



Throop Polytechnic Institute



FOURTH ANNUAL ANNOUNCEMENT

Pasadena, California
1895-1896

FOURTH ANNUAL CATALOGUE

OF

THROOP

POLYTECHNIC INSTITUTE

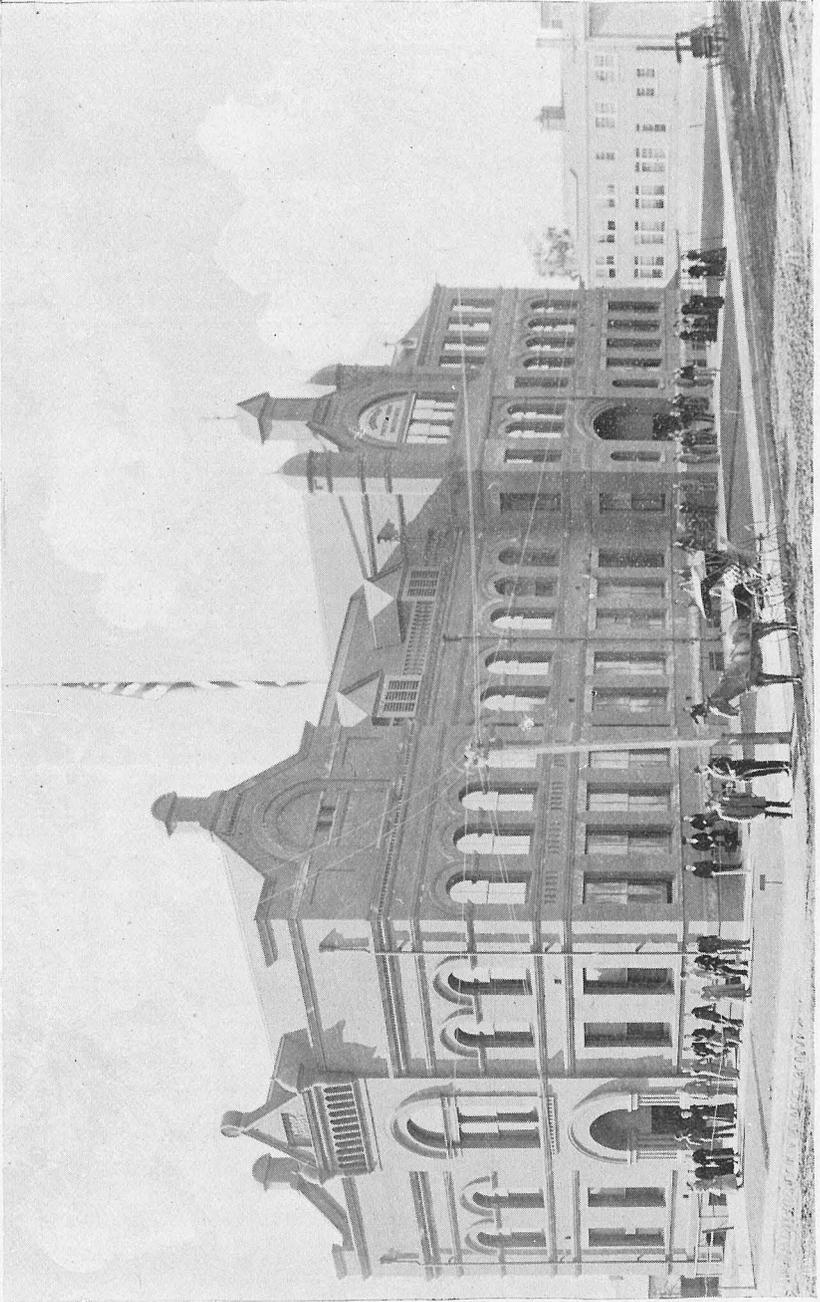
AND

MANUAL TRAINING SCHOOL

PASADENA, CAL.

1895-1896

B. R. BAUMGARDT & CO.
LOS ANGELES



EAST HALL.—THROOP POLYTECHNIC INSTITUTE.

FOUNDER

HON. AMOS G. THROOP.

Born at De Ruyter, New York, July 22, 1811

Died at Pasadena, Cal., March 22, 1894

BOARD OF TRUSTEES

E. E. SPAULDING, A.M.,	-	-	-	-	-	-	-	-	-	Pasadena	1895
W. E. ARTHUR, ESQ.,	-	-	-	-	-	-	-	-	-	Pasadena	1895
HON. F. C. BOLT,	-	-	-	-	-	-	-	-	-	Pasadena	1895
WALTER LINDLEY, M.D.,	-	-	-	-	-	-	-	-	-	Los Angeles	1896
MRS. ELLEN I. STANTON,	-	-	-	-	-	-	-	-	-	Pasadena	1896
JOHN WADSWORTH,	-	-	-	-	-	-	-	-	-	Pasadena	1896
E. L. CONGER, D.D.,	-	-	-	-	-	-	-	-	-	Pasadena	1897
MRS. LOUISE T. W. CONGER,	-	-	-	-	-	-	-	-	-	Pasadena	1897
C. B. SCOVILLE, ESQ.,	-	-	-	-	-	-	-	-	-	Pasadena	1897
C. D. DAGGETT,	-	-	-	-	-	-	-	-	-	Pasadena	1898
HON. H. M. HAMILTON,	-	-	-	-	-	-	-	-	-	Pasadena	1898
PRESIDENT C. H. KEYES,	-	-	-	-	-	-	-	-	-	Pasadena	1898
HON. P. M. GREEN,	-	-	-	-	-	-	-	-	-	Pasadena	1899
HON. T. P. LUKENS,	-	-	-	-	-	-	-	-	-	Pasadena	1899
NORMAN BRIDGE, M.D.,	-	-	-	-	-	-	-	-	-	Pasadena	1899

OFFICERS OF THE BOARD

HON. P. M. GREEN,	REV. E. L. CONGER, D.D.,
President.	Vice-President and General Agent.
F. J. POLLEY,	HON. C. B. SCOVILLE,
Secretary	Treasurer.

EXECUTIVE COMMITTEE

HON. P. M. GREEN,	PRES. C. H. KEYES,	W. E. ARTHUR, ESQ.,
REV. E. L. CONGER, D. D.,	NORMAN BRIDGE, M. D.	



CALENDAR

1895-1896

Fall Term begins	Wednesday, September 18, 1895
Thanksgiving Vacation	Thursday, Nov. 28, to Monday, Dec. 2
Founder's Day	Thursday, December 13
Fall Term ends	Friday, December 21

HOLIDAY VACATION

Winter Term begins	Tuesday, January 7, 1896
Winter Term ends	Friday, March 27

SPRING VACATION

Spring Term begins	Monday, April 7
Spring Term ends	Wednesday, June 18

OFFICERS OF INSTRUCTION AND GOVERNMENT

CHARLES H. KEYES, A. B., PRESIDENT,
Education.

MILLARD M. PARKER, A. M., VICE-PRESIDENT,
Greek and Latin.

ALFRED J. McCLATCHIE, A. B.,
Biology.

SARAH E. SPRAGUE, PH. D.,
English Language and Literature.

ARTHUR L. HAMILTON,
Mathematics.

HERBERT B. PERKINS, S. B.
Mechanical Drawing and Civil Engineering.

WALLACE K. GAYLORD, S. B.,
Chemistry and Mathematics.

WILLIAM H. PARKER,
Machine and Pattern Shop Work.

THOMAS M. GARDNER, B. M. E.,
Physics and Electrical Engineering.

N. SAUNDERS, A. M.
French, German and Spanish.

FRANK J. POLLEY, B. L., SECRETARY,
History and Civics.

ALICE CAMPBELL,
Sewing and Cooking.

CHARLES H. WRIGHT,
Smithing and Forging Shop Work.

CHARLES N. CHAMBERS, S. B.,
Joinery, Turning, and General Wood Work.

MARY L. ALLIS,
Clay Modeling and Wood Carving.

CHARLES A. KUNOU,
Sloyd.

FANNIE FERN STURRETT,
Freehand Drawing.

BONNIE BUNNELLE,
English, Geography and Writing, in Preparatory Department.

WARREN LOREE, B. S.,
Mathematics, U. S. History, in Preparatory Department.

J. R. MESKIMONS,
Mathematics and English, in Preparatory Department.

MILLIE A. MORSE,
Typewriting and Stenography.

FACULTY COMMITTEES

EXECUTIVE COMMITTEE

M. M. PARKER, HAMILTON,
McCLATCHIE, SPRAGUE.

MUSIC

C. N. CHAMBERS, M. M. PARKER,
B. BUNNELLE, MESKIMONS,
POLLEY.

BUILDINGS AND GROUNDS

HAMILTON, WRIGHT,
GAYLORD, BUNNELLE.

ATHLETICS

KUNOU, POLLEY,
McCLATCHIE, MESKIMONS.

LITERARY SOCIETIES

SPRAGUE, LOREE,
HAMILTON.

Executive Committee will serve as Classification Committee.

THROOP POLYTECHNIC INSTITUTE.

Founding.

The Throop Polytechnic Institute of Pasadena, California, was founded by Hon. Amos G. Throop, who, in 1891, endowed it with \$200,000, and consecrated all his energy to its support. Articles of incorporation were filed September 23rd; the first Board of Trustees organized on October 2nd. A five years' lease of the Wooster Block, a handsome and commodious four-story brick building, situated at the corner of Fair Oaks avenue and Green street, was secured and fitted up with appropriate furnishings. The doors of the institution were opened to students on November 2nd. It was established as an institution of learning that should furnish to students of both sexes and all religious opinions, a liberal and practical education, which, while thoroughly Christian, should be absolutely non-sectarian in its character.

In 1892 it was determined to make Manual and Industrial Education the characteristic feature of the school.

Location.

Pasadena is generally acknowledged to be one of the most beautiful residence cities in California. It has a population of over ten thousand. It is situated within ten miles of the city of Los Angeles, at the head of the San Gabriel Valley and at the base of the picturesque San Gabriel Mountains. In beauty and healthfulness, in the culture of its homes, and in its high social and moral tone, Pasadena has no superior on the Pacific Coast. It is reached by the Santa Fe and Los Angeles Terminal railways, as well as by an electric railway, whose lines pass just in front of each of the Halls. This last road extends from Los Angeles through Garvanza and South Pasadena. Students living at any point along this line will be enabled to make the daily trips to and from the institution for little more than ordinary street car fare. The Southern Pacific is also building a road into Pasadena.

Courses, Departments, Etc.

The Institute comprises three distinct departments, a Sloyd School, a Manual Training Academy, and a College Department. Manual Training is one of the leading characteristics of the Institute. Its aim is the development of conscious, skillful energy and the subordination of every other power of body and mind to the action of the will. Its chief product is never the accurate drawing, the beautiful sketch, the well-made garment, the well-cooked dinner, the exactly fitted joint, the perfectly adjusted machine or the intricate and ornamental iron work; but it is the

self-controlled, self-centered young man or woman who has learned how to live and has prepared himself to easily learn how to get a living. It is the boy who is to be a man rather than simply a machinist, a citizen rather than simply a carpenter. It is the boy who aspires first to the high estate of right living, and afterward to the successful following of the calling for which he has in his training discovered his adaptability. The girl trained in such a school will come out to honor first the demand of society and home for an intelligent, careful, noble woman who can be, when occasion demands it, the true friend, the helpful wife, or the worthy mother.

While it is true that the young man or woman who takes the manual training course may master any one of a score of arts, trades, or callings in a few months, while the average man or woman requires years, it is far from true that this training is only or chiefly valuable to the boy who is to be a carpenter, a blacksmith, a draughtsman, an architect, a machinist, an engineer, or an artist. For the physician or surgeon no preparatory training is worth more. For the lawyer, in this day of endless commercial litigation, what preparation is better? For the preacher, what training can better fit him to appreciate the condition of the masses of the people? And, as "learn to do by doing" becomes something more than a fine institute sentiment, such training for the teacher is indispensable. The man who has to manage large commercial, manufacturing, or constructive enterprises needs such training for the protection and economic expenditure of his capital, more than the laborer needs it for the winning of his livelihood.

It must not be assumed that the girl who takes this training is to become a draftsman, a milliner, an artist, architect, a professional cook, housekeeper or dressmaker, a typewriter, a pharmacist, or a teacher. True, she has prepared herself to rise to mastery in these lines; but she has also prepared herself for the thorough management of a home. She has secured a training as essential for the lady whom others must serve, as for her whose skill wins her daily bread.

In addition to the courses of the Manual Training School and College Department, opportunity is afforded teachers to prepare for service in High Schools as instructors in the Languages, Mathematics, Natural Sciences, etc. The training of teachers for Manual Training and Sloyd Schools, in which education by doing has become a real thing, also receives attention. Laboratory opportunities are offered mature students who have had experience in the school room.

