Carnegie Technical Schools
Pittsburgh, Pa.

General Catalogue
1908-09

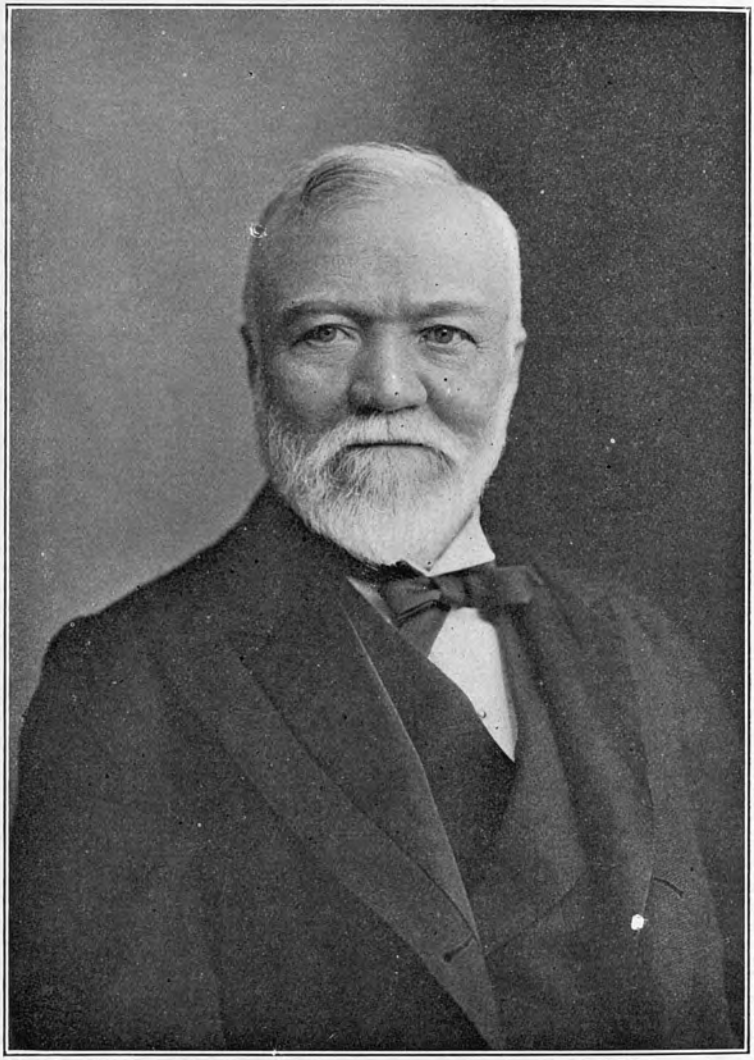
School of Applied Science

School of Applied Design

School for Apprentices and Journeymen

Margaret Morrison Carnegie School for Women

Descriptive Matter concerning each School is preceded by corresponding color page



ANDREW CARNEGIE,
Founder

Carnegie Technical Schools

Pittsburgh, Pa.

General Catalogue

1908–1909

NOTICE

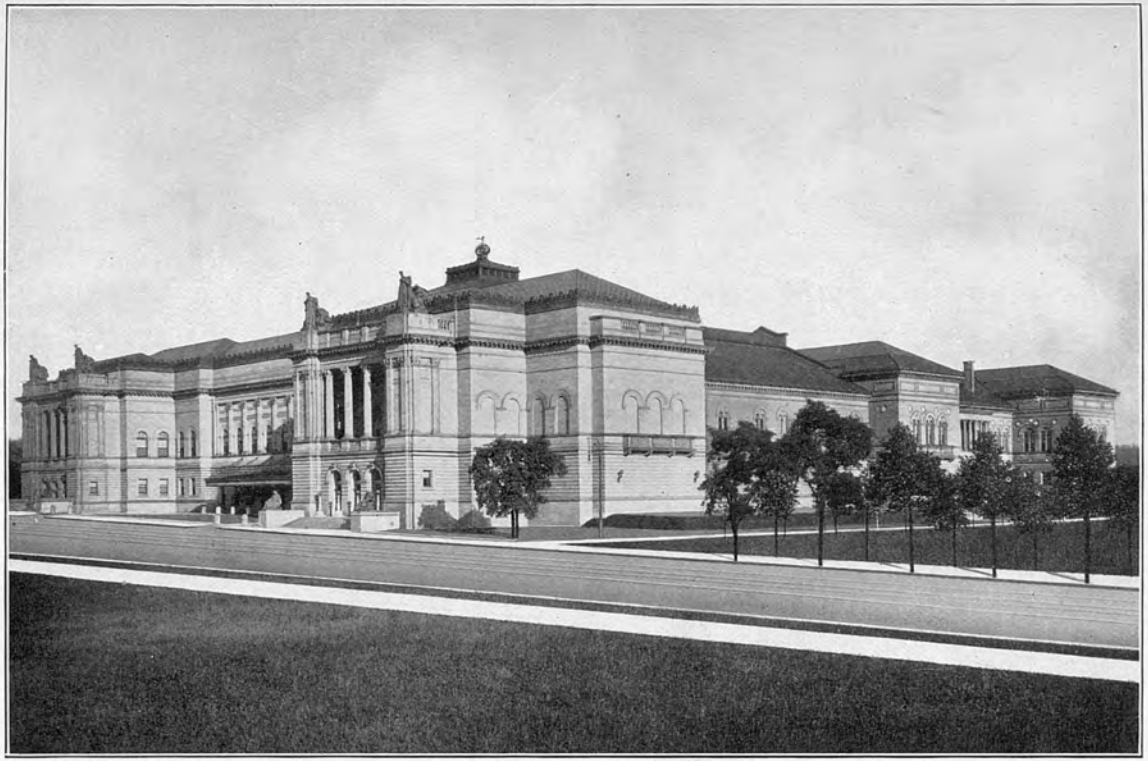
The Four Schools are indicated by the four colors of the Carnegie Tartan as shown on the cover. Descriptive matter relating to each School is preceded by a page of the corresponding color.

