides, var. crispa or p. nankinensis, cultivated for its foliage.

MENTHA, *Mint*, perennials.
viridis, *Spearmint*, naturalized from Europe, Lapham.
canadensis, *Wild Mint*, native, Lapham; Cook county, Babcock.
piperita, L. Wet places, not common.

LYCOPUS, *Water Horehound*, perennial.
virginicus, *Bugle Weed*, native, Lapham.
europæpus, native, Cook county, Babcock; Champaign county, Macauley.
var. sinuatus, native, Lapham; Cook county, Babcock.
var. integrifolius, Gray.

CUNILA, *Dittany.*
mariana, *Common Dittany*, native, Vasey.

COLLINSONIA, *Horse-Balm.*
canadensis, *Rich Weed, Stone Root*, Wabash county, Schenck; Jackson county, French.

HEDEOMA, *Mock Pennyroyal*, annuals.
pulegioides, *American Pennyroyal*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
hispida, native, Lapham; western Illinois, Gray.

HYSSOPUS, *Hyssop*, perennial.
officialis, cultivated in gardens, from the old world.

PYCANTHEMUM, *Mountain Mint, Basil.*
incanum, native, Vasey; Champaign county, Macauley.
muticum, Pers. Wabash county, Schenck.
pilosum, native, Lapham.
lanceolatum, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
linifolium, native, Lapham; Champaign county, Macauley.

ORIGANUM, *Marjoram*, perennial.
majorana, *Sweet Marjoram*, cultivated in kitchen gardens, from Europe.

THYMUS, *Thyme*, perennial, of the old world.
serpyllum, *Creeping Thyme*, cultivated as a sweet herb.
vulgaris, rarely cultivated.

SATUREIA, *Savory*, annual.
hortensis, *Summer Savory*,, adventive from Europe, Lapham. Sweet herb.

CALAMINTHA, *Calaminth*, perennial.
glabella, native, Vasey; Cook county, Babcock.
var. nuttallii, native, Cook county, Babcock.

MELISSA, *Balm, Bee Balm, Sweet Herb*, perennial.
officinalis, *Common Balm*, cultivated as sweet herb and naturalized from Europe, Lapham.

SALVIA, *Sage*, perennial and annual.
lyrata, native, Gray, perennial.
officinalis, *Common Sage*, cultivated for its "savory foliage," from southern Europe, annual.
patens, from Mexico; splendens or *Scarlet Sage* from Brazil; fulgens, Cardinal or Mexican red sage, from Mexico; coccinea and pseudo-coccinea from tropical America, and argentea from the Mediterranean region are cultivated for ornament.

ROSMARINUS, *Rosemary.*
officinalis, cultivated from southern Europe as a pot-herb. Not hardy north.

MONARDA, *Horse Mint* or *Balm.*
fistulosa, *Wild Bergamot*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
bradburiana, native, Lapham; Cook county, Babcock.
punctata, *Horse Mint*, native, Lapham; Cook county, Babcock.
clinopdia, L. Henderson county, Patterson; Marion, Bebb.

BLEPHILIA, perennial herbs, common.
ciliata, native, Lapham.
hirsuta, native, Lapham; Cook county, Babcock.

LOPHANTHUS, *Giant Hyssop*, perennial, tall herbs.
nepetoides, native, Lapham. Cook county, Babcock; Champaign county, Macauley.
scrophulariifolius, native, Lapham; Cook county, Babcock.

NEPETA, *Cat Mint.*
cataria, *Catnip*, naturalized from Europe, Lapham; Cook connty, Babcock; Champaign county, Macauley, etc.
glechoma, *Ground Ivy*, Gill; adventive from Europe, Lapham; Cook county, Babcock; Champaign.

DRACOCEPHALUM, *Dragon Head.*
parviflormm, native. Cook county, Babcock.

CEDRONELLA, perennials, not hardy.
tryphylla, *Balm of Gilead* of English Gardens, cultivated from Madeira.
mexicana, cultivated from New Mexico.

PHYSOSTEGIA, *False Dragon Head*, smooth perennials,
virginiana, native, Lapham; Cook county, Babcock; Champaign county, Macauley.

BRUNELLA, *Self Heal or Heal All*, perennial.
vulgaris, *Common Self Heal or Heal All*, native, Lapham; Cook county, Baccock; Champaign county, Macauley.

SYNANDRA.
grandiflora, Nutt; Jackson county, French; Union, French.

SCUTELLARIA, *Skull. Cap*, perennials.
versicolor, native, Lapham.
canescens, native, Lapham.
serrata, native, Lapham.
nervosa, native, Lapham.
parvula, native, Lapham; Vasey; north, Bebb; Cook county, Babcock; common, Brendel.
var. mollis, Gray; Henderson county, Patterson; Kankakee, Hill; and southward.
galericulata, native, Lapham; Cook county, Babcock.
lateriflora, native, Lapham; Cook county, Babcock; Champaign county, Macauley.

MARRUBIUM, *Horehound*, bitter perennials.
vulgare, *Common Horehound*, naturalized from Europe, Lapham.

LAMIUM, *Dead Nettle.* low spreading herbs.
maculatum, cultivated from the old world.

LEONURUS, *Motherwort*,
cardiaca, naturalized from Europe, Lapham; Cook county, Babcock; Champaign county, Macauley.

STACHYS, *Hedge Nettle*, perennial.
palustris, native, Cook county, Babcock; Champaign county, Macauley.
var. glabra, Gray; woods, common.
var. cordata, Gray; scarce.
var. aspera, native, Lapham.
hyssopifolia, native, Gray; Cook county, Babcock.
lanata, cultivated from Europe for ornament.
coccinea, *Scarlet Stachys*, cultivated from Mexico for ornament.

BETONICA, *Betony*, perennials, cultivated occasionally from old world.
grandiflora, *Great Betony*, from northern Asia.
officinallis, *Wood Betony*, from Europe.

PHLOMIS, *Jerusalem Sage*, perennial.
tuberosa, cultivated from eastern Europe.

MOLUCCELLA, *Molucca Balm, Shell Flower*.
lævis, cultivated from Asia, annual.

BORRAGINACEÆ—Borage Family. Chiefly rough, hairy herbs, not aromatic.

BORRAGO, *Borage*, annual, cultivated from Europe.
officinalis, *Common Borage*, pot herbs, etc.

MERTENSIA, perennial.
virginica, *Virginian or Smooth Lungwort*, native, Lapham; Cook county, Babcock; Champaign county, Macauley. Cultivated for ornament.

ONOSMODIUM, *False Gromwell*, perennials.
virginianum, native, Lapham.
carolinianum, native, Vasey; common.

ECHINOSPERUM, *Stickseed*.
lappula, Lehm. roadsides, etc., common, naturalized from Europe.

LITHOSPERMUM, *Gromwell Puccoon*.
arvense, *Corn Gromwell*, naturalized from Europe.
angustifolium, native, Lapham; includes L. longiflorum, Spreng.
officinale, *Common Gromwell*, adventive from Europe, Champaign county, Macauley.
latifolium, native, Lapham; Cook county, Babcock.
hirtum, *Hairy Puccoon*, native, Lapham; Cook county, Babcock, Champaign county.
canescens, *Hoary Puccoon or Alkenet*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
longiflorum, native, Lapham; Cook county, Babcock. (See above).

MYOSOTIS, *Forget-me-not or Scorpion Grass*.
verna, native, Lapham; Cook county, Babcock.

OMPHALODES, cultivated from Europe for ornament.
verna, *Blue or Spring Navelwort*, perennial.
linifolia, *White Navelwort*, annual.

CYNOGLOSSUM, *Hound's Tongue*.
officinale, *Common Hound's Tongue*, naturalized from Europe, Lapham; Cook county, Babcock, Champaign county, Macauley.
virginicum, *Wild Comfrey*, native, Lapham; Marion county, Bebb; perennial.
morisoni, *Beggar's Lice*, native south, Lapham; Cook county, Babcock; Champaign county, Macauley.

SYMPHYTUM, *Comfrey*, cultivated from old world.
officinale, and asperrimum, are used medicinally and in some repute for fodder.

HELIOTROPIUM, *Heliotrope*.
curassavicum, native, Gray; annual.
peruvianum, *Sweet Heliotrope* and corymbosom are perennial house and bedding plants cultivated from Peru and Chili.

HELIOPHYTUM.
indicum, *Indian Heliotrope*, adventive from India, south Illinois, Lapham.

HYDROPHYLLACEÆ—Waterleaf Family.

HYDROPHYLLUM, *Waterleaf*. perennials.
macrophyllum, Nutt; Wabash county, Schneck.
virginicum, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
canadense, native, Vasey.
appendiculatum, native, Lapham, Cook county, Babcock; Champaign county.

NEMOPHILA, annuals, cultivated for ornament.
phacelioides, from Arkansas.
insignis, from California.
maculata, from California.
atomaria, from California.

PHACELIA, mostly cultivated for ornament.
congesta, cultivated? from Texas.
tanacetifolia, cultivated from California.
bipinnatafida, native, Vasey; St. Clair county, Brendel.
purshii, native, Lapham.
viscida, cultivated from California.

ELLISIA.
nyctelea, L., common.

WHITLAVIA, annual.
grandiflora, cultivated for ornament from California.

HYDROLEA, perennial.
affinis, native, (on Ohio river) Vasey.

POLEMONIACEÆ—POLEMONIUM FAMILY.

PHLOX.
drummondii, cultivated for ornament from Texas, and parent of the annual phloxes of the gardens
paniculata var acuminata, native, Lapham; perennial.
maculata, *Wild Sweet William*, native, Vasey; Woodford and St. Clair counties, Brendel; Champaign county.
glaberrima, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
pilosa, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
stellaria, Gray; Grand Tower, Jackson county.
reptans, native, Vasey; Brendel.
divaricata, native, Lapham; Cook county, Babcock, Champaign county.
var. laphamii, Champaign county, Macauley.
bifida, native, Lapham; Cook county, Babcock.

GILIA, cultivated for ornament, biennial.
coronopifolia, or ipomopsis, *Cypress*.
androsacea, or Letosiphon androsaceus, from California, annual.
tricolor, annual, from California.
capitata, from California and Oregon.

POLEMONIUM, *Greek Valerian, Jacob's Ladder*.
reptans, native, Lapham; Cook county, Babcock; Champaign county, Macauley; cultivated.
cæruleum, cultivated for ornament from Europe, also native.
capitata, cultivated from Oregon.

COBÆA, perennial, climber from Mexico.
scandens, cultivated as a house plant.

CONVOLVULACEÆ—CONVOLVULUS FAMILY.

QUAMOCLIT, annuals.
vulgaris, *Cypress Vine*, cultivated from Mexico for ornament.
coccinea, naturalized from tropical America or India, Champaign county, Macauley.

IPOMŒA, *Morning Glory*.
purperea, *Common Morning Glory*, adventive from tropical America, Vasey; Champaign county, Macauley, annual.
nil, *Smaller Morning Glory*, adventive from tropical America, Lapham; Champaign county, Macauley, annual.
learii, cultivated from South America, perennial.
bona-nox or Calonyction speciosum, cultivated for ornament.
batatus, *Sweet Potato*, cultivated from the East Indies, perennial. The production of this vegetable in Illinois and the United States has been as follows:

Year.	Production.	United States.	Illinois.
1850.....	Sweet Potatoes, bushels	38,268,148	157,432
1860.....	" "	42,095,026	306,154
1870.....	" "	21,709,824	322,641

Union county grew 65,052 bushels of the amount credited to the whole state for 1870; Williamson, Jackson and Madison counties come next.
pandurata, *Wild Potato Vine*, or *Man of the Earth*, native, Lapham; Cook county, Babcock; Champaign county, Macauley, perennial.
lacunosa, native; Lapham.

CONVOLVULUS, *Bindweed*.
tricolor, cultivated from Europe for ornament, annual.

CALYSTEGIA, *Bracted Bindweed*.
sepium, *Hedge Bindweed*, native. Lapham; Cook county, Babcock; Champaign county, Macauley.
spithamæa, native; Lapham; Cook county, Babcock; Champaign county, Macauley.

BONAMIA,
pickeringii, Gray; common and seemingly indigenous in Henderson county, Patterson.

EVOLVULUS.
argenteus, native, is found at Potosi, Missouri, Gray.

CUSCUTA, *Dodder*, parasitic plants with thread-like stems.
tenuiflora, native, south, Lapham.
inflexa, native, Lapham. (Umbrosia).
decora, southwestern Illinois, Engelmann.
arvensis, native, south, Lapham.
chlorocarpa, native, south, Lapham.
gronovii, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
compacta, native, south, Lapham.
glomerata, native, south, Lapham.

SOLANACEÆ—NIGHTSHADE FAMILY. Plants with rank-scented herbage.

NOLANA, annuals planted for ornament. from Peru and Chili.
atriplicifolia.
prostrata.

LYCOSPERSCICUM, *Tomato.*
esculentum, *Tomato*, cultivated from tropical America, including many varieties and forms, annual. The use of this vegetable increases rapidly from year to year, until it begins to rank among the most important.

SOLANUM, *Nightshade.*
rostratum, Dunol. introduced from western plains, Adams county.
carolinense, *Horse Nettle*, native south, Lapham; Cook county, Babcock; Champaign county, Macauley, perennial.
melongena, *Egg Plant, Aubergine;* cultivated from tropical Africa or America for food, annual.
nigrum, *Black or Common Nightshade*, naturalized from Europe, Lapham; Cook county, Babcock; Champaign county, Macauley, etc.
tuberosum, *Potato*, cultivated from Chili for the esculent tubers. Production in the United States and Illinois has been as follows:

Year.	Production.	United States.	Illinois.
1850.....	Potatoes, bushels.....	65,797,896	2,514,761
1860.....	" "	111,148,867	5,540,390
1870.....	" "	143,337,473	10,944,790

New York, Pennsylvania and Ohio each produce much more than Illinois. Of the Illinois counties, Madison produced 557,460 bushels in 1870, and Cook, 444,554. These two counties lead. The northern and central counties, as a rule, grow more than the southern counties.

dulcamara, *Bitter Sweet*, naturalized from Europe, Lapham.
jasminoides, cultivated as a house plant, from Brazil, woody stemmed and tall, climbing perennial.
pseudo-capsicum, *Jerusalem Cherry*, cultivated from Madeira, shrubby perennial house plant, with bright red berries.

CAPSICUM, *Cayenne or Red Pepper*, South America.
annuum, *Common Capsicum* cultivated for the pungent fruit, annual.
cerasiforme, is cultivated for ornament and sometimes for use.

PHYSALIS, *Ground Cherry.*
alkekengi, *Strawberry Tomato*, cultivated from southern Europe for its edible fruit. Burr says it is a South American fruit.
angulata, L., Menard county, Hall; Union, Vasey.
pennsylvanica, native, Cook county Babcock,
var. lanceolata, native, Lapham.
viscosa, native, Lapham; Cook county, Babcock; Champaign county, cultivated says Darlington.
pubescens, native, Lapham; Champaign county, Macauley.
philadelphica, native; Lapham; Champaign county, Macauley; cultivated, Gray.

NICANDRA, *Apple of Peru*, annual weed.
physaloides, adventive from Peru, Lapham.