A fully equipped Sloyd School, in charge of an able teacher, is prepared to give boys and girls, in classes of twenty each, in connection with thorough instruction in the elementary branches, the most approved form of hand and eye culture for pupils of this age. It is the aim of this department to give pupils the individual attention which would be impossible in any school with large classes. Special provision is also made in this department for the training of persons who purpose becoming Sloyd teachers.

Library.

The Library contains a collection of valuable works of reference, consisting of about fifteen hundred volumes, bearing chiefly on English Literature, History, and Natural Science. The works on Physics, Chemistry, Electricity, Botany, Zoology, etc., are kept in the various laboratories. The remainder of the library is located in a room adjoining the general assembly and study room. Through the generosity of Mrs. Jeanne C. Carr the school has received three hundred volumes of valuable historical and scientific books.

Discipline. The instructors of the Institute constantly keep in mind the development of self-governing, self-respecting, law-abiding men and women. The helpfulness of the ever-watchful friend takes the place of the educational police-officer. Students are expected to attend whatever church their parents or guardians elect. Sixteen societies have houses of worship and pastors located in this city. Representatives of many of the leading denominations are found on the faculty, and a definite effort is made to establish in the community such a relationship for the student as is desired by the home.

Athletics. Every encouragement is given to the legitimate growth of athletics. Membership in any of the athletic organizations is subject to forfeiture for failure in any regular line of school work. The faculty committee on athletics may at any time cancel membership in any athletic organization for neglect of class, shop or laboratory work.

Homes for Non-Resident Students. Non-resident students will be able to find good homes in the community at from five to six dollars per week. A number of families, have with the approval of the management of the Institute, arranged to open private homes for students where not only pleasant rooms and healthful fare can be assured, but where the general living and study habits of pupils will be carefully supervised. A list of such homes can be secured on application to the Secretary, Frank J. Pölley. The dormitory plan has been abolished, owing to the firm conviction that in so favored a community as Pasadena better home surroundings and more healthful social influences can be furnished for young people in the families willing to accept such responsibility than would be possible in any dormitory.

POLYTECHNIC HALL.

Most of the shops and laboratories of the Manual Training Department are located in the Polytechnic Hall, which is a two-story brick structure with a frontage of 140 feet on Fair Oaks avenue and 80 feet on Chestnut street.

Wood Shop. The wood shop, which is located on the second floor, has been provided with twenty work-benches, at each of which four students can work daily. Every bench is provided with a drawer for each student who has occasion to use it, in which, under Yale lock, are placed the planes, chisels and turning tools used by the student to whom that drawer is assigned. These tools are left to his care; for, to sharpen and keep tools in proper condition for use involves, probably, as much skill as does their actual use. Accordingly, no two students are permitted to handle the same edged tools.

Each bench has a set of tools, which are used in common by four students during the day, and comprise the following: One tri-square, one T bevel square, one foot-square, one marking gauge, one pair of inside calipers, one pair of outside calipers, one pair of compasses, one block plane, one hammer, one mallet, one oil can, one oil stone, one back saw, one hand saw, one rip saw, one screw driver, and one six-inch Coe's wrench. At the student's right hand, on the bench, is a fourteen-inch lathe, while at the opposite end of the bench is placed his bench-

stop and lightning grip wood-worker's vise. The shop is supplied with a large band saw for cutting up stock, and also a fine fret saw, which was given by the business men of the city. Besides these, the following, which are less often used, are at his disposal when needed: One combined rabbit, beading and slitting plane, one plow plane, braces and bits, cabinet scrapers and files, carving chisels and veniers. He is thus equipped with all the appliances and tools necessary to do thorough work in joinery, turning, inlaying and scroll-sawing. A special pattern-maker's lathe and well equipped bench is provided for the use of the instructor.

Forging Room. The forging room, situated on the first floor in the east wing of Polytechnic Hall, is equipped for twenty-three pupils.

The furnishing consists of five nests of Buffalo quadruple forges and three single forges. Each forge has a telescopic hood. The fires are urged by a No. 9 pressure blower and the room is kept reasonably free from smoke by a 60-inch exhaust fan.

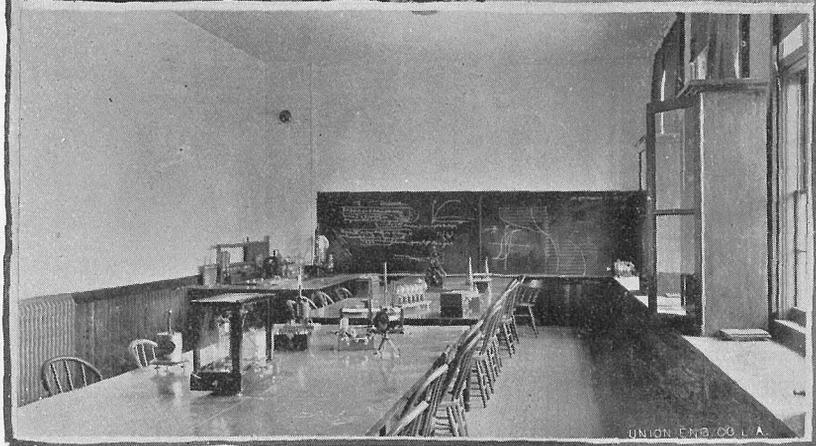
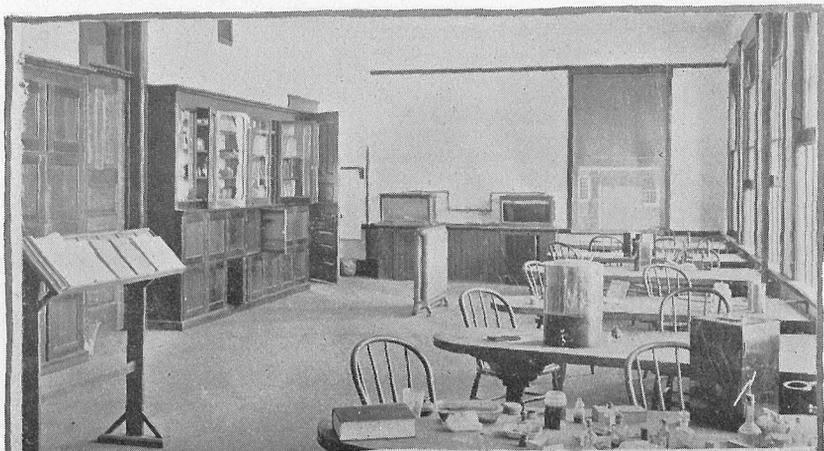
The anvils are furnished with all necessary tools, such as hammers, hardies, swages, fullers, flatters, tongs and squares. In addition to these tools for individual use, special sets of sledges, heading tools, set hammers, hot and cold cutting chisels, punches, calipers, taps and dies, drills, etc., are provided for general use. A hand blower, double emery grinder, combined hand and power drill and four blacksmith vises complete the furnishing of the room.

Pattern Shop. The equipment in this shop is similar to that of the wood shop, but more extensive. In addition, it is provided with a well equipped moulding bench where the students may test their patterns and gain some knowledge of the principles of moulding. The adjoining lumber room contains a band saw and a scroll saw.

Machine Shop. The machines in this shop, including a 55-horsepower engine, are of the latest style, having all the modern improvements. They were obtained through the generosity of citizens of Pasadena, at a cost of nearly ten thousand dollars.

The shop contains the following machines: A 24-inch x 6-foot "Powell" planer; a "Hendy" shaper, 15-inch stroke; a 24-inch "Prentiss Bros." drill; a Sigourney sensitive drill; "Brown & Sharp's" No. 1 Universal milling machine, with overhanging arm and universal milling head; a two-wheel emery grinder; a grindstone; a 24-inch x 10-foot "Reed" lathe, with compound rest; a 16-inch x 8-foot "Reed" lathe; four 14-inch x 6-foot "Reed" lathes, one of which has a taper attachment; two 14-inch x 6-foot "Prentiss Bros." lathes; a 14-inch x 6-foot "Putnam & Sons" lathe; a 14-inch x 6-foot "Hendey Norton" lathe which has the latest improvements for screw cutting, also a compound rest, and two 12-inch x 4-foot speed lathes. It contains a bench provided with six machinist's vises. In the tool room is an 8-inch x 32-inch Mosely & Company bench lathe, the countershaft having forward, reverse and polishing speeds and an overhanging grinding counter. The lathe is furnished with hand and slide rests, wire and drill chucks, several special tools and inside and outside grinding attachments.

The following is a partial list of tools in the tool room: One 24-inch, one 16-inch and three 12-inch four-jawed independent chucks; three 12-inch, two 9-inch



BIOLOGICAL, PHYSICAL AND CHEMICAL LABORATORIES.

UNION FINE CO. L. A.



CLAY MODELLING, SEWING AND COOKING ROOMS.

and one 6-inch three-jawed universal chucks; cutters, end mills and attachments for the milling machine; a set of twist drills from $\frac{1}{4}$ -inch to $1\frac{1}{4}$ -inches by 32nds; from $1\frac{1}{4}$ to 2-inches by 16ths; a set of hand reamers from $\frac{1}{4}$ -inch to $1\frac{1}{4}$ -inches by 32nds; a set of "Rose" reamers from $\frac{1}{4}$ -inch to $1\frac{1}{4}$ -inches by 16ths; a set of taps and dies from 7-64 to $\frac{1}{4}$ -inch by 64ths and taps from $\frac{1}{4}$ to 1-inch by 16ths; a full set of dogs and two sets of arbors. Revolving frame contains calipers, squares, etc. Other tools are in the drawers and hung about the room.

The check system is used in giving out tools, and the students in turn caring for the tool room.

Sewing and Dressmaking Room.

The sewing and garment making room is located on the first floor. It has been equipped with four large tables furnished with a sufficient number of drawers to accommodate three classes of sixteen members each in garment making. Seven Standard Sewing Machines, a patent gas iron heater, pressing boards, together with necessary needles, scissors, thimbles, scales, tape-lines, etc., for the use of individual students, constitute the equipment of this department. Adjoining the main sewing-room, a retiring room for fitting purposes is provided.

Cooking Room.

The cooking room is located on the second floor and is supplied with tables, upon which are gas stoves. Along either side of each table are the drawers containing the caps, aprons, sleeve-protectors, note books, etc., of the two young ladies assigned to work at that side of the table. A drawer contains cooking utensils, mixing, measuring dishes, stirring spoons, kitchen knives and forks, etc., while in the cupboard beneath is a full assortment of stove and kitchen furnishings. At either end of the table, towels, lid-lifters, etc., are hung. Two girls work at each stove, each student participating in every process called for in the instruction. A large dust-proof cupboard, containing meal and flour bins, dish closets, etc., a large water heater and Lowe patent gas range and a large refrigerator and cupboard for furnishings, are also provided.

Mechanical and Architectural Drawing Room.

This is an east room, situated on the second floor, and is well lighted. It is provided with tables which have lockers for each student. Valuable works of reference for use in architectural or engineering design are kept in the room for the use of students. During the past year the library for reference has been enriched by the gift of a number of volumes of the "American Machinist," by Mr. Clinton Brooks of Pasadena. This room is also provided with models and casts illustrating the five orders of architecture. A number of valuable models for work on machine design have been imported during the past year.

Chemical Laboratory.

The chemical rooms occupy part of the second floor of Polytechnic Hall. The main laboratory is furnished with experiment benches, fitted with water, gas, shelves for reagents and ample drawer space for forty-eight students. A hood for experiments involving the creation of noxious gases is fitted with drying closet, steam evaporating bath, water, gas and automatic hydrogen sulphide generator. A table with two-inch cement top is used for glass working and furnace operations. Half the room is at present used for recitations and lectures, being furnished with chairs and teacher's experiment table, with water, gas and pneumatic trough.

Adjoining the main laboratory on the north is a room used as a balance and burette room. It is fitted with eight burettes and a short-arm analytical balance, sensitive to one-tenth milligram with a load of 100 grams. This room also contains the library, which consists of a carefully selected list of books, which are of every day use to the students.

Directly south of the main laboratory is a room fitted with shelves and cases for chemicals and apparatus. This contains the instructor's private experiment table, an automatic water still, and a closet for electrolytic work with both dynamo and storage battery current. A complete supply of glassware and chemicals for general and analytical work is kept on hand and furnished to the students at cost.

Physical Laboratory.

This department occupies three rooms on the first floor of the Polytechnic Hall. The physical laboratory is a large, well-lighted room, fitted with tables, gas and water pipes, lockers and cases which contain the usual physical apparatus for both qualitative and quantitative experiments.

Adjacent to this laboratory is the physical lecture room, and adjoining this on the north is the testing laboratory. This has seven large piers built independently of the floor so as to be free from vibration. The equipment of this room consists of one Edison generator, one motor, two Brackett dynamometers and a storage battery, and such instruments as the Deprez D'Arsonval mirror, Thompson tripod, Queen horizontal reflecting, Universal tangent and Queen ballistic galvanometers; ordinary tangent galvanometers, post-office and ordinary resistance boxes, Queen testing set, earth inductor, Queen quadrant electrometer, $\frac{1}{3}$ microfarad, Weston volt meter, ammeter, Siemen's electro-dynamometer, Bunsen photometer, standard cells, slide meter bridges, scales and telescopes. A well selected library is in the laboratory for reference.