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THE CARNEGIE INSTITUTE AND LIBRARY BUILDING

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Carnegie Technical Schools

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SCHENLEY PARK VIEW OF PRESENT BUILDINGS

Carnegie Technical Schools

HISTORICAL SKETCH

THE Carnegie Technical Schools were founded by Mr. Andrew Carnegie. In a letter to the Mayor, dated November 15, 1900, Mr. Carnegie tendered to the city of Pittsburgh the money to establish a technical school for both sexes, upon condition that the city of Pittsburgh provide a site of ample size for future extension. On November 26 the Mayor transmitted the communication from Mr. Carnegie to the members of the Select and Common Councils, and in January, 1901, the City Councils accepted the gift.

In November of that year Mr. Carnegie further explained his views concerning the proposed technical school, and increased the endowment from one million dollars, as promised in the first instance, to two million dollars. The Trustees thereupon adopted the following resolution:

> "Resolved, That the Board of Trustees, for themselves and on behalf of the people of Pittsburgh, hereby express their very high appreciation of the practical philanthropy of Mr. Andrew Carnegie, especially as exhibited in these additional proofs of his unbounded esteem for the City of Pittsburgh. And they rejoice with him upon the civic benefits which flow continuously from the development of his wise purposes in this community."

During the year 1902 a site was selected and in February, 1903, the Trustees, meeting with a committee of Councils, approved a site of thirty-two acres of land adjoining Schenley Park near the Carnegie Library and Institute building. A bill was then introduced in the Legislature of the State of Pennsylvania to enable the city to purchase this site, which was acquired by the city in September of the same year, and tendered to the Carnegie Technical Schools.

Immediately after this purchase the committee on plan and scope of the Board of Trustees of Carnegie Institute presented a preliminary report prepared by the advisory committee, which met with the approval of Mr. Carnegie. Mr. Carnegie then agreed to place at the disposal of the Trustees of Carnegie Institute a sufficient fund with which to erect the necessary buildings.

In October, 1905, the Schools opened their doors to students, and as new buildings were made ready for occupancy additional departments were started. In the following year, 1906, Mr. Carnegie increased the funds available, and in April, 1907, at the Dedication Exercises of the enlarged building, a letter was read from Mr. Carnegie to the President and Board of Trustees, doubling the endowment fund and making provision for the further extension of the Technical Schools.

The need for education of this character can easily be appreciated when it is pointed out that but little opportunity for technical instruction is offered in Allegheny County, which has a population of over a million, a large proportion of whom are engaged in industrial pursuits.

THE CARNEGIE LIBRARY AND INSTITUTE BUILDING

This building, given to the city by Andrew Carnegie, is a massive structure of Ohio sandstone, covering approximately six acres, providing floor areas for the Library, Art Galleries, Museum, and Music Hall.

The Carnegie Library of the city of Pittsburgh, of which Mr. Anderson H. Hopkins is the Librarian, is maintained by the city and contains 300,000 volumes in its departments of Circulation, Reference, Loan, and Technology, over 75,000 of which are on technical subjects. This main library also supplies six branches, located in different sections of the city. Recently a station equipped with technical literature has been established at the Schools, open every school day until 10 P.M., which is freely used by the students for general reading and reference. These are but a few of the agencies through which the Library system operates. There are stations in all the public schools, in the various clubs for young men, and in reading rooms established for the use of working men and working girls. In all there are one hundred and nine such agencies which bring within easy reach of every home in the city exceptional facilities for reading.

The Department of Fine Arts, of which Mr. John W. Beatty is Director, is endowed by Mr. Carnegie, and has in its possession a permanent collection of the works of the best modern painters, illustrating the progress of American contemporary art. Among its treasures are paintings by Puvis de Chavannes, Bastien-Lepage, Whistler, Abbey, Homer, Dagnan-Bouvere, Melchers, Innes, Chase, Alexander, Harpignies, Mauve, Ranger, Tryon, East, Cazin and Simon. The Department holds an annual international exhibition, excelled by no other exhibition of its kind in the country, in which appears the best work of the year by American artists as well as by artists from practically every foreign country. At this exhibit prizes and honorary mentions are awarded by an international jury chosen by ballot from the exhibitors. Since the foundation of the exhibition in 1896 the first prize has been five times awarded to an American painter. The approach to the Galleries is through Alexander Hall, named in honor of John W. Alexander, a native of Pittsburgh, whose decorations adorn the walls and ceiling.

Architectural and Sculptural Halls contain a splendid group of models, among the most important of which may be named the following: West Portals of Abbey Church of St. Gilles, Gard, France; Pulpit of Siena; Portal of the North Transept of the Bordeaux Cathedral; Eastern Doors of the Baptistry of St. John the Baptist, Florence; Facade of the Temple of Nike Apteros on the Acropolis, Athens; Porch of the Maidens, or Karyatides; Statue of King Kephren; Frieze of the Lions, Persian; Sculptures from the Eastern Pediment of the Parthenon; Hermes of Praxiteles; Nike

of Samothrake. The architectural models are representative of some of the great historical buildings, and form a collection unique in interest from the fact that they are all of full size. Included in this department are also valuable collections of bronzes and casts. Here the Pittsburgh Chapter of American Institute of Architects holds frequent exhibitions in order that the public may become familiar with the best work of the day in Architecture. At the last exhibition many drawings were shown by foreign as well as American architects of the first rank.