ATROPA, *Belladonna*, perennial.
belladonna, sometimes cultivated from Europe for medicine, poisonous.

PETUNIA. cultivated as garden, flowering annuals from South America.
nyctaginiflora.
violacea.

NIEREMBERGIA, perennial and annual.
gracilis, cultivated for ornament from Buenos Ayres.

NICOTIANA, *Tobacco.*
tabacum, *Common Tobacco.* cultivated for the narcotic foliage and become an important article of production. Its production the last three census has been as follows:

Year.	Production.	United States.	Illinois.
1850..... ...	Tobacco, pounds	199,752,655	841.394
1860.....	" "	434,209,461	6,885,262
1870.....	" "	262,735,341	5,249,264

Ten states lead Illinois in tobacco production. Of our own counties, Saline produced 1,155,941 pounds in 1870, and Williamson, 1,152,509 pounds. Stephenson and Jo Daviess were the only northern counties that produced more than 10,000 pounds.

DATURA, *Thorn-Apple, Stramonium.*
stramonium, *Jamestown Weed,* or corrupted, *Jimson Weed,* adventive from Asia, Lapham, Cook county, Babcock: Champaign county, Macauley, etc.
tatula, L., a common weed.
metel, cultivated for ornament.
meteloides, cultivated from New Mexico for ornament under name of wrightii.
arborea and suaveolens are tropical American tree-like shrubs cultivated in conservatories.

CESTRUM, shrubs cultivated in conservatories.
elegans or habrothamus elegans, from Mexico, nocturnum from West Indies, and parqui from Chili.

LYCIUM, trailing, climbing, or low spreading shrubs.
vulgare, *Matrimony Vine,* introduced from Mediterranean region, Lapham.

GENTIANACEÆ—Gentian Family. Very smooth and bitter tonic plants.

SABBATIA, *American Centaury.*
angularis, native, Lapham; Cook county, Babcock.

ERYTHRÆA, *Centaury.*
centaurium, introduced, Cook county, Babcock.

FRASERA, *American Columbo.*
carolinensis, native, Lapham; Madison county, used as a tonic medicine,

GENTIANA, *Gentian.*
quinqueflora, *Five-Flowered Gentian,* native, Lapham, Cook county, Babcock; Champaign county.
crinita, *Fringed Gentian,* native, Lapham; Cook county, Babcock.
detonsa, *Smaller Fringed Gentian,* native, Vasey; Cook county, Lapham.
ochroleuca, *Yellowish White Gentian,* native, Lapham.
alba, *Whitish Gentian,* native, Lapham; Cook county, Babcock.
andrewsii, *Closed Gentian,* native, Cook county Babcock, Champaign county.
saponaria, *Soapwort Gentian,* native, Gray.
puberula, native, Cook county, Babcock; Champaign county.

OBLARIA, low very smooth, purplish-green perennial.
virginica, native, Vasey. St. Clair county, Brendel.

MENYANTHES, *Buckbean,* perennial herb.
trifoliata, native, Lapham, Cook county, Babcock; Boggs.

BARTONIA.
tenella, *Muhl,* woods, Kankakee county, Hill.

LOGANIACEÆ—Logania Family.

SPIGELIA, *Pink-Root* or *Worm-Grass.*
marilandica, *Maryland Pink Root,* native, Lapham. perennial, used as a vermifuge.

APOCYNACEÆ—Dogbane Family. Herbaceous or woody plants, milky juice.

ALLAMANDA, from Guiana.
cathartica, showy conservatory shrub.

NERIUM, *Oleander,* from the Levant and India.
oleander, and odorum, or sweet oleander, are house and conservatory plants.

ECHITES, from warm parts of America.
suavolens, or Mandevillea suavolans, *Chili Jessamine,* conservatory climber.

FORSTERONIA.
difformis, native south, Vasey; barely woody climber.

VINCA, *Periwinkle*, perennials, from Europe.
minor, common *Periwinkle*. creeping evergreen plant.
major, *Large Periwinkle*, not quite hardy north.
herbacea, not evergreen.
rosea, erect house and bedding plant from West Indies.

APOCYNUM; *Dogbane, Indian Hemp*.
androsæmifolium, *Spreading Dogbane*, native, Lapham; Cook county, Babcock, Champaign county, Macauley.
cannabinum, *Indian Hemp*, native, Lapham; Cook county, Babcock, Champaign county.

AMSONIA.
tabernæmontana, native southward, Lapham.

ASCLEPIADACEÆ—Milkweed Family.

ASCLEPIAS, *Milkweed. Silkweed*. perennials.
tuberosa, *Butterfly Weed, Pleurisy Root*, native, Lapham; Cook county, Babcock; Champaign county.
curassavica, cultivated from South America as a house and bedding plant.
incarnata, *Swamp Milkweed*, native, Lapham; Cook county, Babcock; Champaign county.
ovalifolia, Decaisne, McHenry county, Vasey.
meadii, Torr, Huncock county, Mead; Peoria, Brendel; Menard, Hall; rare.
obtusifolia, native, Lapham; Cook county, Babcock; Champaign county.
cornuti, common *Milkweed* or *Silkweed*, native, Lapham; Cook county, Babcock, Champaign county.
sullivantii, native, Lapham; Cook county, Babcock; Champaign county.
phytalaccoides, *Poke Milkweed*, native; Vasey; north, Bebb; Cook county, Babcock; Peoria county, Brendel.
purpurascens, native, Lapham; Cook county, Babcock; Champaign county.
variegata, *Variegated Milkweed*, native, Lapham.
quadrifolia, *Four-leafed Milkweed*, native, Lapham.
nuttalliana, ? native, Vasey; Lapham.
verticillata, *Whorled Milkweed*, native, Lapham: Cook county, Babcock.
perenis, Walt. southward.

ACERATES, *Green Milkweed*, perennials.
viridiflora, native, Lapham; Cook county. Babcock.
longifolia, native, Lapham; Cook county, Babcock.
paniculata, native, Vasey.
monocephala, (?) native. Vasey.
lanuginosa, Decaisne. Winnebago county, Bebb; McHenry, Vasey.

ENSLENIA, perennial.
albida, native south, Lapham.

GONOLOBUS, twining perennial herbs.
laevis, native, Vasey; Wabash county, Schneck.

HOYA, *Wax Plant*.
carnosa, house plant from India

STEPHANOTUS.
floribunda, hot house twiner from Madagascar.

PERIPLOCA.
græca, ornamental climber from southern Europe, hardy in middle states.
stapelia, fleshy plants from Cape of Good Hope.
hirsuta, conservatory plant.

OLEACEÆ—Olive Family. Trees or Shrubs—chiefly smooth.

JASMINUM, *Jessamine*, cultivated for ornament, all tender.
odoratissimum, common sweet yellow jessamine, from Madeira.
revolutum, from Himalayas or China.
officinale, common White jessamine, from the East.
grandiflorum, from India.
azoricum, from Azores and Madeira.
sambac, from tropical India.

FOTSYVHIA, ornamental shrubs from China and Japan.
viridissima, early yellow flowers.
suspensa.

SYRINGA, *Lilac*, ornamental tall shrubs.
vulgaris. or common lilac, cultivated from eastern Europe or Persia.
perrica, Persian lilac, more slender. Nearly 40 varieties of the lilac are now advertised by one nursery.

LIGUSTRUM, *Privet* or *Prim*, cultivated for ornament.
vulgare, *Common Privet*, cultivated for hedges, etc., from Europe.
japonicum, cultivated from Japan, not hardy north.

OLEA, *Olive.*
Europæa, *Olive of the Levant*, not hardy in Illinois.
americana, *Devil-Wood*, cultivated for ornament.
fragrans or osmanthus, fragrans of China and Japan, conservatory shrub.

CHIONANTHUS, *Fringe Tree.*
virginica, cultivated from eastern states for ornament.

FRAXINUS, *Ash.*
americana, *White Ash*, native in Cook and Hardin, and probably nearly or quite all the counties. Mr. Ridgeway gives the measurement of one near Mt. Carmel as 144 feet high, 90 feet of trunk and a circumference of 17½ feet. Prof. Swallow measured one in Mississippi county, Mo., 100 feet high and 17 feet in circuit. Considering its ease of propagation, rapidity of growth and value of its timber, the white ash is one species that should go into every plantation.
viridis, *Green Ash*, native, Vasey; Wabash county, Ridgeway; Fulton county, Wolf. "Does not rank above a middle-sized tree."—Bryant. Often mistaken for white ash.
sambucifolia, *Black or Water Ash*, native, Vasey, North, Bebb; Wabash county, Ridgeway and in many other counties. "The wood is more elastic than that of any other species."—Bryant. A large tree.
quadrangulata, *Blue Ash*, native, Lapham, Vasey; Peoria, Menard and Grundy counties, Brendel; Fulton and Henry counties, Geological report. Rare north of Bureau county. "The most durable species,"—Bryant. A large tree.
ornus, *Flowering Ash of Southern Europe*, not hardy north.
excelsior, *European Ash*. "Inferior to the white and blue ashes for timber."—Bryant.

FORESTIERA, shrubs.
acuminata, native, Lapham. Southward.
liquatrina, native. St. Clair county, Brendel.

ARISTOLOCHIACEÆ—Birthwort Family. Twining Shrubs or Low Herbs.

ASARUM, *Asarabacca. Wild Ginger.*
canadense, *Snake Root*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.

ARISTOLOCHIA, *Birthwort.*
serpentaria, *Virginia Snakeroot.*
tomentosa, native, south, Lapham.
sipho, *Dutchman's Pipe*, cultivated climbers.

NYCTAGINACEÆ—Four O'clock Family.

ABRONIA, western North American herbs. Cultivated for ornament. Perennials.
umbelletta, from coast of California.
fragrans, from Rocky Mountains. Hardy north.

OXYBAPHUS, herb.
nyctagineus, native, Lapham. "Likely to become a troublesome weed."—Patterson.

MIRABILIS, *Four O'clock. or Marvel of Peru*, natives of warm parts of America. Perennials.
jalapa, cultivated for ornament in many varieties.
longiflora, less common in cultivation.
wrightiana, cultivated from Texas.

PHYTOLACCACEÆ—Pokewood Family.

PHYTOLACCA, *Poke* or *Pokewood*, perennial.
decandra *Common Poke* or *Scoke*, or *Garget*, etc., native, Lapham. Common throughout the state. Young stalks used like asparagus.

CHENOPODIACEÆ—Goose-foot Family. Homely Herbs.

BOUSSINGAULTIA, perennial, ornamental.
baselloides, cultivated from South America.

BETA, *Beet*, biennials.
vularis, *Common Beet*, cultivated from Southern Europe in many varieties. Thus far grown but scantily in the United States.

SPINACIA, *Spinach.*
olercea, *Common Spinach*, cultivated from the Orient as a pot herb.

BLITUM, *Blite.*
capitatum, *Strawberry Blite*, native, Lapham.

CYCLOLOMIA, *Winged Pigweed*, annual.
platyphyllum, native, Lapham; Cook county, Babcock.

CHENOPOMIUM, *Goosefoot Pigweed*, weeds.
album, *White Goosefoot or Lambsquarter Pigweed*, naturalized from Europe, everywhere.
glaucum, *Oak-leafed Goosefoot*, naturalized from Europe, Vasey; Cook county, Babcock.
murale, adventive from Europe, Lapham.
hybridum, *Maple-leafed Goosefoot*, naturalized from Europe, Lapham; Cook county, Babcock.
botrys, *Jerusalem Oak, Feather Geranium*.
ambrosoides, *Mexican Tea*, naturalized from tropical America, Lapham; common.
anthelminticum, *Wormseed*, naturalized from tropical America, Lapham; vermifuge.

ATRIPLEX, *Orache*, herb.
patula, var. hastata. Cook county, Babcock.

CORISPERMIUM. *Bugseed*, low branching annual.
hyssopifolium, native, Vasey; Cook county, Babcock.

AMARANTACEÆ—Amaranth Family.

ACHYRANTHES, or iresine verschifelti, is cultivated for its red foliage.

AMARANTHUS, *Amaranth*, annuals.
paniculatus *Prince's Feather*, escaped from gardens, from Mexico.
candatus, *Prince's Feather*, cultivated for ornament, from India.
hypochondriacus, cultivated from Mexico for ornament, and adventive, Vasey.
melancholicus, *Lover Lies Bleeding*, cultivated from China or India.
retroflexus, *Common Pigweed*, adventive from tropical America.
var. hybridus, Lapham.
albus, naturalized from tropical America.
spinosus, *Thorny Amaranth*, naturalized from tropical America, Lapham; Cook county, Babcock.

CELOSIA, *Cockscomb*, annual, ornamental.
cristata, cultivated from India.

GOMPHRENA, *Globe Amaranth or Bachelor's Button.*
globosa, cultivated from India, for ornament.

MONTELIA, annual glabrous plant.
tamariscina, native, Lapham; Cook county, Babcock.

ACNIDA, *Water Hemp*, annual.
cannabina, native, (?) Lapham.

IRESINE, nearly glabrous annual.
celosioides, native, Gray; Wabash county, Schneck.

FRŒLICHIA, hairy or woolly herbs.
floridana, native, Lapham.

POLYGNACEÆ—Buckwheat Family.

POLYGONUM, knot weeds.
orientale, *Prince's Feather*, adventive from India, common.
hartwrightii, Gray; Winnebago county, Bebb.
pennsylvanicum, native, Lapham; Cook county, Babcock; Champaign county.
incarnatum, native, Cook county, Babcock, Champaign county.
lapathifolium, native, Lapham; probably a synonym of incarnatum.
persicaria, *Lady's Thumb*, naturalized from Europe.
hydropiper, *Common Smart Weed or Water Pepper*, native, Lapham; Cook county, Babcock; Champaign county, Macauley; annual.
acre, *Water Smartweed*, native, Lapham; Champaign county, Macauley.
hydropiperoides, *Mild Water Pepper*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
amyhibium, *Water Persicaria*, native, Lapham; Cook county, Babcock; Champaign county.
virginianum, native, Lapham; Cook county, Babcock.
arifolium, native, Vasey.
convolvules, *Black Bindweed*, introduced from Europe, Vasey; Cook county, Babcock; Champaign county, Macauley.
articulatum. *Joint Weed*, native, Cook county, Babcock.
aviculare, *Knotgrass, Goosegrass, Doorweed*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
var. erectum, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
ramoissimum, native, Lapham; Champaign county, Babcock.
tenue, native, Lapham.
saggittatum, *Arrow-Leafed Tear-Thumb*, native, Lapham; Cook county, Babcock.
dumetorum, *Climbing False Buckwheat*, native, Lapham; Cook county, Babcock; Champaign county, Macauley.
var. scandens, Cook county, Babcock.

FAGOPYRUM, *Buckwheat*,
esculentatum, *Common Buckwheat*, cultivated from northern Asia for the grain and for the flowers in honey production.

Year.	Production.	United States.	Illinois.
1850.....	Buckwheat, bushels.....	8,956,912	184,504
1860.....	" "	12,571,818	324,117
1870.....	" "	9,821.721	168,862

Illinois is far behind the other great states in the production of buckwheat. New York produced 3,904,030 bushels in 1870, and Pennsylvania 2,532,173 bushels. The only county in Illinois producing any considerable quantity, was McHenry, 20,412 bushels. Champaign, DeKalb, Kane, Ogle, Stephenson, Wayne and Winnebago, were all the counties besides that produced over 5,000 bushels. All but one of these are northern counties.

tartaricum, *Tartary or Indian Wheat*, cultivated from Tartary, more hardy and productive, but of poorer quality than the last.