For the use of the Electrical Engineering students is an Otto gas engine of 20-horsepower for running the shops and testing; a 55-horsepower McIntosh, Seymour & Co.'s engine, for supplying power and testing; a 60-horsepower horizontal multitubular boiler, and oil fuel apparatus, gauges, indicators, etc. These are in the charge of J. M. Bush, a steam engineer of experience.

EAST HALL.

This building stands on Chestnut street and Raymond avenue, and cost, finished and furnished, nearly forty thousand dollars.

On the first floor are class-rooms for Latin and Greek, Mathematics, History and the Preparatory department. A double office is located at the left of the main entrance, while at the rear are cloak and toilet rooms for both ladies and gentlemen.

The second floor is given up to a large assembly room, a library for the accommodation of 8000 volumes, cloak and toilet rooms for ladies and gentlemen, and the quarters of the department of Biology.

On the third floor are located the modern language room, the free-hand studio, the museum and the stenographic and type-writing room.

Biological Laboratory.

The biological apartments are located on the second floor. Facing the north is the 19x50 laboratory lighted by nine large windows, with seven V-shaped tables, a sink, an aquarium, a glass-sided cage, and a rack for biological periodicals. Against the south wall are built seventy-four lockers, and four cases for books and reagents.

The laboratory is furnished with seventeen Bausch & Lomb compound microscopes, thirty dissecting microscopes, thirty sets of dissecting and microscopic tools, two microtomes, two camera lucidæ, injecting apparatus, culture dishes, a dry and steam sterilizer, and other apparatus used in bacteriological work. A Universal Bausch & Lomb stand is equipped with the appliances for work in bacteriology and other advanced work. A gas pipe, to which Bunsen burners can be attached, is located at the end of each of the microscopic tables.

In the cases (to which all students have access after making their dissections, notes and drawings) are ninety volumes of zoological works, and thirty volumes of works on human anatomy and physiology.

An adjoining room contains cases for instruments and material and an herbarium of about 4000 species of plants ranging from the lowest algae and fungi to the highest flowering plants. This apartment is also fitted up as the instructor's private work-room.

South of the instructor's room is a large, well-lighted class-room. In it is placed a case for the student's herbaria and a case for alcoholic specimens. The windows are furnished with close fitting shutters, making it possible to quickly change the room into a dark chamber for the projection of microscopic objects by solar light. In the south side of the room is a bay-window used for work in physiological botany. On the floor above is a museum room fitted with cases which contain the geological specimens belonging to the Institute.

Free-hand Drawing, Painting and Designing Room.

This room is fully equipped with all necessary studio appointments. Side light and sky light are both available. The equipment is as follows: Adjustable desks, which can be transformed into tables or easels, at any angle desired; stationary desks, suitable for the execution of large designs, which also contain drawers for students' supplies; a large table with water connection adapted for mounting designs and grinding colors; blackboards for class demonstrations of perspective principles; a full line of wooden models, type solids, from which first lessons in perspective are given; a case of bric-a-brac and objects of still life, furnishing material for sketching; a complete set of charts used in study of historic ornament and design; plaster casts of historic ornament, natural leaf forms, masks, heads and full length figures which serve as models in the rendering of light and shade in charcoal drawings.

Sloyd Room. The Sloyd Department, located in the basement of the East Hall, is equipped with twenty Sloyd working benches, each of which is provided with a set of high grade cabinet maker's tools. Charts, models, blackboards and cases divided in compartments where students keep their work, material, drawing instruments, etc., are also provided.

Clay Room. The work in clay modeling is carried on in a light, well ventilated room on the main floor of East Hall. The department is equipped with a fine selection of casts of ornament, one hundred

and eighteen having been added this year. It is also furnished with a complete set of anatomical charts besides the usual lockers, stands, etc., for clay work.

Wood Carving Room. The department of Wood Carving occupies two rooms in East Hall, one of which is fitted with work tables, lockers with tools for students' use and cases for exhibition of work. The instructor's private room adjoins this and is used for special lines of advanced work. These rooms are fitted with a good selection of casts and charts showing the various styles of historic ornament.

Society Hall. A good room on the basement floor is devoted by the Institute to the use of the literary societies. It is seated with chairs and lighted by electricity. A first-class piano is also part of its equipment.

SLOYD SCHOOL.

The urgent need of educational manual training in connection with the work ordinarily done in public schools inspired the establishment of a Sloyd department in the Institute. Pupils will be admitted to this department who have completed the usual third year of the public school. The work, as arranged for this department, consists of two lines:

- (1) The ordinary book work, and
- (2) That of Sloyd proper.

SCHEDULE OF WORK.

Group 1.	{	Arithmetic—Fundamental Operations. English. History and Geography. Science—Elementary Work on Plants and Animals. Sloyd.
Group 2.	{	Arithmetic—Review Fundamental Operations. Factoring. Greatest Common Divisor. Least Common Multiple. Simple work in Fractions. English. History and Geography. Science—Elementary Work on Plants and Animals. Sloyd.
Group 3.	{	Arithmetic—Fractions. Denominate Numbers and Supplementary Work. English—Language Lessons. Hans Anderson's Fairy Tales—Wonder Book—Poets and Heroes. History and Geography—Eggleston's First Steps in United States History. Advanced Geography with Modeling. Science—Elementary Work on Plants and Animals. Sloyd.

Group 4.	}	Arithmetic—Applications of Percentage and Supplementary Work.
		English—Elements of Grammar and Analysis. Kingsley's Greek Heroes. Snow Bound. Six Selections from Sketch Book. Hiawatha.
		History and Geography—Fisk's United States History begun. Geography Completed.
Group 5.	}	Science—Simple Experiments in Physics.
		Sloyd.
		Arithmetic Reviewed and Elementary Geometry.
		English—Grammar Completed. Lady of the Lake. Evangeline.
		History and Geography—United States History Completed. Geographic Reviews.
Group 5.	}	Science—Simple Chemical Experiments.
		Sloyd.

1. The course in English includes a thorough drill in *writing, spelling and composition*.

2. The following materials are needed by every participant in Sloyd classes:

A drawing board, 18 in. x 24 in. x 1½ in., a "T" square, a triangle, a set of drawing instruments, thumbtacks, drawing paper, pencils and erasers.

The Sloyd work is arranged in four courses. It proceeds from very simple to more complex forms, introducing the tools and exercises at proper intervals. This methodical arrangement and consecutive nature permit its application to the different groups of pupils.

The entire Sloyd course consists of drawing and wood work.

The drawing course consists of:

Geometrical constructions; Principles of representation; Representation by use of scale; Projections—orthographic and isometric; Inking and tracing; Perspective—linear.

The wood-work consists of the making of thirty-seven Sloyd models, of which the first twelve constitute Course I. The next nine, Course II. The following ten, Course III. And the last six, Course IV. Course IV is followed by a course in wood turning consisting of fifteen models.

Teachers' Training Classes.

Admission to these classes can be gained by persons who are graduates of High Schools, Normal Schools or Colleges, or by persons passing the special examinations required. A teacher's certificate will also admit and exempt from examinations.

TEACHERS' TRAINING COURSE.

The work of this course is as follows:

Manual Work.	}	Mechanical Drawing (including 1. Geometrical constructions; 2 Principles of representations; 3. Representation in reduced size by the use of scales; 4. Projections—orthographic and isometric; 5. Inking and tracing; 6. Perspective—linear; 7. Blue-printing).
		Completion of thirty-six Sloyd models.
		The completion of twelve wood-turning models.
		Sharpening and care of tools.

Theoretical Work. { The Psychology of Sloyd.
 Pedagogy of Sloyd.
 History of Sloyd.
 Mechanics of Sloyd.
 Study of materials; botanical structure and properties of wood, etc.

The drawing involves not only inventional and descriptive Geometry, but also an appropriate amount of free hand drawing, and teachers who complete the Sloyd course will be prepared to teach Industrial Drawing.

General Requirements. Members of these classes are required to take a course in Physiological Psychology and to pursue a series of systematic readings on the subjects of manual training and Sloyd.

For the reading course, the students in these classes are required to provide themselves with the following books :

“The Theories of Educational Sloyd,” by Otto Solomon, \$1.25.

“Industrial Instruction,” by Robert Seidel, \$1.00.

“Linear Drawing and Projection,” by Ellis A. Davidson, \$1.50.

Length of Course. As there is a marked difference in the capabilities of individuals, it is difficult to fix the absolute limits of the Normal Course in Sloyd. While an active student may complete the models and drawings involved in many of the so-called teachers' courses in a few months, or even a few weeks, it is not possible to master the philosophy of Sloyd, which embodies the underlying principles of all educational manual training, in any such time. Three terms of three months each will be adequate time for students of the maturity and preparation indicated above, to fit themselves as Sloyd teachers.

No student will be awarded a Sloyd teachers' diploma unless the entire course has been finished.

Method of Instruction. The instruction will involve both individual and class methods. The general use of tools, working positions, sharpening of tools, etc., are all illustrated by class instruction. This is also the case in the mechanical drawing which precedes the making of each model. All general principles are illustrated on the blackboard as in any other subject. Individual instruction is predominant, however, and each student receives individual observance, guidance and instruction. The director does not touch the work, which is to be prepared and finished entirely by the student teacher.

ACADEMY.

Students holding a certificate of graduation from a California Grammar School or any other school of equivalent grade will be admitted to the Academy without examination. All other applicants will be subject to examination in Arithmetic, Grammar, English, Geography and United States History. Information concerning subject matter and amount of work required in these lines will be found in the schedule of work for Sloyd School.

SCHEDULE OF WORK.

First Year.	{	English, I. Mathematics, I. Latin, I; or French, I; or German, I; or Physical Geography. Drawing, I; and Shopwork, I or V.
Second Year.	{	English, II. Mathematics, II. Latin, I or II; French, I or II; German, I or II; Greek, I. History, I; Zoology, I; Botany, I; Chemistry, I. Drawing II, and Shopwork II or VI.
Third Year.	{	History, I or II. Some two of the following: English, III; Mathematics, III; Latin, I, II or III; French, I or II; German, I or II; Greek, I or II; Botany, I or II; Zoology, I or II; Chemistry, I or II; Physics, I. Drawing, III; and Shopwork, III or VII.
Fourth Year.	{	History, III. Some two of the following: English, IV; Mathematics, IV or V; Latin, II, III or IV; French, II; German, II; Greek, II or III. Zoology, I or II; Botany, I or II; Physics, I or II; Chemistry, I or II. Drawing IV, and Shop-work IV or VIII.

Roman numerals in above table refer to courses outlined hereafter:

The above is the order of work recommended. In special cases deviations from this schedule are permitted provided they do not conflict with the following requirements:

If Latin, French or German be chosen it must be pursued for not less than two years to receive credit for the work.

A subject once elected cannot be dropped after two weeks from the time of choice, and must thereafter be pursued until successfully completed. All subjects extend through the entire year.

Each student must, in order to complete this course, take not less than two years of English; two of Mathematics; two of History (one of which must be devoted to Course 3); four years of Drawing; and four years of shop-work.

For graduation from the Academy, thirty-six credits are required. Two credits are given for the successful completion of each annual subject except Drawing, for which one credit is given.

Every graduate must have pursued for the full four years the study of (1) Language, or (2) Mathematics, or (3) Natural Science, or (4) Mathematics and Natural Science.

COLLEGE.

The requirements for admission to the college department are as follows:

The completion of three years of the Academy course; or the completion of a course in an accredited High School or an approved Preparatory School; or passing an examination upon English 1 and 2, and Mathematics 1 and 2 and any eight of the following subjects, outlined in the course of study: Physical Geography, Botany 1, Botany 2, Zoology 1, Zoology 2, Physics 1, Chemistry 1, Latin 1, Latin

2, Latin 3, Latin 4, German 1, German 2, French 1, French 2, Greek 1, Greek 2, History 1, History 2 Mathematics 3, English 3. Any applicant offering Latin, French or German must present at least two years of each.

The work in this department is entirely elective. Each student who is a candidate for a degree must choose a major subject which is the work of one professor, who shall prescribe the necessary or desirable collateral work. Such major and accessory work shall not constitute more than two-thirds of the work offered for a degree and the amount subject to prescription by the professor shall not exceed one-third. The remainder of the work may be chosen from any of the courses offered with the exception of Mathematics 1 and 2 and English 1 and 2, and Physical Geography. The degree B. A. will be granted to students having satisfactorily completed four years' work of at least three recitation or lecture periods per day. Upon a basis of two credits for a year's work in each subject, twenty-four credits would thus be required for graduation.

The institution reserves the right not to organize classes in any given subject, unless at least eight students elect said subject.