The Museum, under the direction of Dr. W. J. Holland, also endowed by Mr. Carnegie, is one of the four great museums of America, containing 1,500,000 objects, large and small. The collection in Paleontology contains a quarter of a million of specimens, of which 6,000 represent vertebrates, among them the famous Carnegii Diplodocus, a replica of which has been presented to the German Emperor. The British Museum and other museums also possess replicas. The collection in Mineralogy embraces types covering a wide range of species, including many specimens described by Dana in his standard work on Mineralogy. The Botanical collection has one of the best herbariums in existence. The department of entomology contains 250,000 specimens, and there is also a collection of well-arranged and beautifully mounted birds

In the Music Hall there has been given annually for a number of years a series of free organ recitals conducted by prominent organists. These concerts, given on Saturday evenings and Sunday afternoons, are largely attended and prove the popular appreciation of musical art. The Director of Music is Mr. Charles Heinroth. The Hall of Music is also the home of the Pittsburgh Symphony Orchestra, one of the five permanent symphonic organizations of the country. This orchestra, maintained by the people of Pittsburgh, gives during the winter a series of concerts of high merit and is a powerful factor in the musical education of the city. The Director of the Orchestra is Mr. Emil Paur.

The Art Society of Pittsburgh, under whose auspices many prominent artists visit the city, also gives monthly performances in the Hall of Music. Many other gatherings are held here, including meetings of public organizations, conventions, college glee club concerts, lectures, etc., and in the lecture hall adjoining are held the meetings of the Academy of Science and Art.

The Library, Museum and Art Gallery are free to every citizen of Pittsburgh, and the exceptional advantages offered contribute toward the cultivation of the whole community, while the students have free access to the buildings at all times and are offered every facility for pursuing their studies in the Arts and Sciences.

LOCATION AND BUILDINGS

The Carnegie Technical Schools are located in Schenley Park in the geographical center of the city, at an equal distance from the residence and business centers, and in the heart of the great industrial activity of the region. The recent incorporation of the greater city enables a large

number of students living within the new boundaries to take advantage of the reduction in tuition offered to residents of the city, while it is but a short distance from the Schools to the traction lines which reach nearly every portion of the city as well as Wilkinsburg, Swissvale, Homestead, Braddock, Duquesne, Wilmerding, McKeesport, Sharpsburg, Bellevue, Crafton, Carnegie and the numerous other suburbs where are located the great industries whose activities and achievements have given the city of Pittsburgh a world-wide reputation.

In April, 1905, foundations were laid for a group of buildings designed ultimately to house the School for Apprentices and Journeymen, but providing temporary room for the several departments, containing a floor space of 120,000 square feet. In October of the same year the buildings were completed and ready for occupancy. The style of architecture adopted admits of an ample amount of light, air and ventilation, and permits ready access to every room through a general system of corridors, while the construction is absolutely fireproof and in accordance with the most modern practice.

During the year 1905-6 courses were offered as follows:

Day Courses in the School of Applied Science,
Day Courses in the School of Applied Design,
Night Courses in the School of Applied Science,
Night Courses in the School of Applied Design,
Night Courses in the School for Apprentices and Journeymen.

In November, 1905, a temporary power plant was completed which insured efficient heating, lighting, and ventilation.

In December, 1906, a portion of Machinery Hall, with a floor space of 20,000 square feet, was furnished and equipped with laboratories and heavy machinery.

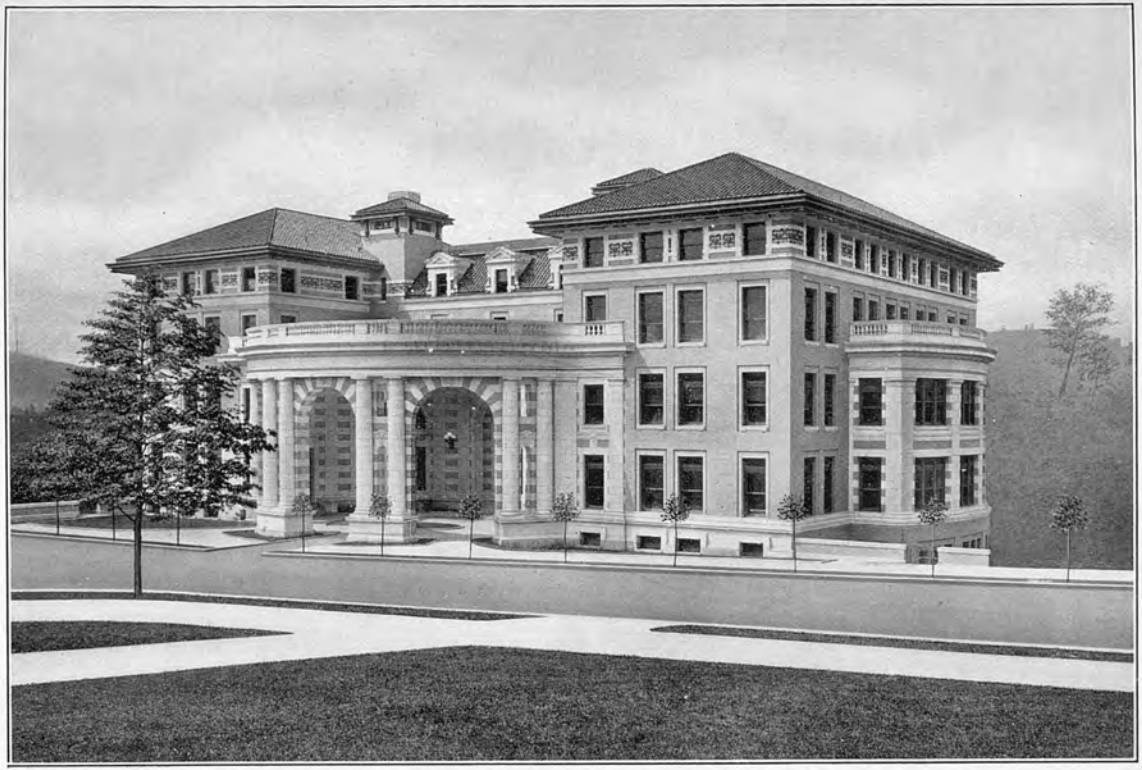
During the year 1906-7 the following additional courses were offered:

Day Courses in the School for Apprentices and Journeymen.
Day Courses in the Margaret Morrison Carnegie School.
Night Courses in the Margaret Morrison Carnegie School.