RHEUM, *Rhubarb*, perennial.
rhaponticum, *Garden Rhubarb, Pie Plant*, cultivated from northern Asia for the acid, fleshy stalks of its leaves.

RUMEX, *Dock, Sorrel.*
orbiculatus, *Great Water Dock*, native, Lapham; Cook county, Babcock.
britannica, *Pale Dock*, native, Lapham;
conglomeratus, Murray; *Smaller Green Dock*, Kankakee county, Hill.
patientia, L, . spontaneous about gardens at Augusta, Ills., Mead.
verticillatus, *Swamp Dock*, native, Lapham; Champaign county, Macauley.
crispus, *Curled Dock*, naturalized from Europe, Lapham; the common perennial weed.
obtusifolius, *Bitter Dock*. naturalized from Europe, Lapham; perennial.
maritimus, *Golden Dock*, native, Vasey; annual.
engelmanni, *Sorrel*, southwestern Illinois, Gray.
acetosella, *Field or Sheep Sorrel*, naturalized from Europe; too common.

BRUNNICHIA,
cirrhosa, shrubby, smooth, climbing plant, Pulaski county, southwestern Illinois, Brendel.

LAURACEÆ—Laurel Family.

SASSAFRAS.
officinallis, native, Lapham; Cook county, Babcock; Champaign county, Macauley, and probably throughout the state. Mr Ridgeway measured one near Mt Carmel 95 feet high, with 75 feet of trunk and a circumference of 7¾ feet. Prof. Swallow measured one in Mississippi county, Mo., 70 feet high and 9 feet in circumference. Bryant saw it of an equal girth in Mississippi.

LINDERA, *Wild Allspice, Fever Bush.*
benzoin, *Spice Bush, Benjamin Bush*, native, Lapham; Wabash county, Ridgeway: Champaign county; shrub.
melissæfolia, native, Wabash county, Ridgeway.

THYMELEACEÆ—Mezereum Family.

DAPHNE, cultivated for ornament.
mezereum, hardy, low shrub from Europe.
cneorum, hardy under shrub from Europe.
odora, *Sweet Daphne*, greenhouse shrub from China.

DIRCA, *Leather-wood, Moose-wood*, shrub.
palustris, native, Vasey; Bebb, Champaign county. Used by the Indians for thongs.

ELÆAGNACEÆ—Oleaster Family. Shrubs or Small Trees.

SHEPHERDIA.
canadensis, *Canadian Shepherd*, native, Vasey; Cook county, Babcock; low shrub.
argentea. *Buffalo Berry*, planted from the westward, for ornament and its fruit.

ELEAGNUS.
argentea, *Silver Berry*, cultivated from the west,

SANTALACEÆ—Sandal Wood Family. Herbs, Shrubs or Trees.

COMANDRA, *Bastard Toad Flax.*
umbellata, native, Lapnam; Cook county, Babcock.

LORANTHACEÆ—Mistletoe Family. Shrubbery, Plants, Parasitic.

PHORADENDRON, *False Mistletoe, American Mistletoe,*
flavescens, *American Mistletoe,* native, parasitic south, Lapham.

SAURURACEÆ—Lizzard's Tail Family.

SAURURUS, *Lizzard's Tail.*
cernuus, native, Lapham; Champaign county, Macauley.

CERATAPHYLLACEÆ—Hornwort Family. Aquatic Herbs.

CERATOPHYLLUM, *Hornwort.*
demersum, native, Lapham; ponds.

CALLITRICHACEÆ—Water Starworts. Small Annuals or Perennials.

CALLITRICHE, *Water Starwort.*
austini, native, Gray.
verna, native, Vasey; north, Bebb; St. Clair county, Brendel.
heterophylla, native, Gray.
autumnalis, native; St. Clair county, Brendel.

EUPHORBIACEÆ—Spurge Family. Usually with a milky, acrid juice.

EUPHOTBIA, *Spurge.*
polygonifolia, native, Vasey.
geyeri, native, Lapham, Vasey.
serpens, native, Lapham.
glyptosperma, native; St. Clair county, Richl.
maculata, native, Lapham; Champaign county, Macauley.
humistrata, native, Lapham.
hypericfolia, native, Lapham; Champaign county, Macauley.
corallata, native, Lapham; Champaign county, Macauley.
helioscopia, L., a weed about gardens.
cyparissias, L., *Cypress Spurge,* in gardens and running wild.
dentata, native south, Lapham.
malginato, cultivated from westward for ornament.
heterophylia, native, Lapham.
commutata, Engelm; near Chicago, Babcock; Winnebago and Ogle counties, Bebb; Lee, Vasey.
obsutata, native south, Lapham.
lathyris, *Caper Spurge,* cultivated from Europe.
pulcherrima or poinsettia, of Mexico, splendens of the Mauritius, fulgens or jacquiniæflora, of Mexico, are shrubbery conservatory species.

ACALYPHA, *Three Seeded Mercury,* annuals.
virginica, native, Lapham, Champaign county.
var. gracilens, native, Lapham. Champaign county.
caroliniana, native, Lapham. Southward.

TRAGIA.
macrocarpa, wild; Pope county. Forbes.

RICINUS, *Palma Christi, Castor Oil Plant.*
communis, cultivated from Africa for its seeds and as an ornamental plant. Naturalized, Vasey. The census returns of castor beans, it seems, probably, are at least partly made with the returns of peas and beans in Illinois, and their relative or absolute production here cannot be determined.

CROTON, annuals.
glandulosus, native, Lapham; Henderson county, Patterson.
capitatus, native, Lapham. Southward.
monanthogynus, native, Lapham. Southward.

CROTONOPSIS, slender low annual.
linearis, native, Lapham. Southward.

PHYLLANTHUS.
carolinensis, native, Lapham. Southward.

BUXUS, *Box.*
sempervirens, *Tree Box* and var rana, *Dwarf Box,* are planted from the Mediterranean regions for edgings, etc. Both need winter protection north, and are not generally successful in more northern parts of the west.

URTICACEÆ—NETTLE FAMILY.

ULMUS, *Elm.*
fulva, *Slippery Elm, Red Elm*, native, Lapham. Is native in numerous counties, according to the geological reports, and probably throughout the state. Champaign county.
montana, *Wych* or *Scotch Elm*. Planted for ornament from Europe. Does not produce suckers, says Bryant.
campestris, or glabra, *English Elm*. Cultivated for ornament from Europe. "One of the most pestilent producers of suckers known."—Bryant.
americana, *American* or *White Elm*, native, probably, throughout the state. Very easily propagated, and very handsome as an ornamental tree. A rapid grower but of small value for timber. Prof. Swallow measured a tree of this species, I believe, in Pemiscot county, Missouri, 100 feet high, and 22 feet in circumference.
racemosa, *Corky, White Elm*, native, Vasey. "Found only in the north, and there sparsely. Greatly resembles the white elm."—Bryant.
alata, *Whahoo*, or *Winged Elm*, native; Vasey, Wabash county; Ridgeway, Union county. "Ninety feet high and seven feet in circumference, in Danklin county, Missouri."—Swallow.

CELTIS, *Hackberry* or *Nettle Tree.*
occidentalis, *American Hackberry, Sugarberry*, native, Lapham. Champaign county. Vasey's map gives this as one of the trees growing throughout the state. Prof. Swallow measured a specimen in Howard county, Missouri, 124 feet high and 11 feet in circumference. Only cultivated for ornament.
var crassifolia, native, Lapham.
mississippiensis, native; Vasey, in extreme south; Wabash county, Ridgeway.

FICUS, *Fig.*
carica, *Common Fig.* This plant is almost cultivable in the open air in the extreme south; certainly so with a moderate protection in winter. From the Levant.
elastica, *India Rubber Tree*, cultivated for ornament in conservatories.
repens, conservatory creeper from China. Many others in conservatories.

MORUS, *Mulberry.*
rubra, native, Lapham. Found, according to geological reports, in Madison, Hancock, Johnson, Massac, Pope, Jackson and Fulton counties. Champaign county. Mr. Ridgeway describes one near Mt. Carmel as 60 feet high, with 20 feet of trunk and ten feet in circumference. Valuable and durable timber.
nigra, *Black Mulberry.* Cultivated from the Levant. Not hardy.
alba, *White Mulberry*, adventive from Europe, Lapham. Silkworm Mulberry. Champaign county.

BROUSSONETIA, *Paper Mulberry.*
papyrifera, cultivated as a shade tree from Japan. Tender north.

MACLURA, *Osage Orange.*
aurantiaca, *Osage Orange*, Bois d'arc, *Bow Wood*, cultivated from Texas for hedges, and ornament; and latterly for timber, as it is very durable, and shrinks and cracks little in seasoning. Somewhat tender north. Not native, but Prof. Swallow says he saw this tree, in appearance indigenous, in the valley of Spring River, Newton county, Missouri, which is hardly south of Cairo.

URTICA, *Nettle.*
gracilis, native, Lapham.
dioica, L., Hancock county, Mead; Fulton, Wolf; Wabash, Schneck.

LAPORTEA, *Wood Nettle.*
canadensis, native, Lapham.

PILEA, *Richweed Clearweed.*
pumila, native, Lapham. Champaign county.

BŒHMERIA, *False Nettle.*
cylindrica, native, Lapham.

PARIETARIA, *Pellitory.*
pennsylvanica, Muhl., *American Pellitory*, common.
nivæ, ramie or grass cloth plant of China. Is under cultivation as a textile plant in the gulf states.

CANNABIS, *Hemp*, annual.
sativa, *Common Hemp.* Cultivated from Europe as a fibre plant, and adventive. Lapham.

Year.	Production.	United States.	Illinois.
1850	Hemp, tons	34,871	None given.
1860	Hemp, tons	74,493	1,502
1870	Hemp, tons	12,476	174

Hamilton, Douglas and Pope counties produced nearly all the scanty product of 1870.

HUMULUS, *Hop*, perennial.
lupulus, *Common Hop*, native, Lapham. Cultivated.

Year.	Production.	United States.	Illinois.
1850	Hops, pounds	3,497,029	3,551
1860	Hops, pounds	10,991,996	7,254
1870	Hops, pounds	25,455,669	104,032

New York and Wisconsin produced nearly all of the crop of 1870. Boone, DeKalb and McHenry were the leading Illinois counties.

PLATANACEÆ—Plane Tree Family.

PLATANUS, *Plane Tree.*

occidentalis, *American Plane Tree, Sycamore* or *Buttonwood*, native, Lapham. Seems to be found in nearly every county in Illinois. Cultivated somewhat for ornament and its timber is used in making boxes for plug tobacco, etc. It is the largest tree of our Mississippi valley forests. Mr. Ridgeway, of Mt. Carmel, reports one 168 feet high, with 68 feet length of trunk and a circumference of 33½ feet. Prof. Swallow measured "an old stub" in Mississippi county, Missouri, 65 feet high and 43 feet in circumference, with a hollow 15½ feet in one direction and 13 feet in another. Another tree in Howard county measured 125 feet high and 31½ feet in circumference. Downing gives some still larger measurements in his landscape gardening.

orientalis, *Oriental Plane*,. Cultivated from Asia for ornament, especially var acerfolia.

JUGLANDACEÆ—Walnut Family.

JUGLANS, *Walnut.*

cinerea, *Butternut or White Walnut*, native, Lapham, and noted in twenty counties by the geological report—probably in all of them. Cultivated a little for ornament, nuts and timber. Bryant says its nuts improve by cultivation.

nigra, *Black Walnut*, native, Lapham, and still more common than the butternut. One of the most easily propagated and valuable timber trees, promising to be valuable for its fruit, as the nuts become improved through selection. Mr. Ridgeway measured a tree near Mt. Carmel 120 feet high, with 60 feet trunk and 22 feet circumference. Prof. Swallow found one in Benton county, Missouri, 22 feet in circumference and 110 feet high.

regia, *English or European Walnut*, cultivated from Asia. "The tree is rather impatient of the climate in the rural districts of Pennsylvania, but does very well in the shelter afforded by our cities and large towns."—Darlington. The tree is not hardy in northern Illinois, and it is doubtful if it would succeed in the central parts of the state."—Bryant. "I know of no success as far south as Alton."—Flagg.

CARYA, *Hickory.*

oliviæformis, *Pecan Nut*, native south, Lapham. I have notes of its growing in Randolph, St. Clair, Madison, Hancock, Pulaski, Massac, Pope, Alexander, Union, Jackson, Jersey, Schuyler, Fulton, Henderson, Peoria, Menard. This would carry it as far north as 41 degrees on the rivers Mississippi, and Illinois, but does not show it to extend far east of the last mentioned stream. Bryant says it is found as far north as 42 degrees on the Mississippi, and Woodford county on the Illinois. We may conclude that on proper soils it may be cultivated throughout the state, and the high value of the nuts make cultivation and improvement only a question of time. Natural groves of it in Madison, St. Clair and Randolph are already carefully fenced and guarded. Mr. Ridgeway measured one near Mt. Carmel 175 feet high, with a trunk 90 feet and its circumference 16. Prof. Swallow describes one in Mississippi county, Missouri, 130 feet high, 10 feet to a limb, and 18 feet in girth. It is one of the largest forest trees.

alba, *Shell-bark* or *Shag-bark Hickory*, native, Lapham. Found, I presume, in every county, and coming into cultivation. Varies a good deal in its fruit, so that the selection of large, thin-shelled nuts and propagating from the trees that bear them, will improve the cultivated sorts. It is one of the most valuable of the hickories for timber, and not surpassed by any other tree for fuel."—Bryant.

sulcata, *Western Shell-bark*, native, Lapham, Vasey. This is the species with the very large nut and resembling the shell-bark in its general appearance, and the pecan in its love of deep, rich soils and great size. It is either not common or the botanists are afraid to commit themselves, for I find only one habital (Fulton county) named in the books. It is found in Madison, and I presume a great share of the river counties. Champaign county.

tomentosa, *Mocker-nut, White Heart Hickory*. Perhaps confused with last; native, Lapham, Vasey. It seems to be a southern rather than a northern tree, and is the

earliest of its genus to spring up in the southern Illinois prairies. It is said to be slower in growth than other species.

porcina, *Brown Hickory* or *Pig Nut Hickory*, native, Lapham. Noted in fourteen counties by the geological surveys. Most common it would seem in the south, "The wood is considered by many the strongest and toughest of the hickories."—Bryant. A large tree.

amara, *Bitter Nut* or *Swamp Hickory*, native, Lapham. The nut has a softer shell than the last, and the wood is less valuable. Noted in geological survey as occurring in several counties, nearly all of which are northern.

CUPULIFEREÆ—Oak Family.