Candidates for admission to college classes should make application as early as possible, indicating the subjects they purpose electing.

DEPARTMENTS AND COURSES OF INSTRUCTION.

Mathematics.

I. Elementary Algebra. Fundamental operations: Special attention given to the reading of problems; to the subject of factoring; simultaneous equations; involution and evolution; radical and imaginary expressions. The work of this year is covered by such text as Wentworth's School Algebra to Quadratics. This is first year work.

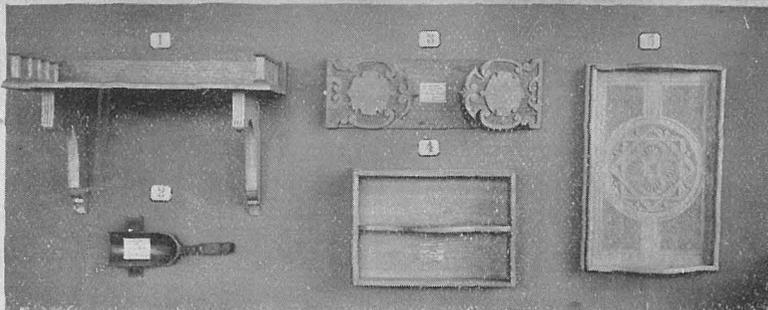
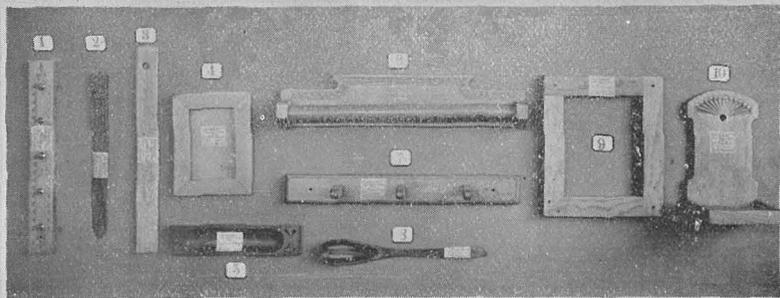
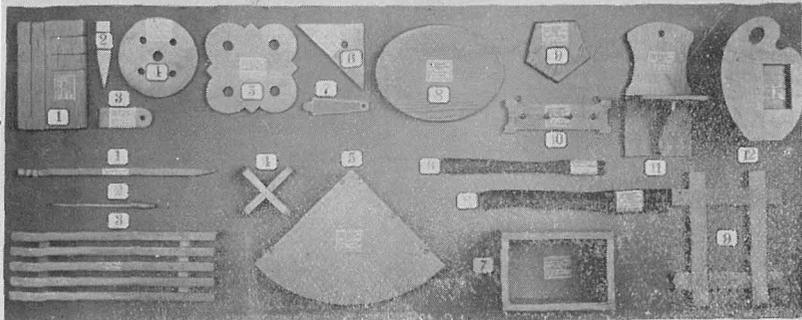
II. Plane Geometry. Regular work contained in Wentworth's New Plane Geometry. The work contains the original propositions and problems in this book, supplemented by other original work. The subject comprises the mathematical work of the second year.

III. (a) Higher Algebra. Indeterminate equations, inequalities, theory of exponents, radical expressions and rationalization, imaginary expressions, square root of binominal surds, quadratic equations, theory of quadratic equations, with solutions by factoring, logarithms, variation, arithmetical, geometrical and harmonical progression, binomial theorem, undetermined coefficients, permutations and combinations, theory of limits, and continued fractions. Text Book, Wells' College Algebra.

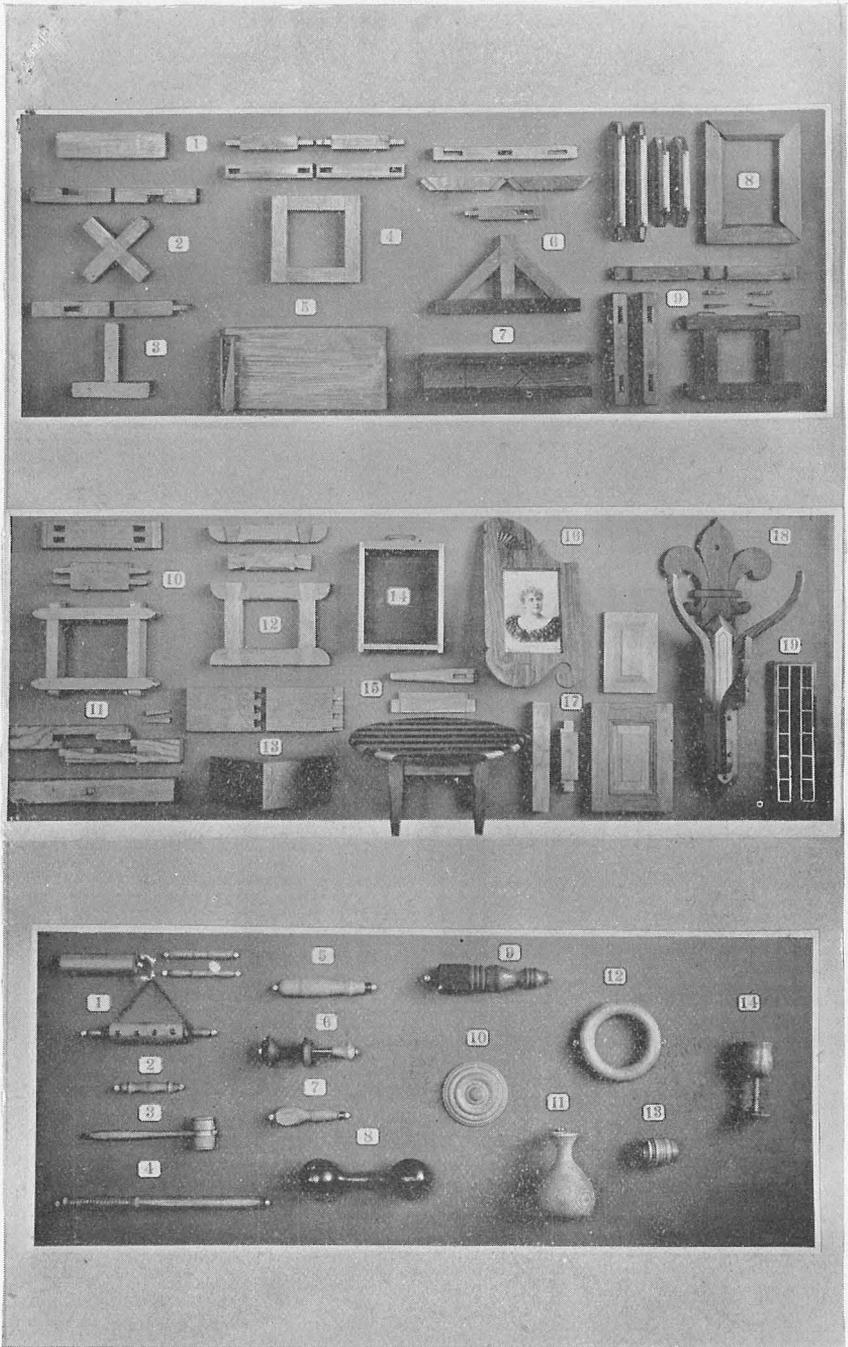
(b) Solid Geometry. The course given in Wentworth's New Plane and Solid Geometry, books VI—VIII, inclusive. This subject, supplemented by Higher Algebra, comprises the work of the third year in the regular course.

IV. (a) Trigonometry. The course comprises plane and spherical trigonometry. Problems from text books proven in the field, also problems solved by the class. The text book is Wentworth's Trigonometry.

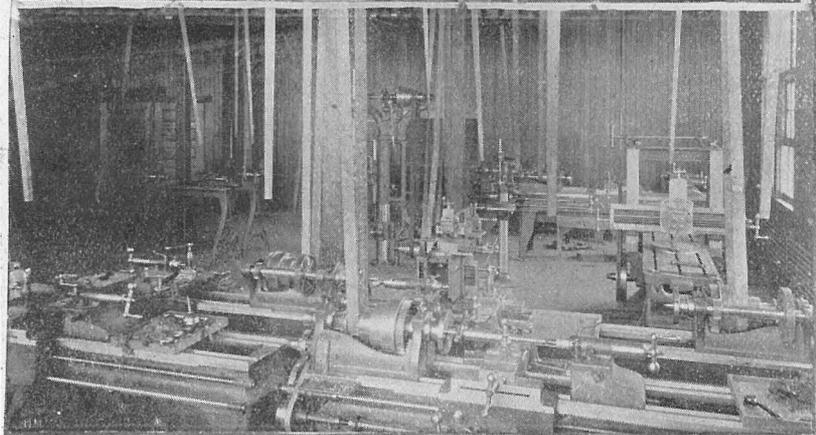
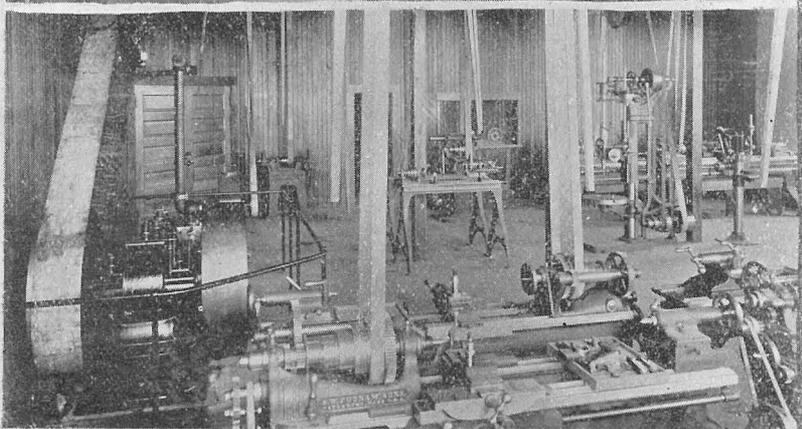
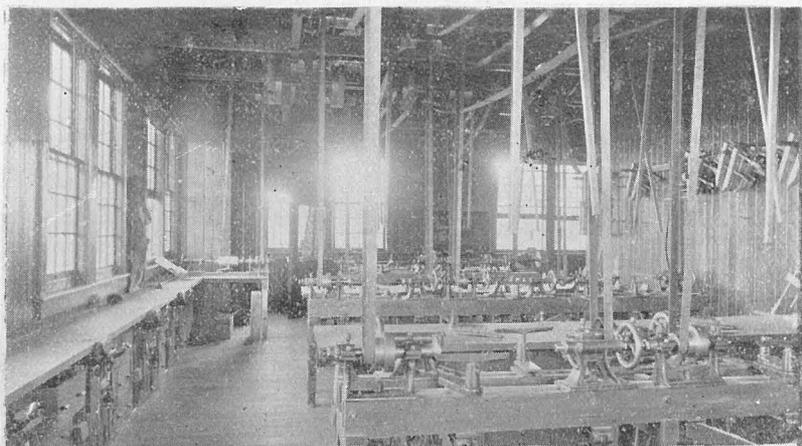
(b) Plane Surveying. Survey with chain alone; with compass and chain; leveling with "Y" lever; making out profiles of elevations and grades. Adjustment of transit and level. Plotting of field work, also field work done from plottings.



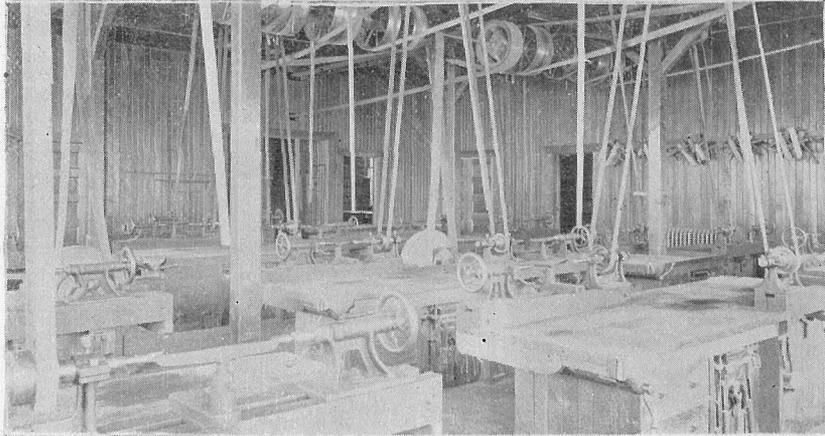
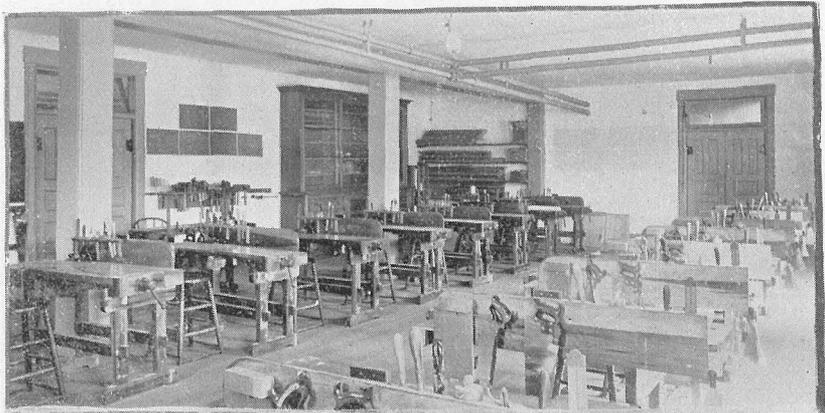
SLOYD MODELS.