In September, 1907, the first of a group of buildings for the Margaret Morrison Carnegie School for Women, containing a floor space of 70,000 square feet, was occupied. The new building, situated apart from the others, is four stories in height and has a frontage of 200 feet on Woodlawn Avenue. The architectural treatment, while indicative of the purpose for which the building is designed, is in keeping with the general building scheme of the Schools.

Two separate buildings in the group for the School of Applied Science are under construction, which will provide 150,000 additional square feet of floor space. These will be ready for occupancy in October, 1908.

In the near future separate quarters will be provided for the School of Applied Design, giving over to the exclusive use of the School for Apprentices and Journeymen the buildings which up to the year 1907 housed all departments.



MARGARET MORRISON CARNEGIE SCHOOL, FOR WOMEN

STUDENT ORGANIZATIONS

The social life of the institution finds expression in the various scientific, literary, musical, dramatic and athletic clubs which have been organized in the Schools. While membership in the scientific societies is obviously restricted to the School of Applied Science, students in good standing in any department are eligible for admission to many of the other organizations.

The Glee and Mandolin Club, with a membership of 50, gives several concerts during the year which compare favorably with concerts given by other college musical clubs. The Orchestra has been organized this year on a permanent footing with a membership of 16.

The Athletic Association is composed of a large percentage of the student body, who take an active interest in some phase of amateur sport, such as baseball, football, hockey, track events, basketball or tennis.

Engineering societies, literary societies and debating clubs have been organized in the several schools. Meetings are held at regular intervals when papers are read and discussed. There are occasional social gatherings and once a month the societies are addressed by some prominent engineer or scientist.

Two publications are issued, *The Tartan,* a weekly publication, recording events of contemporary interest, and *The Thistle,* an annual publication serving as a permanent record of student activities during the year.

These organizations are influential in building up a spirit of loyalty and esprit de corps among the student body as a whole, and have a far-reaching effect upon the individual in the intellectual and social development that goes to make up the educated man.

ATHLETIC FIELD

The student body has voted by a large majority to contribute toward the support of an athletic field.

These fees are to be collected on registration at the beginning of the school year in consideration of which there will be issued a season ticket entitling the holder to admission to specified contests on home grounds.

CHEMICAL LABORATORY OF THE TECHNOLOGIC BRANCH U. S. GEOLOGICAL SURVEY

The United States Geological Survey has established in Machinery Hall, Carnegie Technical Schools, the main laboratory of the Chemical Division, Technologic Branch. The work done consists of the analysis and investigation of fuels in connection with the movement toward conservation and better utilization of the mineral resources of the country. Samples of coal are received from all parts of the United States, being collected by the organized force of field experts in the Geological Survey, and are examined for their chemical composition, heating value, coking qualities, gas-making qualities and yields in by-products, as well as for their smoke-

producing character and their adaptability for steam boiler firing. Tests are made also on the weathering and deterioration of coal.

The Technologic Branch, U. S. Geological Survey, is directed by Dr. J. A. Holmes, Expert-in-charge, Washington, D. C., and the Chemical Division by Prof. N. W. Lord, Chief Chemist, Columbus, Ohio. At the Pittsburgh Laboratory Mr. F. M. Stanton is in direct charge of the analytical work and Dr. Horace C. Porter and Dr. J. C. W. Frazer of the investigation work. Seven other chemists and assistants are employed.

DORMITORIES

To provide a home for students with special reference to those living at some distance from Pittsburgh, several private houses a block from the Schools' property have been rented for use as dormitories. These houses are managed by a house committee consisting of students under the direct supervision of the Faculty and are maintained on a coöperative basis, the student sharing the actual cost of living, including board and lodging, in accordance with the advantages enjoyed by the individual.

Under these conditions the expense of living ranges from approximately $5.00 to $6.50 per week. Before occupancy the houses are thoroughly renovated and made absolutely sanitary. The food provided is wholesome and the water used is analyzed by the Department of Bacteriology of the City of Pittsburgh.

Students not thus cared for can find room and board in private houses in the near vicinity of the Schools at $5.00 a week and upwards.

ARRANGEMENTS FOR STUDENT EMPLOYMENT

A bureau of employment has been established at the Schools to assist students who are compelled, either wholly or in part, to support themselves during their educational period. It is the purpose of the bureau to secure such positions as are available in the manufacturing and business districts of the city, as there is little opportunity for employment about the buildings.

Students desiring positions should fill out an application blank provided for that purpose at the office of the Secretary, stating in detail, in addition to the kind of work preferred, their qualifications and experience.

GIFTS

Acknowledgment is hereby gratefully made of the many gifts that have been presented to the Carnegie Technical Schools in the two or more years the Schools have been in operation. Nearly every department has been the recipient of valuable donations, many of which are of the greatest help to the students for purposes of demonstration as well as for examination and reference.

Public Addresses Delivered before the Schools

MR. WM. MCCONWAY, "Relation of Raw Materials to Finished Product"
Chairman of the Committee on Carnegie Technical Schools.

MR. ANDERSON H. HOPKINS, - - "Value of Libraries to Students"
Librarian Carnegie Library, Pittsburgh.