QUERCUS, *Oak* robur, *European* or *English Oak*. Planted from Europe for ornament only, for which its habit of holding its leaves green is said to give it a preference, [Meehan].

alba, *White Oak*, native, Lapham. Noted in 28 counties by the geological reports and probably found in greater or less quantity in every county, although the older trees are now termed "slaughtered." Mr. Ridgeway measured near Mt. Carmel, 6 white oaks that averaged 132 feet in height, 60 feet of trunk and 17½ in girth. Prof. Swallow, in Howard county, Mo., measured one 100 feet high and 26 in circumference. "Wherever strength, compactness and durability are required, it is preferred to that of any other tree."—Bryant.

obtusiloba, *Post Oak*, *Rough or Box White Oak*, native, Lapham. Mentioned in thirteen counties, all southern, by the geological survey. It makes but a small tree in southern Illinois, but is larger and valuable in Arkansas and other southern states. The timber is hard, heavy and durable, the acorns sweet and sought for by wild pigeons, etc. "Almost unknown in the northern part of the state."—Vasey.

macrocarpa, *Bur Oak*, *Over-cup* or *Mossy-cup Oak*, native, Lapham. Enumerated in fifteen counties by the geological survey, and no doubt found throughout the state. In the northern counties it is an upland tree, however, while in the southern it is confined so far as I have seen to the bottom lands. A like fact is noticed by Swallow, that "there is a zone in north Missouri throughout which it is found abundantly on the hills, seeming to usurp the place of the white oak." I suppose it is a question of drainage. An over-cup, Wabash county, according to Mr. Ridgeway, measured 163 feet in height, its trunk 79 feet, and its girth 21. A tree measured by Prof. Swallow, in Howard county, Mo., was 125 feet high and 20 in girth. It is a large, handsome, valuable tree. Well authenticated hybrids of two, alba, L., and macrocarpa, Michx, are known in Menard and Winnebago counties.

var. lyrata, Walt, Union county, Vasey; Wabash Schneck.

bicolor, *Swamp White Oak*, native, Lapham. The geological survey reports it in seventeen counties in various parts of the state. Is found throughout the state on low lands, according to Bryant, and ranks next to the white oaks in value for timber.

prinus, *Swamp Chestnut Oak*, native, Lapham. "The swamp chestnut oak, Mr. Lapham found near Janesville, Wis., which is not far from our northern state line."—Brendel. Dr. Worden thought he identified this tree in Madison county.

var. monticola. *Rock Chestnut Oak*, native, Lapham; Madison county, Brendel. Professor Swallow measured this oak in Mississippi county, Mo., 110 feet high and 18 feet girth.

var. acuminata, *Yellow Chestnut Oak*, native, Lapham; Menard, Sangamon and Madison counties, Vasey; Peoria Tazewell, Cook and Winnebago counties, Brendel. One hundred feet high and 20 feet in girth in Howard county, Mo Swallow.

The above species and its varieties are all of good size, and their timber valuable. Their botanical nomenclature mixed.

phellos, *Willow Oak*, native, Massac; geological report, vol. 1, Wabash valley and county, rare, Ridgeway. Found also "in the rich bottoms of southeast Missouri" says Professor Swallow, who measured one in New Madrid county 100 feet high and 9 feet in girth.

imbricaria, *Laurel* or *Shingle Oak*, pine oak of some sections, native, Lapham. Mentioned in nine southern and central counties by Geological Survey. Brendel says this tree is not found in Lapham's Wisconsin list, and thinks it is wanting in Cook and Winnebago counties. From Joliet southward, Patterson.

nigra, *Black-Jack* or *Barren Oak*, native, Lapham; Johnson, Perry, Clinton and Morgan, Geological Survey. "Growing in St. Clair Marion and Menard counties. Seems to have its northern limits in Middle Illinois."—Brendel; near Chicago, Babcock.

triloba, Michx. Union county, Wolf.

leanna, Nutt. This is probably a hybrid between Q. imbricana and Q. nigra. It occurs in Peoria county, Brendel; Fulton, Wolf; in Southern Illinois, Forbes.

falcata, *Spanish Oak*, native, Vasey; Hardin, Johnson, Pulaski, Massac, Pope, Alexander, Geological Survey; Wabash county, Ridgeway; (150 feet high, 75 feet to a limb, and 20 feet in circumference). Ninety feet high, 26 feet in girth in New Madrid county Mo., Swallow.

coccinea, *Scarlet Oak*, native, Lapham; Champaign.

var. tinctoria quercitron, *Yellow-Barked* or *Black Oak*, native, Lapham; "Grow everywhere in the woods of Illinois."—Brendel.

rubra, *Red Oak*, native, Lapham; Champaign county, Macauley. "One of the most common species in the woods of Illinois."—Bryant.

palustris, *Swamp, Spanish* or *Pin Oak*, native, Lapham; Madison, Hardin, Johnson, Massac, Pope, Jackson, Marion, Jefferson and Fulton counties, Geological Report. Champaign county.

CASTANEA, *Chestnut.*

vesca, *European Chestnut*, cultivated from Asia Minor.

var. americana, *American Chestnut*, native. Judge A. M. Brown says: "There are a number of old trees at Caledonia, suppposed by some to have been planted by Indians." In regard to the Pulaski county trees, Rev. E. B Olmstead writes as follows: "I suppose that these trees are indigenous. They grow on a ridge in section 23, town 15, range 1, east, about a quarter of a mile from the Ohio river and overlooking it. They cover an area of about eighty acres. * * * I took a position in their midst to-day, and counted, without moving, thirty-five beautiful and symmetrical trees, averaging in diameter about 22 inches, and in hight 50 or 60 feet. When I came to this place, 37 years ago, (dated February 26 1876) there were a great many more than at present. About 25 years ago I saw a tree cut down and worked up into rails. It was immensely tall and four or five cuts were taken off for rails ten feet long. I measured the stump of that tree to-day * * * and making a reasonable allowance for sap and bark which are gone, found it six feet, two inches, three feet from the ground. Comparing this with a small one, the concentric rings of which we counted, the noble tree was 250 years old when it was cut down. * * * These trees did not originate with any civilized nation. No doubt the Indians for many generations built their council fires under their branches, but they did not plant them." T. J. B.

ferruginea, *American Beech*, native, Lapham; Vasey, Johnson, Pope, Massac, Alexander, Union, Jackson and Edgar counties, geological survey. Wabash county, Ridgeway; "in the southern part of Missouri," Swallow; in cultivation 100 feet high and 18 in girth in Stoddard county, Mo., Swallow.

sylvatica, *European Beech*, planted from Europe, in its various forms and colors.

CORYLUS, *Hazel-Nut, Filbert.*

avellana, *European Hazel-Nut or Filbert*, planted for its nuts and for ornament from Europe. Not successful in my observation.

americana, *American Hazel-Nut*, native, Lapham; found, I think, in about all the counties in the state; rostrata the beaked hazel-nut does not appear to have been found in Illinois, but is in Wisconsin. The hazel-nut also deserves selection and improvement.

OSTRYA, *Hop-Horn Beam, Ironwood.*

virginica, *American Hop-Horn Beam*, native, Lapham; Fulton county, Wolf; Wabash county, Ridgeway; handsome ornamental tree.

CARPINUS, *Horn Beam, Ironwood*

americana, *American Horn Beam, Blue or Water Beech*, native, Lapham; Hardin, Johnson, Massac, Pope, Union, Jackson, Schuyler, Fulton counties, Geological survey; Wabash county, Ridgeway; found throughout the state.

MYRICACEÆ.

COMPTONIA, *Solander, Sweet Fern.*

asplenifolia, Ait. Kankakee county, Hill; near Chicago, Vasey; Monroe, Babcock.

BETULACEÆ—Birch Family.

BETULA, *Birch.*

lenta, *Sweet Black* or *Cherry Birch*, native, "above Dixon," Vasey; Wabash county, Ridgeway; "One of the handsomest of the birches, and the most valuable for timber."—Bryant.

pumila L., McHenry county, Vasey; near Chicago, Munroe.

alba, va. populifolia, *American White Birch*, native, Vasey; JoDaviess county, Bebb; small, ornamental tree.

papyracea, *Paper* or *Canoe Birch*, native, "On Mississippi, at Fulton and Whiteside counties, and on Lake Michigan."—Vasey. "Large, beautiful ornamental tree, affording excellent firewood." Bryant.

nigra, *River* or *Red Birch*, native, Lapham; Madison, Hancock, Johnson, Union, Jackson and Fulton counties, Geological Report; St. Clair county, Brendel. Vasey assigns it to the southern part of the state. A large tree. "The timber," says Swallow, "is beautiful and suitable for cabinet work, and the wood makes excellent charcoal."

ALNUS.

serrulata, Ait., Bureau, McLean, Macon and Madison counties, Miss Holmes; White, Schneck; Union, French.

SALICACEÆ—Willow Family.

SALIX, *Willow.*

purpurea, *Purple Willow*, planted for osiers from Europe.

viminalis, *Basket* or *Osier Willow*, planted for osiers from Europe.

candida, *Horny Willow*, native, Vasey; Cook county, Babcock; Peoria county, Brendel.

tristis, *Dwarf Gray Willow*, native, Lapham; Fulton county, Wolf.

humilis, *Prairie Willow*, native, Lapham; Cook county, Babcock; Fulton conuty, Wolf.
discolor, *Glaucous Willow*, native, Vasey; Cook county, Babcock; north, Bebb.
sericea, *Silky Willow*, native, Lapham.
var. gracilis, Anders. The forms sericocarpa and leiocarpa occur in Winnebago county, Bebb. "From S. sericea, Marsh, through this species, and S. augustata, Pursh, to S. cordata, Muhl, an unbroken series of forms occur—the result of cross fertilization making the limitation of species very difficult, if not purely arbitrary. The hybrid sericea and cordata presents very nearly the technical characters of S. petiolais, Smith." —Bebb.
adenophylla, Hook; near Chicago, Babcock; Vasey.
rostrata, Richardson; Henderson county, Patterson; and northward.
petiolaris, *Petioled Willow*, native, Vasey; Cook county, Babcock; Peoria county, Brendel
cordata, *Heart-Leaved Willow*, native, Vasey; north, Bebb; Fulton county, Wolf.
var. glaucophylla, Bebb; Michigan lake shore, Babcock; Winnebago county, Bebb. This may be specifically distinct.
var. rigida, native north, Bebb; Cook c unty, Babcock.
var. myricoides, native, Peoria county, Brendel.
var. augustata, native, Cook county, Babcock; Peoria county, Brendel; Fulton county, Wolf.
livida var. occidentalis, *Livid Willow*, native, Vasey; north, Bebb.
lucida, *Shining Willow*, native, Vasey; Cook county, Babcock; north, Bebb; Champaign county, Macauley.
nigra, *Black Willow*, native, Vasey; north, Bebb; Peoria county, Brendel; Fulton county, Wolf; Champaign county, Macauley; Cook county, Babcock.
var. falcata, native, Cook county, Babcock.
var. amygdaloides, native, Cook county, Babcock.
eriocephala, native, Lapham; Vasey.
fluviatalis, native, Lapham; Vasey.
fragilis, *Brittle Willow*, adventive from Europe, Cook county, Babcock. Planted for baskets.
alba, *White Willow*, adventive from Europe, Cook county, Babcock. Planted for fences, etc.
babylonica, *Weeping Willow*. adventive from Europe, Vasey. Planted for ornament.
longifolia, *Long-Leaved Willow*, native, Vasey; Cook county, Babcock; Fulton county, Wolf; Champaign county, Macauley.
var. argyrophylla, Anders; Winnebago county, Bebb.
myrtilloides, *Myrtle-Leaved Willow*, native, Vasey; Peoria county, Brendel.

POPULUS, *Poplar Aspen*.
tremuloides, *American Aspen*, native, Lapham; Fulton, Henderson and Warren counties, Geological Survey.
angulata, Ait; Hancock county, Mead.
gradidentata, *Large-Toothed Aspen*, native, Vasey; Peoria and Winnebago counties, B endel; Fulton county, Wolf.
heterophylla, *Downy Poplar*, native, Lapham. "Probably native in the south."—Vasey. Wabash and Jackson counties, Patterson.
alba *Abele* or *White Poplar*, planted from Europe for ornament. Grows rapidly and sprouts inveterately.
dilatata, *Lombardy Poplar*, planted for ornament from Europe. Only staminate variety.
nigra, *Black Poplar*, planted from Europe for ornament.
monilifera, *Cottonwood. Necklace Poplar*, native throughout the state. The most rapid growth of all soft-wood trees, and about as valuable as any of those that are easily propagated. There is a yellow variety which Nutall appears to have endeavored to distinguish as a larger species, as the yellow-wood which Mr Bryant and Judge Whiting pronounce much superior to the common trees. The cottonwood measured at Mt. Carmel by Mr. Ridgeway was 165 feet high, with 75 feet of trunk and 19 of girth. One measured by Prof. Swallow, in Mississippi county, Mo., was 125 feet high and 30 feet in circumference.
balsamifera, var. candicans, *Balm of Gilead*, native, Lapham. Cultivated for ornament.

CONIFERÆ—Pine Family.

PINUS, *Pine*.
ponderosa, *Heavy Wooded Pine*, planted for ornament from the Rocky Mountains. Hardy.
sylvestris, *Scotch Pine*, planted for ornament, shelter and timber, from Europe. perhaps the most rapid grower of the pines.
austriaca, *Austrian Pine*, planted from southern Europe for ornament, etc. Hardy.
pungens, Table, *Mountain* or *Prickly Pine*, not hardy, north.
mitis, *Yellow Pine of the North*, short-leaved, yellow pine, south, native, Jackson and Union counties, Forbes Mr. Brendel reports hearing of a pine near the mouth of the Big Muddy, in Jackson county, which he conjectured to be of this species as that occurs on the opposite side of the Mississippi, in Missouri. There is a Pine Hill in Union county which may derive its name from the same or a like fact. The pines noted by the state geologist as occurring above the heavy bedded sandstones in the edge of Clark county, south of Grandview, I presume to be the same species. Bryant says, "it grows sparingly in southern Illinois, and I have seen small trees among the sand hills at the south end of Lake Michigan." It does

not seem to have been much cultivated, but as an ornamental and timber tree is superior to many that are under trial.

banksiana, *Gray* or *Northern Scrub Pine*, native. "Found on Lake Michigan and ridges in Cook county."—Vasey. Ogle county, Bebb. Of no great value for ornament or use, but is said to transplant more easily than many evergreens.

resinosa, *Red Pine, Norwegian Pine*, planted from the north for ornament and may prove valuable as a timber tree.

strobus, *White Pine*, native, Vasey; Cook, LaSalle, Lake, Stephenson, Winnebago and Boone counties, Geological Report. There are still large trees at Rockford. Extensively planted as an ornamental tree, and to some extent for timber.

cembra, *Cembra* or *Swiss Stone Pine*, cultivated for ornament from Europe. Slow growing and hardy.

ABIES, *Spruce Fir*.