JOINERY AND TURNING MODELS.



PATTERN AND MACHINE SHOPS.



SLOYD, JOINERY AND TURNING, AND SMITHING SHOPS.

Higher Surveying. Trigonometrical surveying. Running R. R. preliminary lines; setting slope stakes; plotting cross sections: calculating cut and fill, running grade lines for irrigating ditches, or roads.

(c) Field Engineering. Theory and practice of laying out curves, side tracks, economic principles of railway location and construction. Carhart's Field Book will be used as a text book.

Land surveying, plotting field work, using various methods of representing topography, calculation of areas by latitudes and departures, also by use of the planimeter. Carhart's Field Surveying the text book.

V. (a) Analytic Geometry. Analytic Geometry is studied chiefly in connection with its application to the study of the conic sections.

In addition to the ordinary methods given in American text books, methods of Abridged Notation are introduced sufficiently to give the student some idea of their advantages.

The text book was prepared for students of the Institute by the teacher of this subject, using chiefly German and English works.

VI. (a) Differential and Integral Calculus. In the study of the Calculus, Osborne's text book is chiefly used. Differentiation of algebraic and transcendental functions. Leibnitz's Theorem. Expansion of functions. Maclaurin's and Taylor's Theorems. Functions of several independent variables. Applications to curves. Maxima and minima of functions of one and of several independent variables. Various methods of integration with applications to the study of curves and certain volumes. Definite integrals.

In connection with the work in the integral calculus, there will be given some work in the integration of differential equations used in mechanics and electricity.

It is thought that this course, which, with respect to mechanics, has been followed by a few of the ablest writers on the calculus, will impart additional interest to it.

(b) Study of the strength of materials used in masonry, carpentry and metallic structures. Stresses and strains in framed structures and arches. Stresses computed analytically and also by graphical methods in the drawing room and results compared.

Construction of roofs, highway bridge trusses and railroad bridge trusses. The books chiefly used will be those by Merriman and by Du Bois.

ENGLISH.

I. During this year a critical study of the following selections will be made: Irving's "Alhambra" and "The Sketch Book;" Longfellow's "Courtship of Miles Standish;" Addison's "De Coverly Papers," and Scott's "Marmion." Compositions based upon the above will be required weekly, in which careful attention will be given to sentence structure, paragraphing, spelling, capital letters and punctuation.

II. Composition work continued throughout this year, and a standard rhetoric systematically studied. The critical readings will include Shakespeare's "Merchant of Venice" and "Julius Cæsar;" also, George Eliot's "Silas Mariner." In each case the reading will be accompanied by such historical research as may be needed to make the selection interesting and instructive to the pupils.

III. "From Milton to Tennyson" will be the basis for work during the first term of the year. The reading of these poems will be accompanied by studies in biography, history and mythology; written reproductions and criticisms will be frequently required. "Oration and Argument" will occupy the winter term. From this, pupils are expected to secure a knowledge of modes of reasoning and to gain a deeper insight into causes of political disturbances. The spring term will be devoted to the study of the development of American literature.

IV. The work of this year will comprise a critical study of the development of English literature, placing especial emphasis upon the philosophic novel and the epic poem.

V. The English Drama; Shakespeare's life and time; his contemporaries and successors.

ANCIENT LANGUAGES.

Latin. 1. Collar and Daniels' Beginners' Book, through first and second terms. Special attention given to vocabularies; translation of the exercises from Latin into English and from English into Latin; conversations based upon the sentences and exercises translated will be held occasionally for memory-training.

Structure of Latin sentence and comparison with English sentence-structure. Paradigms will be mastered, not simply to be recited by rote, but that the pupil may be able to compare them and to see the laws which govern their formation.

II. Introduction to Roman Literature. The readings comprise selections from various authors, including Eutropius, Nepos, Cæsar, Gellius, Cicero and Livy. Critical study of text with translation into idiomatic English. Prose composition and sight-reading. Incidental study of history and geography.

III. Cicero's Orations. Textual study, as in Cæsar, sight-reading and composition; historical allusions investigated; the system of Roman Government; powers of officers; customs and occupations of the people; geography involved in the text is made an incidental topic for study.

IV. Virgil's Aeneid. Structure of the poem, with the theory and practice of scansion of Latin poetry, especially of the hexameter; translation into idiomatic English; study of the superstitions and religious rites of antiquity, as well as of the myths and legends; minute word-study and analysis.

V. Horace. Satires, Epistles and Odes. The work will be similar to that done in the study of the Aeneid, except that more extended investigation will be made of Latin verse.

VI. The Germania and Agricola of Tacitus. Particular study of the author's style.

Cicero's De Officiis, De Senectute and De Amicitia.

VII. Plautus, Juvenal, Hymn Writers.

Greek. I. The alphabet, inflections and simple translations will be studied the first term. The second term will have similar work, with the study of vocabularies. Composition exercises and conversations will be used for memory-training. White's First Lessons will be used as a text book. The third term will be spent on the first four chapters of the Anabasis.

II. Anabasis completed. Careful translation into English; points of linguistic or historical interest studied; prose-composition will be a part of the work through the year, as also sight-reading.

III. Homer's Iliad. Usual amount of college preparatory work, Plato's Apology and Crito.

IV. Selections from Greek Historians and Poets.

MODERN LANGUAGES.

Spanish. I. (a) 1. Worman's First Spanish Book and conversational exercises; 2. Knapp's Spanish Grammar and written exercises.

(b) 1. Worman's Second Spanish Book and conversational exercises; 2. Knapp's Spanish Grammar and written exercises.

(c) 1. Worman's Second Spanish Book and conversational exercises; 2. Knapp's Spanish Grammar and written exercises; 3. Study of Spanish Idioms (Becker and Mora.)

II. (a) 1. Knapp's Modern Spanish Readings; 2. Knapp's Spanish Grammar, with oral and written exercises.

(b) 1. Knapp's Modern Spanish Readings; 2. Knapp's Spanish Grammar, with oral and written exercises.

(c) 1. Knapp's Modern Spanish Readings; 2. Knapp's Spanish Grammar, with oral and written exercises; 3. Study of Spanish Idioms (Becker and Mora);

4. Drill in Correspondence, and also in Ceremonial Formulas in Spanish.

French. I. (a) 1. Keetel's Elementary French Grammar and conversational exercises; 2. Phonetic Study and Practice of French Pronunciation.

(b) 1. Keetel's Elementary French Grammar; 2. Keetel's Analytical French Reader and conversational exercises; 3. Special Study of Irregular Verbs.

(c) 1. Keetel's Elementary French Grammar; 2. Keetel's Analytical French Reader and conversational exercises; 3. Special Study of Irregular Verbs.

Written exercises from English into French will be required throughout the whole year.

II. (a) 1. Keetel's Collegiate French Grammar; 2. Knapp's Modern French Readings; 3. Oral Exercises and Written Composition in French.

(b) 1. Keetel's Collegiate French Grammar; 2. Knapp's Modern French Readings; 3. Oral Exercises and Written Compositions in French; 4. Lectures on the Rhetorical Structure of the French.

(c) 1. Knapp's Modern French Readings; 2. Exercises in French Syntax and Idioms (Chardenal); 3. Original Theses in French; 4. Lectures on French Rhetoric.

III. (a) 1. Exercises in French Syntax and Idioms (Chardenal); 2. Madame Therese (Erkmann-Chatrion); 3. Lectures on the History of the French Language and Literature.

(b) 1. Exercises in French Syntax and Idioms (Chardenal); 2. Picciola—Un Roman par M. H. B. Saintine; 3. Lectures on the History and Characteristics of the French Novel.

(c) 1. Exercises in French Syntax and Idioms (Chardenal); 2. La Famille

de Germandre, par George Sand; 3. Lectures on Comparative Philology as especially related to the French and the modern languages of Europe.

Conversational and written exercises are continued throughout the whole year and are systematically and periodically arranged.

German. I. (a) 1. Worman's First German Book and Conversational Exercises; 2. German Lessons (Collar's Eysenbach); 3. Written exercises from English into German.

(b) 1. Studien und Plandereien (First Series) and Conversational exercises; 2. German Lessons (Collar's Eysenbach); 3. Written exercises from English into German.

(c) 1. Studien und Plandereien (Second Series) and Conversational Exercises; 2. German Lessons (Collar's Eysenbach); 3. Written exercises from English into German.

II. (a) 1. Stein's German Exercises; 2. Wilhelm Tell (Schiller); 3. Lectures on the History of the German Language and Literature.

(b) 1. Stein's German Exercises; 2. Wilhelm Tell completed, and Iphigenia auf Tauris (Goethe) begun; 3. Lectures on Swiss History as illustrative of Wilhelm Tell, and on Classic Mythology as explanatory of Iphigenia auf Tauris.

(c) 1. Stein's German Exercises; 2. Iphigenia auf Tauris (completed); 3. Lectures on the Distinctive Characteristics of the Literature of the New High German Period.

III. (a) 1. Nathan Der Weise (Lessing); 2. Special Study of Conditional Sentences in German; 3. Lectures on the Revolution in German Literature accomplished by Lessing, and on the peculiar features of the German Drama.

(b) 1. Maria Stuart (Schiller); 2. Special Study of Indirect Discourse and of the subjunctive in German; 3. Lectures on the effect of the Thirty Years' War (1618-1648) on German Literature.

(c) 1. Goethe's Faust; 2. Special Study of the German Auxiliaries of Mood and Tense; 3. Special Lectures on the Careers and Works of Goethe and Schiller.

HISTORY.

I. Greek and Roman History. Careful study of the chief epochs of Greek and Roman History with special reference to the development of the institutions and the growth and influence of the respective arts and literature of each. In connection with this is a three weeks' course on the Ancient Civilization of Egypt. The text book used is Myers' and Allen's Ancient History. This the pupil is expected to master in the first and second terms, using the third for comparison of Greek and Roman institutions, during which time selected lives from Plutarch and direct study of the classic authors is made the basis of the work.

II. Mediæval and Modern History. Particular attention will be paid to institutional growth and the social life of the people. The French revolution and its influence on the history of the nineteenth century is made an exclusive study for the third term's work. Myers' Modern and Mediæval History is the text book used. The pupil is expected to familiarize himself with Emerson's "Middle Ages" and collateral reading from other works selected by the instructor.

III. Civics. Candidates for this study must have credit for one year's work

in History. This course will be required of all students before graduation. It will endeavor to consider the origin and to trace the development of constitutional government, making a special study of the United States and California. The State, by Woodrow Wilson, will be the manual in the hands of the pupils. The constitutional history of the United States and of the State of California will be studied from original sources. Pupils will be expected to prepare bibliographies and do collateral reading throughout the year.

IV. English History. A study of social and institutional development for the first half year followed by a similar study of French History for the remainder of the year. In each of these courses pupils receive instruction in the preparation of bibliographies of each epoch studied and are expected to attain the same proficiency in this as in general work.

To those of approved ability, who desire higher work, courses are offered for investigating the following subjects: In Civics—"Japan and the New Diplomacy;" "The Leagues of Ancient and Mediæval Times;" "California's Birth and Growth as a State." In Mediæval History—"On the Influence of the Epic in History;" "Social Life in the Middle Ages;" The Era of Charlemagne; The Rise and Progress of Geographical Exploration. In Greek and Roman—Social Life in Rome, from Satirists; Aristophenes and the Common People of Greece; How to Use the Classic Authors and Historians.

Only those having four credits in History are eligible to the following: A practical reading of (a) Landor's Imaginary Conversations and Lord Littleton's Dialogues of the Dead. (b) Bandelier and the New Light on the Spanish Conquest of America.

PHYSICAL GEOGRAPHY.

A systematic study of the proximate causes of the common phenomena observable at the earth's surface. The planetary relations of the earth; its atmosphere; the sea; the land; life of the globe; the effect of latitude, elevation, topography, and relative situation on climate and products; influence of all these on industries and civilization.

BIOLOGY.

Botany. I. General structure, physiology, and classification of plants; dissecting, drawing and describing individual plants, as types of groups; the first two-thirds of the year being spent upon the groups from the Protophytes to the Pteridophytes inclusive, and the remainder upon the Spermaphytes; collection, classification and preservation of one hundred plants, representing as nearly as possible all the plant groups; McClatchie's Guide in the Study of Plants as a laboratory guide, with readings from Campbell's, Bessey's, Johnston's, and Vine's botanies, the current journals, and other works.