PROF. BONOYENDRA NATH SEN, - - - - - - - - - "Idealism"
Professor of Philosophy in Presidency College, Calcutta.

MR. WILLIAM N. FREW, - - - - "Message from Mr. Carnegie"
President of Board of Trustees of Carnegie Institute.

DR. HENRY F. DRINKER, - - - - - "The Value of Traditions"
President of Lehigh University, Bethlehem.

DR. J. A. BRASHEAR, "Benjamin Franklin, Philosopher, Scientist, Patriot"
Astronomer.

COL. S. H. CHURCH, - - - - "Benjamin Franklin in History"
Secretary of Board of Trustees of Carnegie Institute.

HON. JOSEPH BUFFINGTON, - - - - - - - - - "Opportunity"
United States Circuit Judge.

HON. H. K. PORTER, - - - - - - - - - "Elements of Success"
Ex-Congressman.

MR. W. R. CORWINE, - - - - - - - - "Our Consular Service"
Secretary of Reciprocal Tariff League of America.

DR. W. J. HOLLAND, - - - - - - - - "Human Dependency"
Director Carnegie Museum, Pittsburgh.

PROF. HENRI MARION, - - - - - - - - "John Paul Jones"
United States Naval Academy, Annapolis.

MR. A. M. SCHOYER, - - - - - - - - "Railroad Engineering"
General Superintendent Pennsylvania Lines West.

DR. SAMUEL B. MCCORMICK, - - - - - "Responsibilities of Life"
Chancellor of Western University of Pennsylvania.

MR. MORRIS KNOWLES, - - - - - - - - "Municipal Filtration"
Chief Engineer in Charge of Filtration Plant.

MAJOR WM. L. SIBERT, - - - - - - - "Harbor Improvements"
Engineer in Charge of Locks and Dams, Panama Canal, Canal Zone.

MR. E. K. MORSE, - - - - - - - - "Structural Engineering"
Consulting Engineer, Pittsburgh.

MR. WM. H. STEVENSON, - - "Patriotism: Its Relation to Education"
Merchant.

DR. FLAVEL S. LUTHER, - - - - "Education in Relation to Life"
President of Trinity College, Hartford.

PROF. ANDREW FLEMING WEST, - - - - - - "College Fraternities"
Dean of Graduate School, Princeton.

PROF. C. F. CHANDLER, - - - - - - "Reminiscences of College Life"
Professor of Chemistry, Columbia University.

MR. L. C. PRATT, - - - - - - - "Problems of the Northwest"
Secretary of the Chamber of Commerce, Tacoma, Washington.

MR. JOHN WARD, - - - - - - "Technical Education in Scotland"
Ship Builder, Dumbarton, Scotland.

PROF. LOUIS M. HAUPT, - - - "Importance of National Waterways"
Philadelphia.

MR. J. C. MONAGHAN, - - - - - - - - - - - - "Commerce"
U. S. Consular Service, Washington, D. C.

HON. EDWIN WARFIELD, - - - - - - - - - - "Citizenship"
Governor of Maryland.

HON. EDWIN S. STUART, - - - - - - - "Energy and Application"
Governor of Pennsylvania.

DR. I. C. WHITE, - - - "The Origin of Petroleum and Natural Gas"
State Geologist for West Virginia.

DR. E. W. PARKER, - - "Necessity of Safety Regulations in Mines"
Statistician, U. S. Geological Survey.

MR. WALTER C. KERR, - - "Some Advances in Technical Education"
President Westinghouse, Church, Kerr & Co.

MR. L. C. MOORE, - - - - - - - - - - "Manufacture of Wire"
Consulting Engineer, Pittsburgh.

HON. THOS. H. CARTER, - - - - - - - - - - - "Lincoln"
United States Senator from Montana.

HON. J. SLOAT FASSETT, - - - - - - - "Professional Integrity"
Congressman from New York.

MR. JULIAN KENNEDY, - - - - - "Engineering as a Profession"
Consulting Engineer, Pittsburgh.

EXECUTIVE STAFF

—

ELVIN L. WOODWARD - - - Cashier and Accountant
FRANK ORBIN, B.S. - - - - - Electrical Engineer
CHARLES S. PARSONS, B.A. - - Acting Assistant Registrar
ANNA F. PHILPUT - - - Assistant Secretary-Registrar
JOHN P. WEIDLEIN - Chief Engineer and Superintendent of Buildings
JENNIE C. WILLIAMS - - - - - Record Clerk
M. MARIE McKEE - - - - Clerk to the Director
ROY A. WOODS - - - - - Clerk to the Secretary
HELENE R. EVANS - - - - Clerk to the Registrar

JAMES H. GIESEY - - Superintendent of Building Construction
FRANK G. BAILEY - - - Ass't. Sup't. of Building Construction

GEORGE F. SHEERS - - Auditor of the Carnegie Institute

THE FOUR SCHOOLS

The Carnegie Technical Schools are composed of four separate schools, each having for its purpose the education and training of students for specialized vocations.

I. THE SCHOOL OF APPLIED SCIENCE

Offers technical courses for the education and training of students in engineering practice. It includes the following groups of courses:

1 Courses for Day Students.
2 Courses for Night Students.

II. THE SCHOOL FOR APPRENTICES AND JOURNEYMEN

Offers trade courses for the education and training of students in the manufacturing and building trades. It includes the following groups of courses:

1 Industrial Courses for Day Students.
2 Courses for Apprentices, Night Students.
3 Courses for Journeymen, Night Students.

III. THE SCHOOL OF APPLIED DESIGN

Offers courses for the education and training of students in art and design as applied to the industries. It includes the following groups of courses:

1 Courses for Day Students.
2 Courses for Night Students.

IV. THE MARGARET MORRISON CARNEGIE SCHOOL FOR WOMEN

Offers courses of instruction for the education and training of women for the home, and for various industries and professions open to women. It includes the following groups of courses:

1 Courses for Day Students (Technical).
2 Courses for Night Students (Trade).
3 Special Courses.

Carnegie Technical Schools

Pittsburgh, Pa.