The spruce is not, so far as I can ascertain, a native of Illinois.

excelsa, *Norway Spruce*, planted from Europe for ornament and screens, and to a limited extent for timber. Thus far the most successful and vigorous evergreen planted. The loftiest tree of European forests.

nigra, *Black* or *Double Spruce*, planted occasionally for ornament, from the north. Timber valuable.

alba, *White Spruce*, planted for ornament from the north.

menziesii, *Menzies Spruce*, planted from the Rocky Mountains for ornament. One of the best.

canadensis, *Hemlock Spruce*, planted from the north for ornament. One of the handsomest. Tender south, from excess of heat and drought, I believe.

douglasii, *Douglas Spruce*, planted for ornament from the Rocky Mountains. Not quite hardy north.

balsamea, *Common Balsam*, planted for ornament, from the north.

pectinata, *European Silver Fir*, planted for ornament, from Europe. Succeeds tolerably well at Alton. "Its cultivation in most cases, has been quite unsatifactory. —Bryant.

nordmannii, cultivated from the Crimea and northern Asia. "Said to be quite hardy."—Bryant.

pichta, *Siberian Silver Fir*, "Said to be quite hardy."—Bryant.

grandis, *Great Silver Fir*, cultivated from Oregon and California.

cephalonica, *Cephalonian Silver Fir*, planted for ornament.

pinsapo, *Spanish Silver Fir*, planted for ornament from Spain.

LARIX, *Larch*.

europæa, *European Larch*, planted for ornament and timber, from Europe. Rapid growing and valuable timber tree.

americana, *American Larch*, Tamarack; native, Vasey. Planted somewhat for ornament, but hardly fit for the dry soil and climate of southern Illinois.

TAXODIUM, *Bald Cypress*.

distichum, *Southern Cypress*, native Lapham; Johnson, Pulaski, Massac, Pope and Union counties, Geological Report. Planted for ornament much further north. A tree measured by Prof. Swallow in Cape Girardeau county, Missouri, was 130 feet in height, its girth at one foot from the ground, 29 feet, and at 6 feet from the ground 18 feet. Such is the peculiar form of the cypress and tupelo.

CUPRESSUS, *Cypress*.

thyoides, *White Cedar*, planted for ornament, native, Gallatin county, Schneck.

lawsonia, planted from northern California for ornament.

nootkaensis, planted from Pacific coast for ornament.

pisifera, or Retinospora pisifera, planted from Japan. Not hardy, Gray; but has withstood several winters in northern Illinois.—Bryant.

squarrosa, or ericoides, planted from Japan, hardy.

THUJA, *Arbor Vitæ*.

occidentalis, *American Arbor Vitæ, or White Cedar of the North*, native, Lapham; La Salle, DeKalb, Kane and Dupage, Geological report; planted in many varieties for ornament, etc.

orientalis, or Biota orientalis, *Chinese Arborvitæ*, "Wholly unsatisfactory in northern Illinois.—Bryant.

var. aurea and pendula, succeed pretty well south.

JUNIPERUS, *Juniper*.

sabina L. var. procumbens, Pursh; near Chicago, Babcock.

virginiana, *Red Cedar* or *Savin*, native, Lapham; Madison, Johnson, Cook, LaSalle, Fulton, DeKalb, Kane, DuPage, Kendall, Stephenson and Boone, Geological Report. It is found also in Union, Jackson and many other counties; Planted for ornament, screens and timber. The young trees from the south are said to prove tender, while those brought from the north are hardy. This tree was formerly common enough to be used for posts, especially by the old French settlers of Kahokia and Kaskaskia. Many of the old French houses of St. Louis were built by setting a continuous row of cedar posts in the earth about a square or oblong as the walls of the future dwelling. Our tree planters do not yet appreciate the value of this tree. The report of the Tennessee Bureau of Agriculture says of it: "In the counties of Marshall and Bedford, solid cedar logs have been cut that would square 24 inches for a distance of 30 feet.

communis, *Common Juniper*, native, Vasey; Lake county.

var. hibernica, etc., planted from Europe for ornament.

TAXUS, *Yew*.

baccata var. canadensis, *American Yew, Ground Hemlock*, native, Vasey; Winnebago county, Bebb; St. Clair county, Brendel. Also cultivated for ornament.

SALISBURIA, *Ginkgo.*
andiantifolia, cultivated for ornament from Japan. "Nearly quite hardy in northern Illinois."—Bryant.

PALMACEÆ—Palm Family.

CHAMÆROPS FORTUNEI.—"This is a Chinese species, remarkable as the hardiest known palm." Has endured a temperature of 15 degress. See proceedings Massachusetts Horticultural Society, 1875, p. 10.

ARACEÆ—Arum Family.

ARISÆMA. *Indian Turnip.*
triphyllum, *Indian Turnip*, native, Lapham; Champaign. Macauley.
dracontium, *Green Dragon*, *Dragon Root*, native, Lapham; Champaign county, Macauley.
COLOCASIA, *Perennial.*
antiquorum, cultivated for its foliage here, and in Florida. etc., for its esculent rootstocks.
PELTANDRA, *Arrow Arum*, perennial.
virginica, native, Vasey.
RICHARDIA, perennial.
africana, *Æthiopian* or *Egyptian Calla*, cultivated from Cape of Good Hope as a house plant.
CALLA, *Water Arum.*
palustris, native, St. Clair county, Brendel.
SYMPLOCARPUS, *Skunk Cabbage*, perennial.
fœtidus, native, Vasey; north, Bebb; Peoria county Brendel.
ORONTIUM, *Golden Club.*
aquaticum, native, Vasey.
ACORUS,
calamus, *Sweet Flag*, perennials, native, Lapham; Cook county, Babcock.

LEMNACEÆ—Duckweed Family.

LEMNA, *Duckweed, Duck's-meat.*
trisulca, native, Lapham.
polyrrhiza, native, Lapham.
WOLFFIA.
columbiana, Karsten; Ponds, Menard county, Hall; Fulton, Wolf; St. Clair, Engelmann.
braziliensis, Weddell; Menard county, Hall.

TYPHACEÆ—Cat-tail Family.

TYPHA, *Cat-tail Flag.*
latifolia, *Common Cat-tail* or *Reed-mace*, native, Lapham.
SPARGANIUM, *Bur-reed.*
eurycarpum, Engelm; wet places, common.
var. androcladum, Gray; Wabash county, Schneck.
var. angustifolium, native, Vasey.
simplex, native, Lapham.
ramosum, introduced, Lapham.

NAIDACEÆ—Pondweed Family.

NAIAS, *Naiad*, slender branching herbs, under water.
flexilis, native, Vasey.
indica var. gracillima, Braun; ponds, Wabash county, Schneck.
ZANNICHELLIA.
palustris L. ponds. Widely disseminated, but not commonly met with.
POTAMOGETON, *Pondweed.*
natans, native, Lapham; ponds.
Vaseyi. native, McHenry county. Vasey.
hybridus, native, Lapham.
rufescens, native, Gray: McHenry county, Vasey.
lonchites, native, Gray; Cook county, McHenry, Vasey.
gramineus, native, Lapham; Cook county, Babcock.
var. heterophyllus, native, Lapham.
lucens, native, Lapham; McHenry county, Vasey; Kankakee, Hill.
pauciflorus, native, Lapham; McHenry county, Vasey; Peoria, Brendel.
pectinatus, native, Vasey; common.
claytonii, Tuckerman; Fulton county, Wolf.

spirillus, Tuckerman; McHenry county, Vasey.
pulcher, Tuckerman; Mason county, Hall.
perfoliatus L., McHenry county, Vasey; Kankakee, Hill.
pusilius L., Peoria and Fulton counties, Brendel; Wolf; Menard, Hall.

ALISMACEÆ—Water Plantain Family.

TRIGLOCHIN, *Arrow Grass*, perennials.
palustre, native, Vasey.
maritimum, native, Vasey.
SCHEUCHZERIA.
palustris, native, Vasey; Menard county. Hall.
ALISMA, *Water Plantain.*
plantago, var. americanum, native, Lapham; Champaign county, Macauley.
ECHINODORUS.
parvulus, native, Lapham; Mason and Cass counties, Mead.
rostratus, native, Lapham; southward.
radicans, native, Lapham; southward.
SAGITTARIA, *Arrow Head.*
calycena, Engelm; margins of ponds, Henderson county, Patterson; Menard, Hall. Rare.
lancifolia, Champaign county, Macauley.
variabilis, native, Lapham; Cook county, Champaign county, Macauley.
heterophylla, native, Lapham.
graminea, native, Lapham.
LINNOCHARIS, *Delight of the Pools.*
humboldtii, tender aquatic plant, cultivated from South America.

HYDROCHARIDACEÆ—Frogs-bit Family.

LIMNOBIUM, *American Frogs-bit.*
spongia, native, Vasey; Union county, Brendel.
ANACHARIS, *Waterweed.*
canadensis, native, Lapham; Champaign county, common.
VALLISNERIA, *Tape Grass, Eel Grass.*
spiralis, native, Lapham; slow streams.

ORCHIDACEÆ—Orchis Family.

ORCHIS.
spectabilis, *Showy Orchis*, native, Lapham.
HABENARIA, *Rain Orchis.*
virescns, Spreng., Cook county, Babcock; Peoria, Brendel.
hookeri, Torr., Cook county, Babcock.
ciliaris, R. Br., Kankakee county, Hill; Union, Miss Holmes
viridis, var. bracteata, native, Lapham.
hyperborea, St. Clair county, Brendel.
leucophæa, native, Lapham.
lacera, *Ragged Fringed Orchis*, native, Vasey; St. Clair county, Brendel.
psycodes, native, Lapham.
peramœna, native, Lapham.
flava, Vasey; St. Clair county, Brendel,
GOODYERA, *Rattlesnake Plantain.*
repens, R. Br., Union county, French.
pubescens, native Vasey.
SPIRANTHES, *Ladies' Tresses.*
latifolia, Torr., Menard county, Hall.
gracilis, Bigelow; "Prairie hillsides, scarce."—Patterson.
cernua, native, Lapham.
ARETHUSA, beautiful low herbs.
bulbosa, native, Vasey.
POGONIA.
aphioglossoides, native, Vasey.
pendula, native, Lapham.
CALOPOGON.
pulchellus, native, Lapham; prairies.
MICROSTYLIS, *Adder's Mouth.*
monophyllos, Lindl., swamps, Menard county, Brendel; Kane county, Vasey.
aphioglossoides, native, Lapham.
SIPARIS, *Twayblade.*
lilifolia, native, Lapham.
læselli, Richard; bogs, Peoria county, Brendel; Menard, Hall; rare.

CORALLORHIZA, *Coral Root.*
multiflora, native, Lapham.
odontorhiza, Nutt; Henderson county, Patterson, Menard, Hall; Wabash, Schneck; Union, Forbes; rare.
APLECTRUM, *Putty Root, Adam and Eve.*
hyemale, native. Lapham; widely disseminated but scarce.
CYPRIPEDIUM, *Lady's Slipper, Mocasin Flower.*
arietinum, *Ram's Head*, native, Brendel.
candidum, *Small White Lady's Slipper*. native, Lapham; Champaign county, Macauley.
parviflorum, *Smaller Yellow Lady's Slipper*, native, Lapham.
pubescens, *Larger Yellow Lady's Slipper*, native, Lapham.
spectabile, *Showy Lady's Slipper*, native, Lapham.
insigne and venustum, are East Indan species cultivated in conservatories.

SCITAMINÆ—Banana Family.

HEDYCAIUM, *Garlane Flower*, cultivated for ornament from India.
gardneranianam.
CANNA, *Common Indian Shot.*
indica.
warszewiezii, discolor, glanca, flaccida, are cultivated for summer foliage and sometimes flowers.
STRELITZIA, conservatory plant from Cape of Good Hope.
reginæ.
MUSA *Banana*, cultivated in conservatories for foliage and fruit.
sapientum.
cavendishii, a dwarf variety.

BROMELLIACEÆ—Pineapple Family.

ANANASSA, *Pineapple.*
sativa, cultivated in conservatories for fruit and foliage.

TILLANDSIA.
usneoides, *Long Moss*, *Black Moss*, *Spanish Moss* of south, tender.

AMARYLLIDACEÆ—Amaryllis Family.

NARCISSUS, cultivated from Europe, etc.
pœticus, *Poets Narcissus.*
biflorus, *Two-Flowered Narcissus or Primrose Peerless*, hardy.
polyanthus, hardy.
tazetta.
jonquilla, *Jonquil.*
pseudo-narcissus, *Daffodil.*
"More than 100 species are enumerated, all of which are worthy a place in the flower garden, although comparatively few are in cultivation." —Rand.

PANCRATIUM, cultivated for ornament.
rotatum.

CRINUM, showy conservatory plants.
amibile, from East Indies.

AMARYLLIS, cultivated for ornament.
formosissima, *Jacobœan or St. James' Lilly*, cultivated from South America.
reginæ, from South America.
belladonna, from Cape of Good Hope.
speciosa or Volatta purpurea, from Cape of Good Hope.

GALANTHUS, *Snowdrop.*
nivalis, cultivated from Europe.

LEUCOIUM, *Snowflake*, cultivated from Europe.
vernum, *Spring Snowflake.*
aestivum, *Summer Snowflake.*

ALSTRŒMERIA., conservatory plants.
pelegrina, *Lilly of the Incas*, from Peru.
psittacina.
versicolor.

POLIANTHES, *Tuberose*, ornamental.
tuberosa, cultivated from Mexico.

AGAVE, *American Aloe.*
virginica, *False Aloe*, native, Lapham; St. Clair county, Brendel; Wabash, Schneck.
HYPOXIS, *Star-Grass*
erecta, native, Lapham; Champaign county, Macauley; common.

HÆMODORACEÆ—Bloodwort Family.

ALETRIS, *Colic Root, Star-Grass.*
farinosa, native. Vasey; Cook county, Babcock; Kankakee county, Hili; Wabash. Schneck.

IRIDACEÆ—Lily Family.

IRIS, *Flower-de-Luce.*
versicolor, *Larger Blue Flag*, native, Lapham; Champaign county; Macauley.
cuprea, native, southern Illinois, Vasey.
pumila *Dwarf Garden Iris*, cultivated from the old world as are the following:
germanica, *Common Flower-de-Luce* of the gardens.
sambucina, *Elder*, scented flower-de-luce.
squalens.
variegata.
florentina, *Florence or Sweet Flower-de-Luce.*
pseudacorus, *Yellow Iris.*
graminea, *Grass-Leafed Iris.*
persica, *Persian Iris.*
"A large genus of ornamental plants, all perennial and hardy."—Bryant.

PARDANTHUS, *Blackberry Lily.*
chinensis, cultivated from China.

SISYRINCHIUM, *Blue Eyed Grass.*
bermudiana, native, Lapham; Champaign county, common.

TIGRIDIA, *Tiger Flower*, planted for summer flowering.
pavonia, cultivated from Mexico.

GLADIOLUS, *Corn Flag.*
communis, cultivated from Europe, hardy.
byzantinus, from the Levant, hardy.
blandus, from Cape of Good Hope.
cardinalis, from Cape of Good Hope.
psittacinus, from Cape of Good Hope; parent of G. ganavensis.
"There is probably no one class of plants which promises better for the future."—Rand.

CROCUS, cultivated from the old world.
vernus, *Spring Crocus.*
luteus and susianus, *Yellow Crocus.*
sativus, *Fall Crocus.*
"A beautiful race of about twenty species of hardy bulbs, natives of the south of Europe and eastern Asia.

DIOSCOREACEÆ—Yam Family.

DIOSCOREA.
villosa, *Wild Yam Root*, native, Lapham; Champaign county.
batatas, *Chinese Yam*, cultivated from China and Japan for ornament or for its farinaceous roots.
sativa, the true yam, is cultivated in hot countries.