II. Vegetable anatomy, histology, and physiology, with the structure, life histories, and classification of algæ and fungi; microscopic methods, use of microtome, etc.; Oel's Plant Physiology and Bessey's and Campbell's Botanies as text books, with Sach's and Goodale's Physiological Botanies, Goebel's Outlines of Classification and Special Morphology, De Bary's Fungi, Whitman's Methods in Microscopy, the current journals, and other works, as reference books,—open to those who have taken Course I, or its equivalent.

Zoology. I. General structure, physiology, and classification of animals; dissecting, drawing and describing typical forms; the first two-thirds of the year spent upon Invertebrates and the last third upon Vertebrates; Colton's Practical Zoology as a laboratory guide, with readings from Kingsley's Natural History, Claus and Sedgwick's Text-Book of Zoology, Hyatt's Guides in Science Teaching, Packard's Zoology, the current journals and other works.

II. Comparative anatomy, histology, physiology, embryology and classification of Worms, Spiders, Insects, and Vertebrates; microscopic methods, use of microtome, etc.; Bell's Comparative Anatomy and Physiology, Parker's Zootomy, Hyatt's Insecta, Claus and Sedgwick's Zoology, Whitman's Methods, Packard's Guide in the Study of Insects, the current journals, and other works as reference books. Open to those who have taken Course I, or its equivalent.

Bacteriology and Embryology. Culture and investigation of pathogenic and non-pathogenic Bacteria, by French and German methods; determination of Bacteria in water and milk supplies, in air, in soils, etc.; embryology of achegoniates and flowering plants. Open to students who have completed the Botany courses and have pursued chemistry one year.

General Biology. A general course in Biology with special reference to nervous physiology, for teachers and other mature students who have done some work in Botany and Zoology.

CHEMISTRY.

I. General Chemistry. This course gives a general survey of the subject as a foundation for the more detailed work of succeeding years. Instruction is given by means of laboratory work supplemented by recitations and lectures. In the laboratory each student performs for himself a large number of carefully selected experiments, keeping full and accurate notes of his operations, observations and conclusions. These notes are inspected daily and each student advances as rapidly as his own industry and ability permit. The experimental work is accompanied by class study of a good text book with frequent recitations and occasional lectures, and the use of standard books of reference. Special attention is given to the study of chemical change, laws of combination, atomic and molecular theory, physics of gases, Avogadro's law, the periodic system of the elements, stoichiometrical and other chemical problems, practical applications of chemical processes and the elements of qualitative analysis. Time spent, one hour and thirty minutes daily. Text books: Storer and Lindsay, Manual of Chemistry, Massachusetts Institute of Technology, Laboratory Experiments.

II. (a) Qualitative Analysis. This subject is studied during the first half of the year and a detailed course of preliminary work, taking up the various reactions and processes for detecting the ordinary elements is followed by practical analysis of unknowns. In recitations and lectures the different processes of analysis are discussed at length. Text Book: A. A. Noyes' Qualitative Chemical Analysis.

(b) Quantitative Analysis. In the second half year quantitative work is begun with the study of some of the simpler processes of gravimetric and volumetric analysis.

During this year more advanced study of chemical theory is made than is possible in the first year. Students also have practice in reading foreign chemical literature. Time spent, two hours and fifteen minutes daily throughout the year.

III. Advanced Analysis. In this course more advanced work is done in quantitative analysis and the various processes of chemical analysis are studied critically. This course comprises the analysis of minerals, metallurgical products, fertilizers, soils, butter, milk, water, etc. Mineralogy and blowpipe analysis is taken up during this year and some work done in assaying lead, silver and gold. Time spent, three hours daily, or its equivalent.

IV. Organic Chemistry. This course is devoted to organic chemistry, including text book study and laboratory work. The laboratory course will comprise qualitative and quantitative elementary analysis, vapor density determinations, and organic syntheses. Time spent, three hours daily, or its equivalent.

The aim in all the instruction in this department is to develop self-reliance in the student so that he may be able to make his way confidently in any original investigations or other chemical work he may be called upon to do.

PHYSICS AND ELECTRICAL ENGINEERING.

Physics. I. Weights and measurements; theory and use of the spherometer, optical lever, etc.; determination of volume and density; laws of pendulums and determination of gravity by Borda's and Kater's pendulums; determination of tenacity, rigidity; Young's Modulus; determination of pitch and velocity of sound; nature and effects of heat, temperature, expansion, evaporation, latent heat, conduction, specific heat; use of Bunsen's photometer, mirror, telescope and scale; finding radius of curvature of reflectors, indices of refraction, magnifying power of lenses, and use of spectroscope. The construction of physical apparatus is required throughout the year.

Balfour Stewart's text, with lectures, followed by Sabine's Laboratory Physics.

Electricity. II. Finding electrical resistance by various methods; study of the distribution of magnetism and the effect of temperature on magnets; determination of galvanometer constants, measurement of current and electro-motive force, line faults, testing of insulation, magnetic induction, finding of permeability curves; dynamo testing and use of cradle dynamometer, Prony brake; use of electrometer and condensers.

Elements of mechanism including communication of motion by gears, belts, cams, screws and link work; parallel motions, epicyclic trains, quick return motions, etc. Dynamo electric machinery. The steam engine, including a study of details, slide valve, link motion; automatic cut-off gears and Zeuner diagram; use of indicator and calculation of horse power from indicator cards.

This course is open to students who have completed course I. Text books: Stewart & Gee, Vol. II; S. P. Thompson's Elements of Electricity and Magnetism; Garnet's Treatise on Heat; Stahl & Wood's Elements of Mechanism and S. P. Thompson's Dynamo Electric Machinery.

III. Dynamo electric machinery; study of alternating currents; design of motors, dynamos, transformers; advanced electrical testing; standardizing of

apparatus; testing of dynamos and motors; photometry; study and inspection of electric lighting and power plants; electrical designing with construction of apparatus and machinery.

Power transmission, dynamometers and Prony brakes, efficiency of motors; steam boilers; number and size of tubes and flues, thickness of plates, rivets, kinds of bracing, amount of grate and heating surface, steam and water gauges, safety valves, injectors; management, setting and economic operation of boilers.

Thermodynamics; gases; saturated and superheated steam; application to the steam engine; Hirn's equations, action of injectors, refrigerating machines and gas engines. Analytical Mechanics.

SHOP WORK.

Wood-work.

I. This work consists of work in joinery, turning and cabinet work. It has been the desire to arrange a course which would be valuable, considering it from both an educational and industrial standpoint. The exercises have been designed so that there would be a gradual growth in the difficulty of construction, and at the same time contain practical, useful and aesthetic elements. Such a series of exercises would naturally call for a gradual development in the ability of the student and also cultivate a sense for beauty and proportion.

The work is given to the student by means of a blue print taken from a working drawing. From these he constructs his model. These drawings are made with the greatest care and accuracy. Helpful notes in reference to the work accompany each drawing. This method acquaints the student with the reading of accurate working-drawings, and the working therefrom. After the model has been made he then makes his own working-drawing from it.

The course in joinery is composed of eighteen progressive exercises, involving the construction of sixteen different joints, the drawing of analytical and free-hand curves, and the use of fifty different tools and machines.

The student is allowed to exercise his individuality in the exercises in inlaying and cabinet-work. These exercises are made from his own drawings and after his own designs, which are submitted to the instructor before the work is begun.

The course in turning consists of fifteen progressive exercises given in the following order: Center-work, face-plate work, chucked-work and long-work.

The above problems in wood-work are taken in the order of joinery, inlaying, turning, and cabinet-work. This work is calculated to be finished by the average student in one school year, working one and one-half hours daily.

At the end of the year there will be held a written examination upon the methods employed and the technical terms used in the work.

Forging.

II. Forge. Mechanism of and care of forge; preparation of forge for fire; building and managing fire.

Tools. Instruction in the care and use of tools.

Processes. The processes involved in the year's work are: Drawing, bending, upsetting, different kinds of welding, punching, drilling, fullering, swaging, cutting cold, chipping, cutting hot, splitting, twisting, filing, brazing, hardening, tempering, and ornamental iron work.

Tempering. Hardening in water and oil, tempering or drawing, temperatures and colors used, and processes in tempering tools for wood and iron work.

Ornamental Iron Work.—At the close of the year each student will be required to design some special piece involving the various elements of forging mastered.

Pattern Making and Elementary Machine Shop Practice.

III. The work in pattern making alternates with that in the machine shop. The course commences with the simpler forms of pattern making embodying the fundamental principles of the subject, such as allowance for shrinkage, finish, etc. Later, more difficult work is taken up, involving core-making.

Each student is expected to make for himself or assist in making patterns for a finished piece of work. For example, during the past year one student has made patterns for a breech-loading brass cannon, 20 inches in length; another, a full set of patterns for an 8-inch swing wood lathe; another, a set of patterns for a 2-horse power water wheel—Pelton style; another, a set of patterns for a gas engine of new design; the balance of the class have made a full set of patterns for a 4-horse power automatic steam engine with valve of new design.

One moulding bench is provided where the students test their patterns.

Work in machine shop comprises chipping and filing, use of taps and dies, reamers, etc., hand-tool work in speed lathes, work on engine lathes, turning, boring, screw cutting, outside and in.

Advanced Work in Pattern and Machine Shop.

IV. During the course each student will work on the following machines, besides the lathes: Planer, shaper, drill press and milling machine. All special tools are made by the students and tested with micrometer calipers.

Special attention is given to accuracy in measurement, finish of work, care of tools and machines.

Example of work done during the past year: Making planer bolts, face plates for wood lathes, mounting chucks, finishing of castings made from patterns in above list; three engines are being made from the steam engine patterns, one of which has been finished as class work, the other two are being made by two students, each one doing the entire work on the engine alone.

Plain Sewing.

V. (a) Five days a week. Two periods a day. The fundamental principles of hand sewing, basting, running, hemming, hem-stitching, tucking, felling, sewing on lace, darning, etc.

(b) Machine Sewing. Plain stitching, hemming, tucking and gathering.

(c) Continuation of Plain Sewing. Practical experience in shopping by each pupil. Neatness and accuracy demanded in the work.

During the year a complete suit of underwear must be made by each pupil; also a shirt waist, a cotton dress, and a wrapper or dressing sacque. Same preliminary study in designing for the dressmaking course will be done.

Modeling and Carving.

VI. (a) Modeling of simple leaf forms, followed by the various styles of historic ornament from the cast and from the flat, including original designs, masks, busts and bas-relief. Instruction in the principles of decorative design as applied to wood, metal and stone, the principles of form and proportion involved

in designs of various kinds, and the adaptation of modeled ornament to different surfaces.

(b) Instruction in the care of tools; their use by practice in cutting to a line and to a given depth; Egyptian and Greek ornament studied and expressed by lining and incising; the Moorish, Byzantine, Romanesque, Gothic Roman and Renaissance styles in succession, advancing from simplest to more complicated forms.

Special. (a) Work on busts and full length figures from the antique, the successful completion of one of the latter being required of each pupil who receives the regular credits for this course.

(b) The principles of design studied by taking the scroll framework as a basis for developing surface patterns, continuous scrolls and the various forms of radiating designs; practical application of these principles to designing and ornamenting furniture, such as easels, stools, chairs, jardinières, bedsteads, desks, etc. The successful completion of a piece in Italian Renaissance is required of all students before they receive the regular credit for this course. The growth of woods and their adaptability for various uses is studied and pupils are taught to select material and have it cut and dressed. They are also instructed in working drawings, light carpentry and in finishing work in various styles of polish.

(c) Carving in the round is begun with work on heads, and followed by full length figures.

Cooking. VII. (a) The fundamental principles of cookery and practice in the preparation of vegetables, soups, meats, cereals, biscuits, eggs, cost of materials; care of a kitchen; serving a simple dinner.

(b) Instruction in preparation of more complicated dishes; bread, fish, oysters, pastry croquettes, game, etc.; care of silver and glass; setting and serving a table; table etiquette.

(c) Entrees, salads, deserts, cake, jellies and creams; giving of entire breakfasts, luncheons and dinners; ordering; proportions of food needed; garnishing; short course in invalid cookery; carving.

(d) Presentation of the physiology of nutrition by special lecturer.

(e) In connection with cookery, the following topics will be taken up.

Classification of foods.

Flour, composition, food value.

Water, boiling, simmering, its action on starch and albumen.

Adulteration of foods.

Practical application in cooking meats and vegetables.

Tea, coffee, alcohol; their effects on the system.

Composition of foods.

Disinfectants.

The cheapest and most wholesome foods.

Spices.

General plan of household work.

The greatest amount of nutriment obtained for 25 cents.

House Cleaning.

Care of every portion of a house.

Digestion, assimilation.

Preparation of a dietary for six persons for one week, not to exceed \$10.00.

Study of yeast plant.

Invalid cookery, dietary.