School of Applied Science

Technical Courses in
Engineering Practice

Day School

Night School

Announcement
1908-1909

In this School there are two distinct groups of courses offered:

1 COURSES FOR DAY STUDENTS
Chemical, Civil, Electrical, Mechanical, Metallurgical and Mining Engineering Practice.

2 COURSES FOR NIGHT STUDENTS
Chemical, Civil, Electrical, Mechanical, Metallurgical and Mining Engineering Practice.

Calendar

1908

	DAY	NIGHT
Closing Dates	Wednesday, June 17	Friday, May 8, 10:30 P.M.
Commencement Day	Wednesday, June 17	
Spring Entrance Examinations	Thursday, June 18, 10 A.M. Friday, June 19, 10 A.M.	Thursday, May 21, 7 P.M. Friday, May 22, 7 P.M.
Spring Examinations for the Removal of Conditions	Thursday, June 18, 10 A.M. Friday, June 19, 10 A.M.	Wednesday, May 13, 7 P.M. Thursday, May 14, 7 P.M. Friday, May 15, 7 P.M.
Fall Entrance Examinations	Tuesday, Sept. 15, 10 A.M. Wednesday, Sept. 16, 10 A.M.	Thursday, Sept. 24, 7 P.M. Friday, Sept. 25, 7 P.M.
Fall Examinations for the Removal of Conditions	Tuesday, Sept. 15, 10 A.M. Wednesday, Sept. 16, 10 A.M.	Tuesday, Sept. 22, 7 P.M. Wednesday, Sept. 23, 7 P.M.
Registration and Payment of Tuition Fees	Monday, Sept. 21, 9 A.M. to 12	Thursday, Oct. 1, 7 P.M. Friday, Oct. 2, 7 P.M.
School Year Begins	Monday, Sept. 21, 1 P.M.	Monday, Oct. 5, 7:30 P.M.

1909

Closing Dates	Wednesday, June 16	Friday, May 7, 10:30 P.M.
Commencement Day	Wednesday, June 16	
Spring Entrance Examinations	Tuesday, June 22, 10 A.M. Wednesday, June 23, 10 A.M.	Thursday, May 20, 7 P.M. Friday, May 21, 7 P.M.
Fall Entrance Examinations	Tuesday, Sept. 14, 10 A.M. Wednesday, Sept. 15, 10 A.M.	Thursday, Sept. 23, 7 P.M. Friday, Sept. 24, 7 P.M.
Registration and Payment of Tuition Fees	Monday, Sept. 20, 9 A.M. to 12	Friday, Oct. 1, 7 P.M.
School Year Begins	Monday, Sept. 20, 1 P.M.	Monday, Oct. 4, 7:30 P.M.

Day sessions will be held every week-day except Saturday, beginning at 9 o'clock.
Night sessions will be held every week-day except Saturday, beginning at 7:30 o'clock.

Vacations and Holidays

There will be no sessions on Thanksgiving day or the Friday following.
Christmas recess begins Friday, December 18, at 10:30 P.M., and ends Monday, January 4, 1909, 9 A.M.
A week's recess will be given at the end of the winter term.
Holidays are Lincoln's Birthday, February 12; Washington's Birthday, February 22; Founder's Day, last Thursday in April; Decoration Day, May 30, and Election Day, November 3, 1908.

Faculty

ARTHUR A. HAMERSCHLAG, Sc.D. - Director
JOHN H. LEETE, A.B. - - - - Assistant to the Director
ALEXANDER J. WURTS, Ph.B., M.E. Professor of Electrical Engineering Practice.
WILLIAM E. GIBBS, A.M., M.E. - Professor of Physics.
SAMUEL S. KELLER, A.M. - - - Professor of Mathematics.
GEORGE H. FOLLOWS, M.E. - - - Professor of Machine Design and Mechanical Drawing.
FRED E. FOSS, S.B., A.M. - - - Professor of Civil Engineering Practice.
WILLIBALD TRINKS, M.E. - - - Associate Professor of Mechanical Engineering Practice.
JOSEPH H. JAMES, B.S., Ph.D. - Associate Professor of Chemical Engineering Practice.
ALLAN H. WILLETT, Ph.D. - - Associate Professor of Economics.
FRED CRABTREE, B.S. - - - - Assistant Professor of Metallurgy.
WALTER F. KNOX, Ph.D. - - - Assistant Professor of Mathematics.
HERBERT F. SILL, M.S., Ph.D. - - Assistant Professor of Chemistry.
MARTIN HOKANSON, C.E. - - - Assistant Professor of Materials of Construction and Hydraulics.
WILLIAM B. DOYLE, LL.B., M.A. - Assistant Professor of English and Contract Law.
H. LELAND LOWE, M.E. - - - Instructor in Physics.
HARRY S. HOWER, B.S. - - - Instructor in Physics.
HORACE R. THAYER, M.S. - - - Instructor in Structural Design and Applied Mechanics.
WILLIAM R. WORK, A.M., M.E. - Instructor in Electrical Engineering Practice.
GUSTAVE FERNEKES, B.S., Ph.D. - Instructor in Analytical Chemistry.
AARON E. BERGEY - - - - - Instructor in Mathematics and Mechanics of Materials.
JOHN C. SPROULL, B.S. - - - Instructor in Mechanical Practice.
FRANK M. DENTON, A.C.G.I. - - Instructor in Electrical Engineering Practice.
COURTLAND S. JONES, B.S., M.E. - Instructor in Machine and Rolling Mill Design.
THOMAS PILKINGTON - - - - Instructor in Machine Design.
W. EDGAR REED, B.S. - - - - Instructor in Electrical Engineering Practice.
RAY STANLEY TOMBAUGH - - - Instructor in Mechanical Drawing.
A. LEROY LIGHTNER, A.B. - - Instructor in English.
CHARLES W. HOWARD, B.S. - - Instructor in Materials of Construction.
PERCY L. REED, C.E., M.S. - - Instructor in Surveying.
WILLIAM A. BASSETT, B.S. - - Instructor in Surveying.