SMILACEÆ—Smilax Family.

SMILAX, *Green-Brier, Cat-Brier, China-Brier.*
rotundifolia, *Common Green-Brier*, native, Lapham; Fulton county, Wolf.
var. quadrangularis, native, Lapham.
glauca, native, Vasey.
tamnoides, native, Vasey; Peoria, county, Brendel
herbacea, *Carrion Flower*, native, Lapham; Champaign county, Macauley.
hispida, Muhl, quite common.

LILIACEÆ—Lily Family.

PHORMIUM,
tenax, *New Zealand Flax.*

DRACÆNA and CORDYLINE, *Dragon Trees.*

ALOE,
angulata, variegata and other aloes.

LACHENALIA, tricolor. tender bulb from the Cape of Good Hope.

CALOCHORTUS, CYCLOBOTRA, BRODLÆA and TRITELEIA. from California, are plants of this family, none of them hardy, and mostly conservatory and not common plants.

TRILLIUM, *Three-leaved Nightshade, Wake Robin, Birthroot.*
sessile, native, Lapham.
recurvatum, native, Lapham; Cook county, Babcock; Champaign county.
grandiflorum, *large white trillium* or *Wake Robin.*
erectum, *Purple Trillium* or *Birthroot,* native, Lapham; Champaign county, Macauley.
var. declinatum, Gray; woods northward.
cernuum, *Nodding Trillium* or *Wake Robin.*
nivale, *Dwarf White Trillium,* native, Vasey; Peoria county, Brendel.

COLCHICUM, cultivated from Europe for ornament.
autumnale, *Common Colchicum.*
variegatum, perhaps a variety.

CHAMÆLIRIUM, *Devil's Bit.*
luteum, *Blazing Star,* native, Gray.

STENANTHIUM.
angustifolium, native, Vasey; Pike county, Mead; Union county, Miss Holmes.

VERATRUM, *False Hellebore.*
woodii, native, Lapham; Hancock county, Mead.

ZYGADENUS.
glaucus, native, Vasey; northern Illinois, Gray.

UVULARIA, *Bellwort.*
grandiflora, native, Lapham; Champaign county, Macauley.
perfoliata, native, Lapham; scarce.

MELANTHIUM.
virginicum, *Bunch Flower,* native, Lapham; infrequent, Patterson.

TOFIELDIA, *False Asphodel.*
glutinosa, native, Vasey; northward.

CONVALLERIA, *Lily of the Valley,*
majalis, cultivated from Europe; wild on the Alleghanies.

SMILACINA, *False Solomon's Seal.*
trifolia, desf., Cook county, Babcock; Hancock, Mead.
racemosa, *False Spikenard,* native, Lapham; Champaign county, Macauley.
stellata, native, Lapham.
bifolia, native, Vasey: north, Bebb.

POLYGONATUM, *Solomon's Seal.*
biflorum, *Smaller Solomon's Seal,* native, Lapham; Champaign county, Macauley.
giganteum, *Great Solomon's Seal,* native, Vasey; Champaign county.

ASPARAGUS,
officinalis, *Common Asparagus,* cultivated from Europe for its esculent shoots and adventive.

MYRSIPHYLLUM.
asparagoides, conservatory climber, commonly known as Boston smilax.

LILIUM, *Lily.*
philadelphicum, *Wild Orange Lily,* native, Lapham; Champaign county.
canadense, *Wild Yellow Lily,* native, Lapham.
superbum, *Turk's Cap Lily,* native, Vasey; Tazewell county, Brendel.
tigrinum, *Tiger Bulblet-bearing Lily,* cultivated from China.
pomponium, *turban lily* of Europe.
chalcedonicum, *red lily* of Palestine.
martagon, or *Turk's cap* of Europe.
speciosum, of Japan.
auratum, *golden-banded,* of Japan.
candidum, *common white lily,* from Japan.
longiflorum, *long-flowered white lily,* from Japan. "This is a large family of ornamental bulbs. Many of them are hardy and indispensable in the flower-garden." —Rand.

FRITILLARIA.
meleagris, *Guinea Hen Flower,* cultivated from Europe.
imperialis or Petelium imperiale, *Crown Imperial,* cultivated from Asia. "They are highly ornamental and will thrive in any deep, rich soil."—Rand.

TULIPA, *Tulip,* cultivated for ornament.
gesneriana, *Common Tulip,* from Asia Minor.
suaveolens, *Sweet Tulip,* from Europe.

ERYTHRONIUM *Dog's Tooth Violet.*
americanum, *Yellow Dog's Tooth, Adder's Tongue,* native, Lapham.
albidium, *White Dog's Tooth Violet,* native, Lapham; Champaign county, Macauley.
dens canis, *Dog Tooth Violet,* cultivated from Europe.

ORNITHOGALUM, *Star of Bethlehem.*
umbellatum, *Common Star of Bethlehem* or *Ten O' Clock,* cultivated from Europe.

SCILLA, *Squill.*
fraseri, *Eastern Quamash, Wild Hyacinth,* native, Lapham; Champaign county, Macauley; also cultivated.
amœna, verna, etc., are cultivated for ornament from Europe.

ALLIUM, *Onion, Garlic.*
tricoccum, *Wild Leek,* native, Lapham.
cernuum, *Wild Onion,* native, Lapham.
stellatum, native, Lapham.
canadense, *Wild Garlic,* native, Lapham; Champaign county.
striatum, native, Lapham.

moley, *Golden Garlic*, cultivated for ornament from old world.
sativum, *Garden Garlic*, south of Europe.
porrum, *Garden Leek*.
ascalonicum, *schallott*, from Palestine.
schoenoprasum, chives, frou Europe.
cepa, *Onion*, all these cultivated as garden vegetable.

MUSCARI, *Grape* or *Globe Hyacinth*, cultivated from Europe for ornament.
botryoides, common grape hyacinth.
racemosum
moschatum.
comosum.

HYACINTHUS, *Hyacinth*.
orientalis, commmon hyacinth, cultivated from the Levant, very many variations.

AGAPANTHUS.
umbellatus, house plant, cultivated from Cape of Good Hope.

FUNKIA, ornamental hardy plants, from Japan and China.
subcordata, *White Day Lily*.
ovata, *Blue Day Lily*.

HEMEROCALLIS, *Day Lily*, cultivated from the old world.
fulva, common day lily.
flava, yellow day lily.

TRITOMA, ornamental plant.
uvaria, from Cape of Good Hope.

YUCCA, *Bear Grass, Spanish Bayonet*.
filamentosa, *Common Bear Grass* or *Adam's Needle*, cultivated for ornament. This one is hardy.
angustifolia, cultivated from the plains.
gloriosa and aloifolia, *Spanish Bayonet*, are comparatively tender.

JUNCACEÆ—Rush Family.

LUZULA, *Wood Rush*.
campestris, native, Lapham; northward.

JUNCUS, *Rush, Bog Rush*.
balticus, native, Lapham.
marginatus, native, Lapham.
var. biflorus, native, Gray.
bufonius, native, Lapham.
tenuis, native, Lapham.
vaseyi, native, north, Vasey.
articulatus, native, Vasey.
effusus L., low ground, scarce.
gerardi, Loisel; Chicago, Vasey.
greenii, Oakes and Tuck; Kankakee, Hill.
alpinus var. insignis, Fries; McHenry county, Vasey.
acuminatus, native, Lapham.
var. debilis.
var. robustus, native, Engelmann.
var. legitimus, native, Engelmann.
var. debilis, Engelmann; southern Illinois, Vasey.
nodosus, native, Vasey; Cook county, Babcock.
var. megocephalus, native, Engelmann.
brachycarpus, native, Engelmann.
scirpoides, native, Lapham.
canadensis var. longicaudatus, native, Engelmann.
coarceatus, Engelmann; Kankakee county, Hill.
var. brachycephalus, native, Engelmann.

PONTEDERIACEÆ—Pickerel Weed Family.

PONTEDERIA, *Pickerel Weed*.
cordata, native, Lapham.

HETERANTHERA, *Mud Plantain*.
reniformis, Rutz. and Pav.; Wabash county, Schenck.
limosa, native, Lapham.

SCHOLLERA, *Water Star Grass*.
graminea, native, Lapham.

COMMELYNACEÆ—Spiderwort Family.

COMMELYNA, *Day Flower*.
erecta, native, Lapham; Wabash county, Schneck.
virginica, native, Lapham; Henderson county, Patterson; and southward.
cayennensis. native, Lapham; Madison county, Hall.

TRADESCANTIA, *Spiderwort.*
virginica, *Common Spiderwort*, native, Lapham; Champaign county, Macauley. Also cultivated for ornament.
pilosa, native, Lapham, Champaign county.
zebrina, cultivated from the tropics in conservatories as foliage plant.

XYRIDACEÆ—Yellow-eyed Grass Family.

XYRIS, *Yellow-eyed Grass.*
flexuosa, native, Gray; rare.

CYPERACEÆ—Sedge Family.

CYPERUS, *Galingale. Sedge.*
esculentus, *Chufa* or *Earth Almond*, is cultivated from south Europe for its nut-like, sweet tasted tubers.
flavescens, native, Lapham.
diandrus, native, Lapham.
erythrorhizos, native, Lapham.
inflexus, native, Lapham.
acuminatus, native, Lapham.
phymatodes, native, Lapham.
strigosus, native, Lapham.
engelmanni; native, Lapham.
schweinizii, native, Lapham.
filiculmis, native, Lapham.
michauxianus, Schultes; low ground, frequent.
ovularis, native, Lapham.

KYLLINGIA.
pumila, native, Lapham.

DULYCHIUM.
spathasium, native, Lapham.

FUIRENA, *Umbrella Grass.*
squarrosa, native, Lapham.

HERMICARPHA.
subsquarrosa, native, Gray.

ELEOCHARIS, *Spike Rush.*
quadrangulata, native, Lapham.
obtusa, native, Lapham.
olivacea, native, St. Clair county, Brendel.
palustris, native, Lapham.
compressa, native, Lapham.
intermedia, native, Vasey; St. Clair county, Brendel.
wolfii, Gray; margins of ponds, Peoria county, Brendel; Fulton, Wolf; Menard, Hall.
engelmanni, Stend.
var. detonsa, Gray; Henderson county, Patterson.
tenuis, native, Lapham.
acicularis, native, Lapham.

SCIRPUS, *Bullrush* or *Club-rush.*
paciflorus, native, north, Vasey.
cæspitosus, native, north, Vasey.
planifolius, native, Vasey.
pungens, native, Lapham.
validus, *Great Bul-rush*, native, Lapham
debilis, native, Lapham.
smithii, native, Lapham.
supinus var. Hallii, native, Hall.
fluviatilis, *River Club-rush*, native, Lapham; Cook county, Babcock.
atrovirens, native, Lapham.
polyphyllus, native, Lapham.
lineatus, native, Lapham.
eriophorum, Michx.; wet places, frequent.

ERIOPHORUM, *Cotton Grass.*
polystachyon, native, Lapham.
gracile, native, Lapham.
virginicum L., near Chicago.

FIMBRISTYLIS.
spadicea, var. castanea. native, Lapham
laxa, native, Lapham; Cook county, Babcock.
autumnalis, native, Lapham.
capillaris, native. Lapham.

RHYNCHORUM, *Beak Rush.*
capillecia, native, Vasey.
corniculata, native, Gray.
cymosa, Nutt; Kankakee coutny, Hill.

alba, Vahl; bogs, Peoria county, Brendel; McHenry, Vasey.
glomerata, Vahl; near Chicago, Babcock; Kankakee county, Hill.

CLADIUM, *Twig Rush.*
maricoides, native, Vasey.

SCLERIA, *Nut Rush.*
triglomerata, native, Lapham.

CAREX, *Sedge.*
polytrichoides, native, Lapham.
willdenovii, native, Lapham.
steudelii, native, Lapham.
bromoides, native, Lapham.
siccata, native, Lapham.
disticha, native, Lapham.
teretiuscula, native, Lapham.
var. major, Koch; Winnebago county, Bebb.
decomposita, native, Lapham.
retroflexa, Muhl; Washington county, Vasey; Jackson, French.
sterilis, Willd; Peoria county, Brendel.
bebbii, Olney; Winnebago county, Bebb.
fœnea, Willd; var., (?) ferruginsea, Bt., Menard county, Hall; Wabash, Schneck.
aurea, Nutt; near Chicago, Babcock. Also var. androgyna, Olney.
vulpenoidea, native, Lapham.
crus-corvi, native, Lapham.
stipata, native, Lapham.
conjuncta, native, Lapham.
sparganioides, native, Lapham.
cephaloidea, native, Lapham.
cephalophora, native, Lapham.
muhlenbergii, native, Lapham.
rosea, native, Lapham.
chordorhiza, native, Vasey.
stellulata, native, Lapham.
var scirpoides, Gray; with the typical form.
arida, native, Lapham.
scoparia, native, Lapham.
lagopodioides, native, Lapham.
christata var. mirabilis, native, Lapham.
straminea, native, Lapham.
var. typica.
var. tenera
var. festucacea.
var. crawli, Winnebago county, Bebb.
var. meadii, native, Mead.
vulgaris, native, Lapham.
aquatilis, native, Lapham.
aperta, native, Lapham.
stricta, native, Lapham.
crinita, natiqe, Lapham.
limosa, native, Lapham.
buxbaumii, native, Lapham.
shortiana, native, Lapham.
livida, native. Vasey.
panecea, L., var. meadii, Olney; moist prairies, not common.
var. bebbii, Olney; Winnebago county, Bebb; Chicago, Babcock.
tenanica, Schneck; margins of lakes and streams, frequent.
platyphylla, Carey; McHenry county, Vasey.
retrocurva, Den.; Kane county, Vasey.
pedunculata, Muhl; Kane county, Vasey.
emmonsii, Den.; dry places, Menard county, Hall; and southward, Vasey; French.
debilis, Michx.; southern Illinois, Vasey.
ripari, Curtis; wet places, infrequent.
restrorsa, Schneck; McHenry and Winnebago counties, Vasey; Bebb: Wabash, Schneck.
gigantea, Rudge; Wabash county, Schneck.
bullata, Schneck; Hancock county, Mead.
meadii, native, Lapham.
tetanica, native, Lapham.
cranei, native, Vasey.
granularis, native, Lapham.
conoidea, native, Lapham.
grisea, native, Lapham.
davisii, native, Lapham.
virescens, native, Lapham.
triceps, native, Lapham.
plantaginea, native, Lapham.
caseana, native, Lapham.
digitalis, native, Lapham.
laxiflora, var. intermedia, native, Lapham.
var. blanda, native, Lapham.
aligocarpa, native, Lapham.
hitchcockiana, native, Gray.
umbellata, native, Lapham; Cook county, Babcock.
pennsylvanica, native, Lapham.

varia, native, Lapham.
richardsonii, native, Lapham; Mead.
pubesence, native, Lapham.
æderi, native, Vasey.
filiformis, native, Vasey.
lanuginosa, native, Lapham.
trichocarpa, native, Lapham,
var. imberbis, native, Mead; Hall.
comosa, native, Vasey.
hystricina, native, Vasey.
tentaculata, native, Lapham.
intumescens, native, Lapham.
grayii, native, Lapham.
lupulina, native, Lapham.
lupuliformis, native, Cook county, Babcock.
squarrosa, native, Lapham.
stenolepis, native, Cook county, Babcock.
utriculata, native, Lapham.
vaseyii, native, Gray
monile, native, Lapham.
Tuckermani, native, Lapham; Vasey.
longirostris, native, Lapham.
stenolepsis,

GRAMINEÆ—GRASS FAMILY.