Properties of carbonic acid gas.

Table etiquette.

Fermentation, lactic, vinous, acetic.

Duties of a cook.

Baking powders, soda, cream of tartar.

Duties of waitress.

Special lectures on Chemistry of Cookery, Bacteriology.

Throughout the year Diets and Nutrition will be kept constantly in mind, the object being as much, or more, to study the scientific principles of foods, as to prepare palatable viands.

Dressmaking. VIII. (a) This course is devoted to the principles of dressmaking: Drafting a basque and sleeves from actual measurements; cutting, fitting and finishing a basque; cutting and making a skirt; choice of materials, price, quantity and amount needed.

(b) Drafting continued: Cutting of fancy fronts to basques; pupils are required to plan an entire dress with written description of it before beginning, including collar, trimming sleeves, etc.; making of dress.

(c) In connection with the dressmaking the cultivation of taste will be studied. The proportion of the human figure. Dress as appropriate to individuals, sketches for dresses made in pencil and color. Harmony of color in fabrics.

(d) With the foregoing special attention to bearings of dress on health; how to dress to preserve health and strength; rational dress reform studied; presentation of physiology of dress by special lectures.

(e) During the year three gowns and a house jacket or waist will be required from each pupil.

DRAWING, DESIGNING AND PAINTING.

Freehand. I. (a) Principles of perspective as applied in the drawing of simple type forms, beginning with sphere, cube, cylinder, etc., followed by objects based on type solids.

Parallel and angular perspective, convergence of line, vanishing points and foreshortening are demonstrated on blackboard by the most simple and practical method. Perspective drawings made of wood and iron shop exercises.

Outline, shade, shadow and artistic rendering of line are developed in execution of perspective drawings.

Drawings of scrolls, beginning with the Egyptian, the Grecian and Roman follow in natural sequence.

Original adaptation of scroll in prescribed borders, spandrels and geometric fields.

Original scroll designs for wrought iron work as applied in the iron shop course.

Original designs adapted to wood carving.

Study of light and shade and breadth of treatment are developed by execution of large charcoal drawings from plaster casts of natural leaf forms and conventional rosettes.

II. (a) Perspective as applied in the drawing of groups of objects; relative proportion and study of values; light and shade; the artistic grouping of objects; study in composition, combining fruit and flowers with objects of still life. Drawings are made of the same in pencil, pen and ink, sepia and charcoal. Small sketchy effects, in which impressions of light and shade are jotted down, are the outgrowth of the pencil, and pen and ink work. Sepia and charcoal studies are executed on a larger scale, requiring careful study of details.

Students from Biology Department bring specimens of fungi and insect life, and reproduce them in ink and water colors. Charcoal drawings of the mask and head, from plaster casts of Roman Emperors, Venuses, and mythological personages, which create additional in English Department. Study of historic ornament and original adaptation of the same in designs for tiles, book-cases and wall paper. Color is first introduced by flat washes of water color to these designs

Fresco colors are used in rendering the deep rich coloring required in Saracenic designs. Scheme for a room in which ceiling, side wall and frieze and carpet are made to harmonize in color and design, completes the second year course in designs.

III. (a) Charcoal drawings of full length figure from plaster casts of "Greek Slave," "Venus De Milo," etc. Painting in water colors from groups of still life, using full palette of color in portrayal of fruit and flowers combined with bric-a-brac. Rapid pencil sketching from life of fifteen-minute poses.

Designing from natural plant forms, conventionalizing flowers and applying the same to wall paper and silk designs.

IV. (a) Paintings in oil; draperies and genre; study of composition and illustrating; advanced work in designing for pottery and stained glass windows; study of the history of art; talks given on historic ornament and artistic anatomy; making portrait studies from living costumed model in charcoal, ink, water color and oil.

Mechanical.

It is designed to make the course in mechanical drawing auxiliary to other work at the Institute. Those who are intending to pursue special lines of work will have such work as seems best adapted to their needs. Those who desire it, for instance, can take a course which shall involve much study of the laws of perspective, using one of the best treatises in English,—Ware's Modern Perspective. Again, others may take work especially adapted to the needs of civil, mechanical, or electrical engineers.

When work not in the regular courses is taken by students, it will be credited as regular course work should the student desire to enter the regular course at some subsequent time, provided that in quality and quantity it is a fair substitute for regular course work. At all times endeavor will be made to adapt the work to the needs and ability of the individual student.

I. (b) Selection and use of drawing instruments; fundamental principles of orthographic projection with applications in making working drawings of articles constructed in the wood shop, illustrating different constructions used in carpentering and cabinet-making. Rectangular and circular forms are chiefly used in these models and other forms involving more difficulty are gradually introduced. Tracing and blue printing of working drawings. For those who do not take the course in wood work models and copies are provided.

II. (b) Shop drawings of iron, brass and wood work; development of prismatic, pyramidal and conical surfaces, and projections of the intersections of various surfaces with each other; isometric and cavalier projections; simple constructions of shades and shadows; fundamental principles of perspective; simple constructions of shades and shadows in perspective; methods of coloring drawings.

III. (b) Drawings of plans, elevations and sections of machines; drawings of patterns to be made in the pattern shop; drawings in perspective of furniture, rooms and buildings from actual measurements by the methods practically used by architects and designers; drawings of architectural detail; drawing of involute and epicycloidal gearing from models and with odontographs; topographical drawing; laying out railway curves; profiles, etc.

IV. (b) Drawings of machines with practice in design, using the principles laid down by Anwin, Reanleaux and others; drawings of the architectural orders; methods of artistic rendering used by architects, applied to drawings of buildings; perspectives of curved forms with their shades and shadows; elements of graphic

arithmetic, composition and resolution of forces, studied graphically with diagrams of stresses for roof and bridge trusses.

Stenography. A special department of stenography, typewriting, etc., independent of the other departments of the Institute, has been in operation for the past three years. Its members pay a fee of fifty dollars for the course or by special arrangement with the instructor, a fee of ten dollars per month for short terms.

The purpose of the course in this subject is the equipment of young men and women for practical service as stenographers and amanuenses. The time allotted to the work is six months, in which the student is expected to devote not less than one-third of each day to this particular department. Certificates will be granted to all students who acquire the ability to write at the rate of one hundred words per minute for ten consecutive minutes, matter not previously seen by them, and who then are able to transcribe the same immediately. Pupils who have attained this degree of efficiency have mastered the principles of shorthand, so that the highest skill and accuracy is to be reached thereafter simply by practice.

Typewriting. The students are given thorough training in the use and care of the Densmore, Remington and Caligraph machines. No student will be permitted to take up this course who cannot devote to it at least one-third of his time. To obtain the certificate of the school, pupils must demonstrate their ability to carefully copy new matter at the rate of forty words a minute for ten consecutive minutes. The instruction in this work aims to reach the individuals so that the student may be permitted to advance as rapidly as his ability warrants. The following outline will indicate the chief features to which special attention is paid: [1]. The mastery of the key-board, including accurate fingering and evenness of touch. [2]. Graded word exercises. [3]. Mastery of commercial, legal and legislative phrases. [4]. Special drill in spelling, punctuation, capitalization, business correspondence, etc. [5]. Work on architectural specifications, legal testimony and statutory forms. [6]. Speed exercises, including tests of speed in writing upon the machine from dictation. [7]. Letter-press copying and manifolding. [8.] Special training in the mechanism, adjustment, repair and care of machine.

Book-keeping. The purpose of this work will be: [1]. The mastery by the general student of the elements of accounts. [2]. The special training of young men and young women for position as book-keepers and accountants.

The study then, in this work will include not only mastery of the elementary principles, thorough drill in journalizing and posting, the making of the trial balance and the balance sheet, but will familiarize the student with the various auxiliary books. Thorough drill will be given in rapid calculation, the computation of interest, the writing of notes, checks, receipts, etc. Students desiring to continue the work through the year will have special opportunity to do so.

GENERAL INFORMATION.

Students seeking admission to any department of the Institute will be required to furnish satisfactory evidence of good moral character and of honorable demit from the school with which they were last connected. No student will be admitted whose bills for the previous school year have not been settled in full, or who has any charges standing against him on the books of the institution.

Examinations for admission to any department, under the terms outlined on pages 13 to 15 of this catalogue, will begin on Monday, Sept. 16, 1895, at ten o'clock a.m.

Students of maturity desiring to take special courses should file application with the Secretary at the earliest possible date.

Term bills will be payable strictly in advance and students should submit Secretary's receipt for the same to each instructor whose classes he may seek to enter. The tuition fee which is uniform for all departments, and without reference to amount of work pursued, is Thirty Dollars per term. Each student will also be required to make a deposit of Five Dollars to cover material used, breakage, injuries or loss in libraries, laboratories, shops, and studios. Students who work in more than one shop and one laboratory may be required to make an additional deposit. Such deposits must be kept full from term to term. Any unearned balance of the sums thus deposited will be returned to the student at the end of the year.

Students can obtain good board in homes approved by the officers of the Institute at from five to six dollars per week. Parents desiring for their sons and daughters homes where they will be under special and careful guardianship can be recommended to the same on application to the Secretary. In some cases members of the faculty will take students into their homes and direct their study and living.

For further information address,

PRESIDENT CHARLES H. KEYES,

THROOP POLYTECHNIC INSTITUTE,

PASADENA, CALIFORNIA.

LIST OF STUDENTS FOR 1894-5.

Sloyd School.

Adams, Theodore E.....	South Pasadena
Baldwin, Harry.....	Pasadena
Behrendt, Samuel.....	Los Angeles
Benseman, Albert.....	Los Angeles
Bixby, Jotham W., Jr.....	Long Beach
Bley, John P.....	Pasadena
Bronaugh, Daniel D.....	Los Angeles
Brown, Walter M.....	Pasadena
Clark, Addie.....	Linda Vista
Clark, Mary.....	Linda Vista
Daggett, Maud.....	Pasadena
Dalrymple, Lila.....	Pasadena
Davidson, Leonard E.....	Kingsburg
Dilworth, Alice.....	Pasadena
Dwight, Charles S.....	Pasadena
Eldred, Elisha.....	Chicago, Ill.
Earley, Jessie.....	Pasadena
Eaton, Harold.....	Los Angeles
Farrara, Lillie.....	Richmond, Va.
Farris, E. Lu.....	Pasadena
Foster, Guy.....	North Pasadena
Fowler, Emmett M.....	Los Angeles
Fowler, Will K.....	Los Angeles
Fulton, Horace M.....	Washington, D. C.
Fulton, Jane C.....	Hudson, Wis.
Garben, Charles.....	Chicago, Ill.
Gaylord, John C.....	Pasadena
Gaylord, William L.....	Pasadena
Giddings, Lawson H.....	Pasadena
Gregory, Mable.....	Lamanda Park
Grey, Harry W.....	Pasadena
Greer, William L.....	Pasadena
Griffith, Guy T.....	Long Beach
Grimm, Dora.....	Pasadena
Hallett, Hazel.....	Halliday, New Mexico
Hallett, Homan D.....	Halliday, New Mexico
Hansen, Waldemar.....	Pasadena

Hayes, William.....	Monrovia
Horton, Charles M.....	New York, N. Y.
Howard, George Volney.....	Pasadena
Howe, Elliott.....	Pasadena
Hull, Roy.....	Pasadena
Kenney, Charles E.....	Los Angeles
Keyes, Helen B.....	Pasadena
Keyes, C. Sumner.....	Pasadena
Keyes, Harold.....	Pasadena
King, Martin.....	Pasadena
Klokke, Ernest.....	Los Angeles
La Du, John T.....	Los Angeles
Macdonald, Leroy.....	Seattle, Washington
Mahler, George F.....	Pasadena
Mallory, Conroy.....	South Pasadena
McKinney, Morton.....	Pasadena
Michener, Harvey D.....	Pasadena
Moran, Henry.....	Colton
Muir, Henry A.....	Los Angeles
Naud, Louis.....	Los Angeles
Nelmes, Thomas.....	Pasadena
Nichols, Robert K.....	Pasadena
Obear, Julian W.....	Los Angeles
Ogden, Edna.....	Pasadena
Packard, Willard L.....	Los Angeles
Pearson, Atlee.....	Los Angeles
Phillips, Claude S.....	Pasadena
Potter, John.....	Pasadena
Power, June.....	Springfield, Ill.
Power, Charles P.....	Springfield, Ill.
Pugh, Richard C.....	Los Angeles
Rankin, Jesse A.....	Caliente
Reed, Ole B.....	Pasadena
Rice, Theron L.....	Pasadena
Rowe, Willis A.....	Los Angeles
Saunders, Florence.....	Pasadena
Shaw, Fred.....	Pasadena
Shoemaker, Richard.....	Pasadena
Shoup, John M.....	Pasadena
Strong, Robert M.....	Pasadena
Stuart, William C. Jr.....	Pasadena
Tuttle, Anna H.....	Pasadena

Vajen, Claypool.....	Indianapolis, Ind
Vore, Fred H.....	Pasadena
Wamsley, W. Edward.....	Glendora
West, Fred.....	St. Paul, Minn
White, Fred.....	Milwaukee, Wis
Whitmore, Benjamin.....	Pasadena
Worthington, William.....	Ramona

Academy.