KARL K. STEVENS, B.S. - - - Instructor in Elementary Chemistry.
WILLIAM B. YATES, M.E. - - - Instructor in Mechanical Drawing.
WILLIAM PFOUTS - - - - - Instructor in Pattern Making.
HUGH A. CALDERWOOD - - - - Instructor in Electric Wiring.
JOHN S. TAYLOR - - - - - Instructor in Smithing and Forging.
WILLIAM H. DOSEY - - - - Instructor in Foundry Practice.
PETER W. HEPBURN - - - - Instructor in Machine Work.
FRED F. McINTOSH, B.S., Met.E. - Assistant Instructor in Metallurgy.
HERMAN T. R. AUDE, M.S. - - Assistant Instructor in Mathematics.
HARRY S. LIGHTCAP, B.S. - - - Assistant Instructor in Mathematics.
HANS R. SETZ, M.E. - - - - - Assistant Instructor in Mechanical Drawing and the Mechanical Laboratory.
JOHN H. HILL, M.E. - - - - Assistant Instructor in Physics.
HENRY B. SMITH, A.B. - - - Assistant Instructor in Mathematics.
JOHN J. JEFFREY, B.S. - - - -Assistant Instructor in Physics.

J. HARTLEY ANDERSON, M.D. - - Lecturer.
JAMES I. JOHNSTON, M.D. - - Lecturer.

Part Time Instructors

CURTIS A. TUCKER, B.S. - - - Instructor in Mechanical Drawing.
JAMES R. McTAGGART, B.S. - - Instructor in Chemistry.
H. V. BLAXTER, A.B., LL.B. - - Instructor in English.
WILLIAM A. WILSON, A.B. - - Instructor in English.
EDWIN G. FRAZER, A.B. - - - Assistant Instructor in Mathematics.
F. O. HALE, B.L. - - - - - - Assistant Instructor in Mathematics.
THOMAS WOOD, LL.B., A.M. - - Assistant Instructor in English.
NICHOLAS STAHL, A.M., E.E. - - Assistant Instructor in Mathematics.
EDGE T. COPE, M.E. - - - - Assistant Instructor in Mathematics.

MAX GRAMAN - - - - - - - Mechanician in Physics Laboratory.
F. E. J. LITOT - - - - - - - Mechanician in Electrical Laboratory.
WILLIAM M. GEIST - - - - - Mechanician in Mechanical Laboratory.
HUGH F. PAYNE - - - - - - Mechanician in Materials Testing Laboratory.

Officers of administration are members, ex-officio, of the faculty.

Standing Committees

Committee on Faculty Organization

Professor Wurts — Mr. Leete

Mr. Field

Committee on Entrance Examinations

Professor Knox — Professor Doyle

Professor Sill

Committee on Student Organizations and Publications

Mr. Field — Professor Follows

Professor Foss

Committee on Inter-Schools Relations

Professor Crabtree — Professor McGoodwin

Mr. Leeds — Miss Baldwin

Committee on Education, Curriculum and Standing

Mr. Leete — Professor Willett

Professor Gibbs — Professor James

Professor Keller — Professor Trinks

Mr. Connelley

The Director is a member, ex-officio, of all committees.

School of Applied Science

THE School of Applied Science offers technical courses of instruction for the education and training of students in engineering and chemical practice.

The system of instruction aims to equip the student with the scientific principles underlying his chosen field, and at the same time to train the reasoning faculties and to develop the power of applying abstract theory to practical operations and of utilizing in industrial fields the knowledge acquired in the schools. Energy, initiative and individual capacity are recognized as of paramount importance, and emphasis is laid upon the necessity of forming habits, character and associations which will make these traits of permanent productive value.

In this school two distinct groups of courses are offered:

1. Courses for Day Students.
2. Courses for Night Students.

DAY SCHOOL

All students of the Day School of Applied Science, irrespective of the course of study they may prefer prior to entrance, are first required to complete a course of instruction in those studies which form the basis of a technical education, the principal elements of this part of the curriculum being English, Mathematics, Physics, Chemistry, Drawing and Shop Practice. This instruction takes the form of recitations, demonstrations, lectures, laboratory work, exercises in drawing, field work, and practical work in the shops. The training given in these branches is supplemented by a group of lectures on the evolution of science, industry, art, and politics, to stimulate and broaden the faculties of the students prior to specialization. In all except lecture subjects the classes are divided into sections of such size that the instructor is enabled to give individual assistance to every student. This makes the instruction given equivalent to the old efficient drill system, developed along modern lines to meet the needs of technical education.

The studies of this period prepare the student for the more advanced subjects given during the remainder of the course, and serve, in addition, to disclose his capacity for a specific vocation and to enable him to select, in consultation with the faculty, that course for which he has given evidence of greatest aptitude. A student is not permitted to choose as his specialty any course in which the more advanced work depends upon studies in which he did not obtain creditable rank. This makes it necessary that the general average of all the studies pursued be higher than the minimum rating demanded for individual subjects.