ORYZA, *Rice*, annuals.
sativa, *Common Rice*, cultivated from Asia in the United States, and in an essay on the culture of rice in Illinois, by John Russel, of Bluffdale, Green county, (Trans. Ill. State Agr. Soc., vol 3, p. 527), the writer states that rice was grown in his county in the year the essay was written; had been raised in quantities sufficient for home use by many of the farmers in the southern counties, and was included in the census of 1840 among the agricultural products of the state. Finally, that according to the census of 1850, a considerable quantity was grown in Buchanan county, Mo., in the latitude of Sangamon county, Ill. The census of 1860 shows that 716 pounds were grown in Michigan and 3,286 in Minnesota! "There is no single product of the soil that sustains so much of human life as rice." But its cultivation in the United States is retrograding.

Year.	Production.	
1850.....	Pounds of Rice, thirteen States.....	215,313,497
1860.....	Pounds of Rice, fifteen States.....	187,167,032
1870.....	Pouuds of Rice, ten States.....	73,635,021

LEERSIA, *White Grass*.
virginica, native, Lapham; Cook county, Babcock; Champaign county.
oryzoides, *Rice Cut Grass*, native, Lapham; Cook county, Babcock. "Used in southern states for hay."—Lapham.
lenticularis, *Catch-fly Grass*, native, Lapham; Champaign county.

ZIZANIA, *Water* or *Indian Rice*.
aquatica, *Indian Rice*, *Water Oats*, "Is found, though sparingly, throughout the state of Illinois, and even extends south to Arkansas and Florida."—Lapham. "The Sioux call it 'pshu,' and the Chippewas 'man-om-in.' It is a constant article of food with the northern Indians of the lakes and rivers between the Mississippi and Lake Superior. This plant delights in mud and water, five to twenty feet deep. When ripe, the slightest wind shakes off the grains. After being gathered it is laid on scaffolds four feet high, eight wide and twenty to fifty long, covered with reeds and grass, and a slow fire is maintained beneath for thirty-six hours, so as to parch slightly the husk that it may be removed readily. Its beard is tougher than that of rye. To separate it from the chaff or husk a hole is made in the ground a foot wide and one deep and lined with skins, about a peck of rice is put in at the time; an Indian steps in with a half jump on one foot, then on the other until the husk is removed. After being cleansed, the grain is stored in bags. It is darker than the Carolina rice. The hull adheres tightly and is left on the grain and gives the bread a dark color when cooked. The husk is easily removed after being exposed to heat. In Dakota the men gather this grain, but all other grain the women collect. An acre of rice is nearly or quite equal to an acre of wheat in nuitriment. It is very palatable when roasted and eaten dry."—Department of Agricultural Report, 1870.

ALOPECURUS, *Fox-tail Grass*, perennials.
pratensis, *Meadow Fox-tail*, naturalized from Europe, Lapham. A valuable pasture grass in England. "One of our best pasture grasses, being quite early, much liked by the cattle and withstands our hot summers without burning."—Richard

Gibson, of New York Mills, N. Y., in Willard's practical Dairy Husbandry, p. 72.
geniculatus, *Floating Fox-tail*, naturalized from Europe, Lapham. "It is a grass not much relished by stock of any kind, while it yields but a small amount of herbage."—Flint.
aristulatus, *Wild Fox-tail*, native, Lapham. "Of no special agricultural value." —Flint.

PHLEUM, *Cat's Tail Grass*, perennial.
pratense, *Timothy, Herd's Grass* of New England and New York, naturalized from Europe, Lapham; and in general cultivation. "As a crop to cut for hay it is probably unsurpassed by any other grass now cultivated."—Flint. "More valuable for meadows than pastures."—Gibson. The hay crop f the United States and of Illinois, the most of which we may assume is timothy, runs as follows:

		United States.	Illinois.
1850—tons		13,838,642	601,952
1860—tons		19,083,896	1,774,554
1870—tons		27,316,048	2,747,339
1850—bushels	Clover seed	468,978	3,427
	Grass seed	416,831	14,380
1860—bushels	Clover seed	956,189	18,831
	Grass seed	900,040	191,273
1870—bushels	Clover seed	639,657	10,406
	Grass seed	583,188	153,464

VILFA, *Rush Grass.*
aspera, native, Lapham; perennial.
vaginæflora, native, Lapham; Cook county, Babcock; annual.
virginica, Beauv.; Fulton; Wolf.

SPOROBOLUS, *Drop Seed Grass.*
heterolepsis, native, Lapham; Cook county, Babcock; Champaign county.
cryptandrus, native, Lapham.

AGROSTIS, *Bent Grass of England*, perennials.
perennans, *Thin Grass*, native, Vasey; Peoria county, Brendel: Cook county, Babcock.
scabra, *Hair Grass*, native, Lapham; Cook county, Babock; Champaign county.
vulgaris *Red Top*, herd grass of Pennsylvania and southward, naturalized from Europe, Lapham. Perhaps native northward. "It is a good, permanent grass, and consequently well suited to our pastures. It should be fed close."—Flint.
alba. *Florin*, or *White Bent Grass*, naturalized from Europe, and indigenous, Lapham. "Quite inferior to the red top."—Lapham

CINNA, *Wood Reed Grass*, perennial.
arundinacea, native, Lapham; Cook county, Babcock.
var. pendula, Gray; Kankakee county, Hill; Kane, Vasey.

MUHLENBERGIA, *Drop Seed Grass.*
sobolifera, native, Lapham
glomerata, native, Lapham; Cook county, Babcock.
mexicana, native, Lapham; Cook county, Babcock; Champaign county.
sylvatica, native, Lapham; Cook county, Babcock.
wildenovii, native, Lapham; Cook county, Babcock.
diffusa, *Drop Seed, Nimble Will*, native, Lapham; Champaign county.

BRACHYELYTRUM.
aristatum, native, Lapham.

CALAMAGROSTIS, *Reed, Bent Grass*, perennials.
canadensis, *Blue Joint Grass*, native, Lapham; Cook county Babcock. "It is generally considered a valuable grass. It is eaten greedily by stock in the winter, and is thought by some to be as nutritious as timothy."—Flint. "Abundant and valued about Lake Superior."—Darlington,
nuttalliana, native, Lapham.
longifolia, native, Vasey; Cook county, Babcock; Champaign county.
arenaria, *Sea Sand Weed*, native, Vasey, Cook county, Babcock. "Of great value in protecting sandy beaches."—Flint.

ORYZOPSIS, *Mountain Rice.*
canadensis, native, Lapham.
melanocarpa, Muhl.

STIPA, *Feather Grass.*
avenacea, *Black Oat Grass*, is dried for ornament.
spartea, *Porcupine Grass*, native, Lapham.

ARISTIDA, *Triple-awned Grass.*
ramosissima, native, Lapham; Engelmann.
var. uniaristata, native, McHenry county, Vasey.
dichotoma, *Poverty Grass*, native, Lapham.

gracilis, native, Lapham.
stricta, native, Lapham.
oligantha, native, Lapham.
purpurascens, native, Lapham.
tuberculosa, native, Lapham.

SPARTINA, *Cord* or *Marsh Grass*.
cynosuroides, *Fresh-Water Cord-Grass*, native, Lapham; Cook county, Babcock; Champaign county.

BOUTELOUA, *Musket Grass*.
oligostachya, Torr.; sandy places, Lee county, Vasey; Champaign county.
hirsuta, native, Lapham; Vasey.
curtipendula, native, Lapham.
var. aritrosa, Gray; with the typical form.

DACTYLOCTENIUM, *Egyptian Grass*.
ægyptiacum, adventive from Africa, Lapham; a weed in southern states.

ELEUSINE, *Crab Grass*, *Yard Grass*, annual.
indica, *Dog's Tail* or *Wire Grass*, naturalized from India, Lapham; "Valuable for cattle in southern states."—Gray.

LEPTOCHLOA.
muchronata. native, Lapham.
fascicularis, native, Lapham.

TRICUSPIS.
seslerioides, *Fall Red Top*, perennial, native, Lapham.
purpurea, Gray; Henderson county, Patterson; Fulton, Wolf; Mason, Mead.

DIARRHENA.
americana, native, Lapham; Cook county, Babcock; Champaign county.

DACTYLIS, *Orchard Grass*.
glomerata, naturalized from Europe, Lapham; Cook county, Babcock. "One of the most valuable and widely known of all the pasture grasses,"—Flint. "It is inferior to timothy for hay, yet it has the advantage of the latter in being mature at the same time with clover, with which both are usually cultivated It is also less exhausting to the soil. But its great value is as a pasture"—Darlington. "In my opinion the most valuable grass we have, and should enter into all mixtures intended for permanent pasture. It is one of our earliest as well as our most nutritious and productive grasses, and is exceedingly palatable to stock of all kinds." —Gibson, of N. Y. Mills.

KŒLERIA.
cristata, native, Lapham; Cook county, Babcock.

EATONIA.
obtusata, native, Lapham.
pennsylvanica, native, Lapham.

MELICA, *Melic Grass*.
mutica, native, Lapham.

GLYCERIA, *Manna Grass*, perennial.
canadensis, *Rattle Snake Grass*, native, Lapham; Cook county, Babcock; Champaign county.
nervata, *Fowl Meadow Grass*, native, Lapham; of some value for pastures.
pallida, native, Vasey.
fluitans, native, Lapham; Cook county, Babcock.

POA, *Meadow Grass*, *Spear Grass*.
annua, *Low Spear Grass*, native, Lapham; Cook county, Babcock. "Excellent food for cows."—Lapham.
compressa, *Wire Grass*, introduced, and probably native. "It is exceedingly valuable pasture grass on dry rocky soil."—Flint. Rolling the stem of the seed stalk between the thumb and forefinger enables one to feel the flatness of the stalk, which distinguishes this grass from the more valuable poa pratensis, or Kentucky blue grass.
serotina. *False Red Top*, *Fowl Meadow Grass*, native, Vasey; Cook county, Babcock. "It makes an excellent grass for oxen, cows and sheep, but is thought to be rather too fine for horses."—Flint.
pratensis, *Green* or *Common Meadow Grass*, *Kentucky Blue Grass*, *June Grass*, *etc.*, native, Lapham; Cook county, Babcock. "It has been called by some, without much reason, the most valuable of all the grasses in our pastures."—Flint. "Decidedly the most valuable of all the grasses known in our pastures."—Darlington. "Is seen in it highest perfection in strong lime stone soils."—L. F. Allen.
trivialis, *Rough-Stalked Meadow Grass*, cultivated from Europe. "A valuable grass to cultivate in moist sheltered soils,"—Flint. "One of our most valuable grasses [for pasture.]"—Gibson, at New York Mills. "Affords a good forage, both pasture and hay, but decidedly inferior in value"—to the last—Darlington.
sylvestris, native, Lapham.
alsodes, native, Lapham.
brevifalia, native, Lapham.

ERAGROSTIS.
reptans, native, Lapham; Cook county, Babcock.
pœoides, naturalized from Europe, Cook county, Babcock; Champaign county.
var. megastachya, naturalized from Europe, Lapham; Cook county, Babcock.
pilosa, naturalized from Europe, Lapham, Cook county, Babcock.
frankii, native, Lapham; Cook county, Babcock.
capillaris, Nees: sandy barrens, frequent.
tenuis, native, Lapham.

pectinacea, native, Lapham.
var. spectabilis, native, Lapham.

FESTUCA, *Fescue Grass.*
tenella, native, Lapham; Champaign county.
ovina, *Sheep's Fescue*, cultivated from northward. "It forms an excellent pasturage for sheep."—Flint
elatior *Taller* or *Meadow Fescue*, naturalized from Europe, Cook county, Babcock. "It is a nutritive and productive grass, growing naturally in shady wood and moist stiff soils."—Flint "One of our best grasses and producing a large bulk of very nutritious grass highly relished by cattle; does not attain its full growth until three years from the time of sowing."—Gibson, of New York Mills. "A valuable grass," -Darlington.
nutans, native, Lapham; Cook county, Babcock; Champaign county.

BROMUS, *Brome Grass.*
secalinus, *Cheat* or *Chess*, adventive from Europe, Lapham; Cook county, Babcock.
kalmii, *Wild Chess*, native, Lapham; Cook county, Babcock.
ciliatus, L.
racemosus, L.

UNIOLA, *Spike Horse.*
latifolia, native. Lapham.

PHRAGMITES, *Reed Grass.*
communis, native, Lapham; Cook county, Babcock. Said to be the largest grass in the United States. Champaign county.

ARUNDINARIA, *Cane.*
macrosperma, *Large Cane*, native, Lapham.
tecta, *Small Cane*, Wabash county, Ridgeway.

These two species of cane are not apparently distinguished in the accounts of early settlers, nor by early botanists; but one or the other or both were common in southern Illinois in the early day. Lapham says of the first: "Southern Illinois and Indiana, extending up the Ohio river to the falls at New Albany." Gray, in his earlier edition of the Manual, recognizes but one species with a variation in the small cane. In the later edition he makes the two species, and seems to confine the larger species to the southern region below Illinois. Governor Reynolds, in his Pioneer History, gives the following: "All along the Ohio river and up the Mississippi to Muddy river, and sometimes higher, the cane grew so thick and strong that man or beast could scarcely penetrate it. These were called brakes, and were so thick and matted together that deer, buffalo, horses and other animals were completely housed and sheltered from the storms. Hunters say they have often heard buffaloes, in the winter, bellowing in these canebrakes as if it were summer in the prairies." In Smith county, Tennessee, to-day, as in Illinois seventy-five years ago, canebrakes are used as winter pastures. "With proper care we can again soon have cane for our cattle to live upon in the winter; and it is a nutritious food for them. The destruction is caused by the stock eating up the young, tender, sweet stalks that come up in the spring. But if this young cane is kept free from the depredations of stock until winter, it then becomes hard and the stock will only eat off the rich foliage, which puts out again next spring. This I know by experience. I have a small canebrake made in this way, and a neighbor has about one hundred acres cane raised in the same manner."—Resources of Tennessee, p. 819.

LEPTURUS.
paniculatus, native, Lapham; Mead.