Allen, Irving.....	Pasadena
Allen, Robert M.....	Pasadena
Allen, William C.....	Pasadena
Baker, Calvin F.....	Pasadena
Baker, John H.....	Pasadena
Baker, Ruth E.....	Pasadena
Barker, J. Edmund.....	Pasadena
Beckett, Bertram C.....	Los Angeles
Beery, Mary.....	South Pasadena
Blackman, Roy.....	Los Angeles
Blanchard, Ada.....	Pasadena
Blick, Kate F.....	Pasadena
Bolt, Franc.....	Pasadena
Bonebrake, Percy.....	Los Angeles
Bonner, Ella.....	Pasadena
Bowron, William.....	Pasadena
Brand, Milo B.....	Pomona
Bray, Eustace V.....	Perris
Britton, James.....	North Pasadena
Brodbeck, Otto.....	Los Angeles
Brown, Eddy L.....	Pasadena
Bushnell, Betsy.....	Pasadena
Carhart, Warren.....	Burbank
Casterline, L. Blanche.....	Pasadena
Cobb, William Louis.....	Santa Cruz
Conger, Lulu.....	Pasadena
Conger, Lydia D.....	Pasadena
Conger, Ray E.....	Pasadena
Cook, Jessie.....	Pasadena
Corson, Flavilla.....	Pasadena
Cowan, Bessie J.....	Pasadena
Cox, George B.....	Riverside
Creamer, J. Clifton.....	Alhambra
Daggett, Helen.....	Pasadena
Daggett, John.....	Pasadena
Davis, Warren A.....	Pasadena
Dedual, Andrew.....	Pasadena

Dobinson, Mary H.....	Pasadena
Dodworth, Arthur R.....	Pasadena
Doering, Edmund J.....	Chicago, Ill.
Dunham, George E.....	Los Angeles
Ely, Wellington	Stockton, N. Y.
Enderlein, William.....	Los Angeles
Fuller, Ethel	Pasadena
Gale, Olive M.....	Pasadena
Gaylord, Horace A.....	Pasadena
Gaylord, James M.....	Pasadena
Gaylord, Robert E.....	Pasadena
Glassell, Alfred.....	Los Angeles
Godin, Arthur F.....	Los Angeles
Gorthy, Joseph.....	South Pasadena
Green, Myrtle.....	Alhambra
Grinnell, Harold.....	South Pasadena
Griswold, Eugene.....	Covina
Groenendyke, Edward.....	Pasadena
Groesbeck, James R.....	Pasadena
Hansen, Laurena, Pasadena.....	Pasadena
Harris, Burton S.....	Toronto, Canada
Hart, Edwin.....	Sierra Madre
Hasse, Carl.....	Soldiers' Home
Hawley, Milton.....	Pasadena
Hiller, Edgar.....	Los Angeles
Hiller, Willett.....	Los Angeles
Hodge, Arthur.....	Pasadena
Jewett, Frank B.....	Lamanda Park
John, Edwin.....	Long Beach
Johnston, Blanche.....	Pasadena
Judson, Harry F.....	Pasadena
Keese Sada.....	Pasadena
Kenney, Oliver.....	Sespe
Keyes, Maud V.....	Pasadena
Kidder, Marie.....	Pasadena
Kimble, Robert.....	Los Angeles
Knecht, Emil.....	Los Angeles
Knight, John O.....	La Canada
Knight, Alpha C.....	La Canada
Lacy, Fred.....	Los Angeles
Latimer, Jennie.....	Los Angeles
Laux, Herbert.....	Los Angeles
Lawson, Lawrence.....	Washington, D. C.
Lee, Thomas.....	Los Angeles

Louthian, Emmett.....	Pasadena
Louthian, Laura.....	Pasadena
Luitwieler, Walter M.....	Los Angeles
Mace, Laurence.....	South Pasadena
Macomber, Leroy.....	Pasadena
March, James M.....	Alhambra
McClure, Arthur C.....	Los Angeles
McCollom, John.....	Pasadena
McKinney, Guy.....	Louisville, Ky.
McQuilling, William S.....	Pasadena
Menner, Lottie E.....	Pasadena
Menner, Ivy.....	Pasadena
Mercer, Albert.....	Pasadena
Merriman, John.....	Los Angeles
Miller, J. Evans.....	Los Angeles
Monroe, Grace E.....	Pasadena
Morrison, Margaret L.....	Valley Center
Moss, Clements.....	Los Angeles
Nash, Carl.....	Pasadena
Nelmes, Jeanie.....	Pasadena
Nolan, Nellie.....	Pasadena
Olshausen, Bruno A.....	Los Angeles
Olsen, Albert L.....	Kingsburg
Owen, Edward F.....	Los Angeles
Ozman, Roy.....	Los Angeles
Parker, Harold.....	Pasadena
Parker, Henry A.....	Pasadena
Pendergast, Roland.....	Chicago, Ill.
Peuser, Else.....	Chicago, Ill.
Pfeiler, Albert L.....	Hueneme
Phelps, Bertie.....	Los Angeles
Phelps, Joseph.....	Los Angeles
Phillips, Edmund E.....	Los Angeles
Pingree, John O.....	Murrietta
Pixley, Ethel.....	Sierra Madre
Poindexter, Charles.....	Los Angeles
Polkinhorn, Edwin J.....	Los Angeles
Pomeroy, Walter V.....	Los Angeles
Power, J.....	Springfield, Illinois
Pratt, Herbert.....	Los Angeles
Pratt, Armstrong C.....	San Bernardino
Prentiss, Bertha.....	Pasadena
Randall, Herman P.....	Pasadena
Reed, John O.....	Deer Lodge, Montana
Rice, Isyphoena.....	Pasadena

Rice, Charles E.....	Pasadena
Rice, Harvey.....	Tustin
Roberts, Richard S.....	Pasadena
Roche, Fred W.....	Pasadena
Roche, Frank K.....	Pasadena
Russell, Emma.....	Pasadena
Ryder, Harry S.....	Pasadena
Sanders, Charles H.....	Pomona
Scofield, Harry.....	Lamanda Park
Senter, George S.....	Pasadena
Smith, Howard M.....	Scotia
Snyder, Blanchard.....	Anaheim
Sovereign, Douglass.....	Pasadena
Spalding, Hamilton.....	Los Angeles
Spence, John H.....	Los Angeles
Sterrett, Roger.....	San Jose
Stimson, Charles.....	Los Angeles
Stimson, Robert.....	Pasadena
Stokes, Guy.....	Alhambra
Sulliger, Herman.....	Santa Monica
Sutton, Walter E.....	Murietta
Templeton, John.....	Pasadena
Thompson, L. George.....	Pasadena
Turney, Royal.....	Campbell
Turner, Edson.....	Pasadena
Tuttle, Charlotte M.....	Pasadena
Tuttle, Jesse M.....	Pasadena
Vajen, Mary.....	Indianapolis, Ind.
Vallette, Arline.....	Pasadena
Vore, Jesse R.....	Pasadena
Vose, Richard.....	Los Angeles
Wamsley, Victor.....	Glendora
White, Fred. P.....	Chino
Wiley, Laura.....	Pasadena
Williams, Bertram.....	Los Angeles
Williams, Charles H.....	Pasadena
Williams, Joseph M.....	Pasadena
Wilson, Harry.....	Los Angeles
Winslow, Edward F.....	Pasadena
Wood, Corrine A.....	Pasadena
Wood, Clifford.....	Pasadena
Wright, Edna R.....	Pasadena
York, John M.....	Pasadena
Young, Harold.....	Pasadena

College.

Allen, Robert S.....	Pasadena
Arnold, Ralph.....	Pasadena
Carlton, Don W.....	Los Angeles
Doty, George F.....	Pasadena
Ferguson, Clarence.....	Los Angeles
Gaylord, Harry D.....	Pasadena
Gray, Roy W.....	Pasadena
Grinnell, Joseph.....	Pasadena
Haynes, Dian.....	North Pasadena
Mosher, Kate.....	Pasadena
Skilling, Robert P.....	Los Angeles
Spear, Harold D.....	Pasadena
Towne, Burton.....	Minneapolis, Minn.

Teachers' Training Class.

Daniels, Esther C.....	Pasadena
Doyle, Mrs. Mina.....	Boston, Mass.
Gower, Hattie F.....	Los Angeles
Harris, Carolyn.....	Pasadena
Keyes, Mrs. C. H.....	Pasadena
Loree, Warren.....	Pasadena
McLaren, Jennie.....	Alameda
Meskimons, J. R.....	Pasadena
Miller, Charles E.....	Los Angeles
Simcoe, Benjamin F.....	Los Angeles

Special Students.

Arthur, Claire.....	Pasadena
Banbury, Flora.....	Pasadena
Bixby, Sarah H.....	Los Angeles
Bronson, Minnie M.....	Pasadena
Dupuy, Mrs. Carrie S.....	Chicago
Fushia, Lillian.....	Pasadena

Hanlon, Mrs. Mary.....	Pasadena
Hill, Floy.....	Pasadena
Hurd, Rose B.....	Oconomowoc, Wis
Jones, Mrs. Florence K. M.....	Melrose, Mass
Kirk, Dora.....	Pasadena
Lines, Ellen.....	Pasadena
Metcalf, Jessie.....	Pasadena
Morse, A. Eleanor.....	North Pasadena
Saunders, Mrs. N.....	Pasadena
Sheldon, Nina.....	Pasadena
Shallhamer, Mrs. L.....	Pasadena
Shults, Elbert H.....	Pasadena
Snowball, Verdougal.....	Pasadena
Wassman, Sophie.....	South Pasadena
White, May.....	Pasadena
Winner, Vella.....	North Pasadena

Summary.

Girls	85
Boys	216
Resident Students.....	157
Non-resident Students.....	144
Sloyd School	86
Academy	170
College	13
Teachers' Training Class	10
Special Students	22
Total Enrollment	301

INDEX.

	PAGE
Academy.....	14
Terms of Admission.....	14-15
Course of Study.....	15
Graduation from.....	15
Admission, Terms of.....	30
Algebra.....	16
Analytics.....	17
Ancient Languages.....	18
Athletics.....	7
Bacteriology.....	22
Biology.....	21-22
Biological Laboratory.....	11
Board.....	30
Book-keeping.....	29
Botany.....	21
Calculus.....	17
Calendar.....	2
Chemical Laboratory.....	9
Chemistry.....	22
Clay Modeling Room.....	11
Clay Modeling Course.....	25
Cooking Room.....	9
Cooking Course.....	26
College.....	15
Terms of admission.....	15
Courses.....	16-29
Graduation from.....	16
Degrees granted.....	16
Courses and Departments.....	5
Degrees granted.....	16
Discipline.....	7
Domestic Economy.....	25-27
Drawing Room, Free Hand.....	11
Mechanical.....	9
Dressmaking Room.....	9
Dressmaking Course.....	27
Electrical Engineering.....	23-24
Embryology.....	22
English.....	17
Expenses.....	30
Faculty.....	3-4
Faculty Committees.....	5
Fees.....	30
Forging Shop.....	8
Forging Shop Course.....	24
Founder.....	2
Founding.....	5
Free Hand Drawing Courses.....	27-28
French.....	19

	PAGE
Geometry.....	16
German.....	20
Graduation.....	
From Sloyd School.....	13
From Academy.....	15
From College.....	16
Greek.....	18-19
History.....	20
Homes and Board for Students.....	7
Joinery.....	24
Latin.....	18
Library.....	6
Lists of Students.....	31-37
Machine Shop.....	8
Machine Shop Course.....	25
Mathematics.....	16
Mechanics.....	17
Mechanical Drawing.....	28-29
Modern Languages.....	19
Officers.....	2
Pattern Making Course.....	25
Pattern Shop.....	8
Physics.....	23
Physical Geography.....	21
Physical Laboratory.....	10
Plain Sewing Course.....	25
Qualitative Analysis.....	22
Quantitative Analysis.....	23
Sewing.....	25
Sewing Room.....	9
Shop Work Courses.....	24-27
Sloyd School—	
Terms of Admission.....	12
Course of Study.....	12
Graduation from.....	13
Sloyd Room.....	11
Sloyd Teachers' Course.....	13-14
Terms of Admission.....	13
Graduation from.....	14
Society Room.....	12
Spanish.....	19
Stenography.....	29
Student List.....	31-37
Surveying.....	16-17
Trigonometry.....	16-17
Trustees.....	22
Tuition Rates.....	30
Turning.....	24
Typewriting.....	29
Vacations.....	2
Wood Carving Course.....	25
Wood Carving Room.....	12
Wood Shop.....	7
Wood Shop Course.....	24
Zoology.....	22