LOLIUM, *Darnel.*
perenne *Common Darnel*, *Ray* or *Rye Grass*, cultivated from Europe, of doubtful value.
italicum, cultivated from Europe. Said to endure the climate of Australia well

TRITICUM, *Wheat.*
repens, *Couch*, *Quitch* or *Quick Grass*, native, Vasey; Cook county, Babcock.
caninum, *Armed Wheat Grass*, naturalized from Europe, Vasey.
vulgare, *Common Wheat*, cultivated from the old world, where it is found in the remains of the Lake Dwellings. Now grown nearly all over the world, but not so far north as rye, oats and barley, which are harder. Its production in the United States and Illinois is

Year.	Production.	United States.	Illinois.
1850.....	Wheat, bushels.....	100,485,944	9,414,575
1860.....	" "	173,104,924	23,837,023
1870.....	" "	112,549,733	10,133,207
1870.....	" "	175,195,893	19,995,198

Illinois lead all other states in Wheat Production. Winter wheat was reported as grown in every county except Stark. Spring wheat was reported from 80 counties, and 22 (all southern counties) reported none. The winter wheat is mostly grown south of Springfield. St. Clair, Madison, Pike and Randolph produced the greatest aggregate yield. The acerage of wheat in Illinois since 1870, is reported to the auditor as follows:

1870.....2,035,537 acres.
1871.....1,004,392 "
1872.....2,093,308 "
1873.....2,558,680 "

HOLCUS.
lanatus, L.; Adams county, Mead.
spelta, *Spelt*, cultivated from the old world. Supposed to be the wheat used by the ancient Romans. Fed to horses in southern Europe. A hardier grain, requiring less care than common wheat.

SECALE, *Rye*.
cereale, *Common Rye*, cultivated from Europe. "Seems to do best in light sandy soils. The grain in such soil is of a better quality and affords a whiter flour."—Darlington. Produces a good winter pasture and is good for early soiling.

Year.	Production.	United States.	Illinois.
1850	Wheat, bushels	14,188,813	83,364
1860	" "	21,101,380	951,280
1870	" "	16,918,795	2,456,578

Ogle, Woodford and Stephenson are the leading counties of Illinois in its production. It has taken the place, to a certain extent, of spring wheat.

HORDEUM, *Barley*.
jubatum, *Squirrel Tail Grass*, native, Lapham; Cook county, Babcock.
pratense, native, Lapham.
vulgare, *Common Barley*, cultivated from Asia. Matures in higher latitudes than any other cereal.

Year	Production.	United States.	Illinois.
1850	Common barley, bushels	5,167,015	110,795
1860	" " "	15,825,898	324,117
1870	" " "	29,761,305	2,480,400

Ogle, DeKalb and Stephenson are the leading counties. It is mostly grown in the north part of the state.
distichum, *Two Rowed Barley*, from Tartary.

ELYMUS, *Lime Grass. Rye Grass*.
virginicus, native, Lapham; Cook county, Babcock; Champaign county.
canadensis, native, Lapham; Cook county, Babcock; Champaign county.
striatus, native, Lapham; Cook county, Babcock.
var. villosus, native, Lapham.

GYMNOSTICHUM, *Bottle Brush Grass*.
hystrix native, Lapham; Cook county, Babcock.

DANTHONIA, *Wild Oat Grass*.
spicata, native, Lapham.

AVENA, *Oat*.
sativa, *Common Oats*, cultivated from Asia. Next to barley in hardiness and ability to mature in high latitudes.

Year.	Production.	United States.	Illinois.
1850	Oats, bushels	146,584,179	10,087,241
1860	" "	172,643,185	15,220,029
1870	" "	282,107,157	42,780,851

Illinois leads Pennsylvania, which is next, by 6,000,000 bushels. Will, Cook and La-Salle were the leading counties in 1870. Acreage, auditor's report:

1870		Acres.
1871		"
1872	1,817,463	"
1873	1,821,093	"
1874		"

TRISETUM,
palustre, native, Lapham.

AIRA, *Hair Grass.*
cæspitosa, native, Vasey.

HIEROCHLOA, *Holy Grass.*
borealis, *Vanilla* or *Seneca Grass*, native, Vasey.

ANTHOXANTHUM, *Sweet Scented Vernal Grass.*
odoratum, cultivated from Europe. "Almost the only grass that is fragrant."—Flint. "Should be introduced into all mixtures for permanent pastures, on acount of its early spring growth, as it is also one of the latest in autumn." —Gibson, of New York Mills.

PHALARIS, *Canary Grass.*
canariensis, *Canary Grass*, naturalized from Europe, Cook county, Babcock. Seed used for canaries.
arundinacea, *Reed Canary Grass*, native Lapham, Cook county, Babcock; Champaign. The ribbon grass is a variety of this.

MILIUM, *Millet Grass*,
effusum, native, Gray.

PASPALUM.
fluitans, native, Lapham.
setaceum, native, Lapham.
læve, native. Lapham.
frankii, St. Clair county, Brendel.
waltenanum, Schultz, St. Clair, Brendel.

PANICUM, *Panic Grass.*
filiforme, native, Lapham; common.
glabrum, naturalized from Europe, Lapham; Cook county, Babcock; common.
pauciflorum, Ell.; prairies, common.
sanguinale, *Common Crab* or *Finger Grass*, naturalized from Europe, Lapham; Cook county, Babcock. Grown in southern states for hay, but also a troublesome weed.
anceps, native, Vasey; Peoria county, Brendel.
agrostoides, native, Lapham.
proliferum, native, Lapham.
capillare, *Old Witch Grass*, native, Lapham; everywhere.
autumnale, native, Lapham; Mason county, Mead; Hall.
virgatum, native, Lapham; Cook county, Babcock.
latifolium, native, Lapham; Cook county, Babcock.
clandestinum, native, Lapham.
microcarpon, native, Lapham.
xanthophysum, native, Lapham.
dichotomum, native, Lapham; Cook county; Babcock.
depauperatum, native, Lapham; Cook county, Babcock.
crus-galli, *Barn Yard Grass*, naturalized from Europe, common everywhere. "Succulent and nutritive."—Flint.
var. hispidum, naturalized, Lapham.

SETARIA, *Bristly Fox Tail Grass.*
glauca, *Fox Tail*, adventive from Europe, Lapham; Cook county, Babcock; common.
viridis, *Green Fox Tail, Bottle Grass*, adventive from Europe, common.
italica or germanica, *Italian Millet, Bengal Grass, Hungarian Grass*, cultivated for hay and adventive, Cook county Babcock.

CENCHRUS, *Hedgehog* or *Bur Grass*, vile weed.
tribuloides, native, Cook county, Babcock.
tripsacum, *Gama Grass, Sesame Grass*, native, Lapham. "One of our largest and most remarkable grasses."--Gray.

TRIPSACUM.
dactyloides, a large coarse grass.

ZEA, *Indian Corn.*

mays, cultivated from South America in great variety and immense quantity. It stands next to rice in its sub-tropical nature and its importance as a cereal, not only in all parts of the new world, but in much of the old. Its American origin is sufficiently proven by its immense antiquity, shown by Darwin, who "found on the coast of Peru, heads of maize, together with eighteen species of recent sea-shells, embedded in a beach which had been upraised at least 85 feet above the level of the sea." Its production in the United States and in Illinois was:

	United States.	Illinois.
1850—bushels	592,071,104	57,646,984
1860—bushels	938,792,741	115,174,777
1870—bushels	760,944,549	129,921,395

The acreage since that period in Illinois has been as follows:

1870	6,262,963	acres.
1871	6,923,076	"
1872	7,087,040	"
1874		"

Illinois is by far the largest corn-producing state. Sangamon and Logan produced according to the census of 1870 over four millions of bushels each. Fifty five counties produced in excess of one million of bushels each.

ERIANTHUS, *Woolly Beard Grass.*
alopecuroides, native, Lapham; Gray.

ANDROPOGON, *Beard Grass.*
furcatus, native, Lapham; Cook county, Babcock; Champaign county.
virginicus, native, Lapham.
scoparius, Michx.; dry prairies, etc., common.

SORGHUM, *Brown Grass, Broom Corn.*
nutans, *Indian Grass, Wood Grass*, native, Lapham; Cook county, Babcock; Champaign county.
saccharatum, *Broom Corn*, cultivated from India and Arabia for the "brush," from which brooms are made. Chinese sugar cane, sorghum, imphee, etc., are supposed to be varieties cultivated from Africa, China, etc., for the saccharine matter contained in the stalk. Valuable also as fodder for plants.

The production of sorghum, sugar and molasses is as follows:

Year.	Production.	United States.	Illinois.
1860	Molasses, gallons	6,749,143	806,589
1870	" "	16,050,089	1,960,478

Sugar, in 1870, 24 hogsheads returned from Iowa and Pennsylvania.
Molasses was produced in every county save one, in 1870. Shelby and Edgar lead.
The production of broom corn, although an important industry, is not given in the census.

vulgare, *Indian Millet, Durra* or *Doura*, cultivated from India.
var, cernuum, *Guinea Corn, Drooping Sorghum*, cultivated from India.

The seeds of all the species are valuable as food for domestic animals and even for bread, but their cultivation has been induced by other considerations and their value in this respect not appreciated.

GYNERIUM, *Pampas Grass*, perennials.
argenteum, planted from South America for ornament, tender.

EQUISETACEÆ—Horsetail Family.

EQUISETUM, *Horsetail Scouring Brush.*
arvense, *Common Horsetail*, native, Lapham; Cook county, Babcock.
palustre, L.; wet places, Peoria county, Wolf; Brendel.
scirpoides, Michx.; McHenry county, Vasey.
limosum, native, Vasey; Peoria county, Brendel.
lævigatum, native, Lapham.
robustum, native, Lapham.
hyemale, *Scouring Rush, Shave Grass*, native, Lapham.
variegatum, native, Vasey; Brendel; Peoria county.

Wood says that limosum is greedily devoured by cattle. Is this the "rush," mentioned by Governor Reynolds, when he says: "Above the cane regions the rushes grew on the sandy margins of the Mississippi and on sandy islands, strong and thick. They are more nutritious and better on which to winter animals than cane."—Pioneer History.

FILICES—FERNS.

PLATYCERIUM, *Stag Horn Fern*, native of Africa, etc.
alcicorne, conservatory plant, curious.

POLYPODIUM, *Polypody*.
incanum, native, Lapham.
phyllitidis, *Hart's Tongue*, of Tropical America.
lingua, cultivated from Japan.
aureum, cultivated from West Indies.

GYMNOGRAMME, cultivated species.
triangularies, *California Gold Fern*.
sulphurea, of West Indies.
calomelanos, of tropical America.

NOTHOLÆNA, cultivated species.
flavens, from Central America.
nivea, from Central America.

ADIANTUM, *Maiden Hair*.
macrophyllum, in hot houses from West Indies.
capillus-veneris, *Venus Hair*, in conservatories north.
æthiopicum, in hot houses.
cuneatum, from South America.
pedatum, *Maiden Hair*, native, common.

PTERIS, *Brake*.
longifolia, cultivated from Florida.
cretica, cultivated from Florida.
serrulata, cultivated from China.
quadriaurita, cultivated from East or West Indies.
aquilina, *Common Brake*, native, common.
pedata, cultivated from West Indies and South America.

PELLÆA, *Cliff Brake*.
rotundifolio, from New Zealand.
hastata, from South Africa.

CHEILANTHES, *Lip Fern*.
vestita, native, Lapham.
tomentosa, native, Vasey.
lanuginosa, Nutt; JoDaviess county, Brendel; Pike, Mead; Jackson, French.

WOODWARDIA, *Chain Fern*.
virginica, native, Cook county, Babcock.

DOODIA, small ferns cultivated from Australia and New Zealand.
caudata and aspera.

ASPLENIUM, *Spleenwort*, large species.
nidus, *Bird's Nest Fern*, cultivated from East Indies, etc.
trichomanes, native, Lapham.
ebeneum, native, Vasey; St. Clair, Brendel.
flabellifolium, cultivated from Australia.
furcatum, cultivated from tropical America.
thelypteroides, native, Lapham.
pinnatifidum, Nutt; Jackson and Marion counties, French; Pope, Schneck.
filix-fœmina, *Lady Fern*, native, Lapham; Cook county, Babcock.
angustifolium, Michx.; in woods, scarce.
belangeri, cultivated from Malacca and Java.
bulbiferum, cultivated from New Zealand.

SCOLOPENDRIUM, *Hart's-Tongue*.
vulgare, cultivated from England, but is native in New York, etc

CAMPTOSORUS, *Walking-Leaf*.
rhizophyllus, native, Lapham.

PHEGOPTERIS, *Beech-Fern*.
palypodioides, native, Cook county, Babcock.
hexagonoptera, native, Cook county, Babcock; Champaign county.

ASPIDIUM, *Shield Fern, Wood Fern*.
sieboldii, cultivated from Japan.
thelypteris, native, Vasey; Cook county, Babcock.
molle, cultivated from tropics.
spinulosum, native, Vasey; Cook county, Babcock.
var. intermedium, Cook county, Babcock.
cristatum, Cook county Babcock.
goldianum, native, Vasey.
acrostichoides, native, common.
falcatum, cultivated from Japan.
noveboracense, Swartz; swamps, Kane county, Vasey; Kankakee, Hill; Wabash, Schneck; scarce.
marginale, Swartz; shady, rocky hillsides, infrequent.

CYSOPTERIS, *Bladder Fern*.
bulbifera, native, Vasey; common.
fragilis, native, Lapham; common.

STRUTHIOPTERIS.
germanica, native, Vasey; Peoria county, Brendel

ONOCLEA, *Sensitive Fern.*
sensibilis, native, Lapham; Cook county, Babcock; Vermilion county.

WOODSIA.
obtusa, native, Vasey.
ilvensis, R. Br., sparingly on sandstone cliffs, Ogle county, Bebb.

DAVALLIA, cultivated in conservatories.
canariensis, *Hare's Foot Fern*, from the Canary Islands.
tenuifolia, from India and China.

DICKSONIA.
punctilobula, native, Lapham.
antarctica, *Tree Fern*, from New Zealand.

CYATHEA.
arborea, cultivated from West Indies.

ALSOPHILA.
aspera, cultivated from West Indies.
pruinata, from South America.

LYGODIUM, *Climbing Fern.*
japonicum, conservatory plant, from Japan.

ANEIMIA.
phyllitidis, cultivated from South America.

OSMUNDA, *Flowering Fern*
regalis, *Flowering Fern*, native, Vasey; Lapham; Cook county, Babcock.
claytoniana, native, Cook county, Babcock.
cinnamomea, *Cinnamon Fern* native, Cook county, Babcock.

BOTRYCHIUM, *Moonwort.*
virginicum, native, Lapham; Cook county, Babcock.
lunarioides, native, Lapham.
var. obliquum, native, Cook county, Babcock.

OPHIOGLOSSUM.
vulgatum. L., Wabash county, (a single plant) Schneck.

LYCOPODIACEÆ—Club Moss Family.

LYCOPODIUM, *Club Moss.*
selago, L., "collected" by J. W. Powell near Ottawa, Vasey.
lucidulum, native, Vasey.

SELAGINELLA, many cultivated from tropics.
rupestris, native, Vasey.
apus, Spring; low shady places, scarce, cultivated as S. densa.
delicatissima, cultivated.
kraussiana, (Lycopodium denticularis of the florists) cultivated.
uncinata, (Lycopodium caestum of the florists) cultivated.
martensii, (Lycopodium wildenovii of the florists).
braunii, (Lycopodium cirbinal of florists).
cuspidata, (Lycopodium circinal of florists).
lepidophylla, from Lower California, is the Bird's Nest Moss or Resurrection Plant.

ISOETES, *Quillwort.*
melanopoda, native, Hall; Vasey; Wolf.

AZOLLA.
caroliniana, native, Lapham; Henderson county, Patterson.

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