After the completion of the preliminary training common to all courses, the work of the student is gradually concentrated upon preparation for a particular profession. Certain fundamental studies, such as Mathe-

matics and Physics, are continued, and each year provides a group of lectures on non-technical subjects, designed to broaden the intellectual training of the student and bring him into proper relation with the industrial calling which he is to enter, but an increasingly large proportion of his time is given to the subjects having an immediate bearing upon the practice of the particular branch of the profession he has chosen. The purpose of the more advanced work is to give him that foundation of scientific knowledge which is necessary as a basis for any engineering practice, to equip him thoroughly for immediate service in some particular line, and at the same time so to develop his powers of concentration and of reasoning and his capacity for independent thought that he may be able to cope successfully and with some degree of initiative with the problems that may arise in his future work.

In the technical subjects the student is placed under the immediate instruction of men who have had practical experience in the industrial world and who are familiar with the methods prevailing in the modern practice of engineering. During the long summer vacation the student is encouraged to seek employment which will bring him into contact with the actual work of his chosen vocation and thus give him the practical viewpoint essential for the trained engineer. The aptitude of the individual for the course he has selected is thoroughly tested and the student who is found to be out of place is advised to take up some other line of work.

Briefly, the aim of the courses offered in the School is the production of educated men with faculties trained for creative work, and possessing initiative, individuality and character.

REQUIREMENTS FOR GRADUATION—Candidates for a diploma from the School must complete a regular course of study which approximates thirty-five hundred lesson hours, which is equivalent to the work demanded in similar institutions of the first class. To earn a diploma the student must secure 225 credit units in a prescribed course of study, a credit unit being defined as the amount of credit allowed for the satisfactory completion of the assigned work of a term in a course of one hour a week of recitation or lecture, or of two hours a week of laboratory or shop practice. No credit units will be given in any subject unless the entire work of the term in that subject has been satisfactorily completed.

The number of years necessary to fulfill these requirements is not determinate, as it largely depends upon the student, his preparation, his progress in the school, and his ability to utilize the training afforded by fundamental studies in the advanced work, but no diploma will be awarded to a student who has not been in attendance at least three years in the Day School, unless he shall have entered with advanced standing.

Each student is required to carry a schedule of at least twenty-two hours a week. A student of exceptional ability is permitted to carry a larger number of hours and every opportunity will be offered him to complete the course in the minimum time, subject to the necessary limitations of sequence of studies and arrangement of schedules.

GRADUATE WORK—Students who have met the requirements for graduation in a given course of study are offered opportunity to pursue additional studies of an advanced character, under a schedule to be approved by the faculty.

FACILITIES FOR INSTRUCTION

The School of Applied Science is at present located in the buildings of the School for Apprentices and Journeymen. A group of buildings designed to meet the special needs of the School of Applied Science is now in process of erection and it is expected that it will be ready for occupancy in the fall of 1908. The new buildings will contain ample class room accommodations and laboratories for all departments.

A brief description of the laboratories and equipment now in use is given in the following pages.

Chemical Laboratories

The chemical lecture room, balance room and laboratories are at present on the third floor of the Trade School Building.

The lecture room has a seating capacity of seventy-five and the lecture table is provided with the usual facilities for demonstration. For lecture work in applied chemistry a stereopticon is used. Collections illustrative of the raw materials, intermediate and finished products of the various chemical industries are kept in the lecture room.

The laboratory for general chemistry contains table space which makes it possible to give laboratory instruction to forty-eight students working at one time. The laboratory tables are fitted with pipes supplying gas, water, air pressure and suction, and with individual hoods at each student's desk for carrying off fumes by down draft.

The laboratory for advanced general chemistry, analytical chemistry and electrochemistry accommodates twenty-eight students at one time. The tables here are provided with individual hoods, gas, water, pressure, suction and electric current.

For general and technical analytical chemistry the laboratory is equipped with a complete modern outfit of general and special apparatus, analytical balances, combustion furnaces, gas analysis apparatus, centrifugal machine, and other apparatus.

The equipment for demonstration and laboratory work in physical chemistry and electrochemistry is of the very latest type. This includes apparatus for the demonstration of the molecular weights by the boiling point, freezing point and vapor density methods, for measurement of electrical conductivity, calorimetric work, and the measurement of electromotive force, potentiometers, volt and ammeters for demonstration purposes, models to illustrate industrial electrochemical processes, dielectric constant apparatus and individual student outfits for electrochemical preparations, consisting of rheostats, ammeters, voltmeters, cells, etc.

Civil Engineering Equipment

The department of Civil Engineering is well provided with a large number of transits, levels, compasses, plane tables, sextants and all the smaller instruments used in carrying on ordinary surveying operations.

Models of actual structures such as girders, trusses, roofs and abutments, constructed in the structural shop, are used to illustrate the lectures, and aid the student in the preparation of his own designs.

The structural shop has equipment consisting of a punching and shearing machine and such smaller tools as are needed for the construction of models of actual structures. By a few well chosen exercises in this shop, students who are working on designs for structures are enabled to appreciate the importance of the practical details which every designer should understand.

Materials Testing Laboratory

The laboratory for testing materials is well equipped with apparatus for determining the physical properties of iron, steel, cement, reinforced concrete, stone, brick, wood and other materials.

This apparatus includes two Olsen standard testing-machines, one of thirty thousand pounds and the other of one hundred thousand pounds capacity; two Riehlé testing-machines of fifteen thousand pounds capacity each; an Amsler-Laffon hydraulic beam testing-machine for a uniformly distributed load of two hundred thousand pounds; an Olsen hydraulic testing-machine of fifty thousand poounds capacity; an Amsler-Laffon torsion machine of sixteen hundred pounds capacity; a Brinell hardness testing-machine; a Riehlé abrasion machine; an Olsen abrasion cylinder; a standard Fairbanks cement testing-machine; a Riehlé automatic cement testing-machine; six working tables for mixing cement; two moist closets; six submersion tanks, with a total storage capacity of ten thousand briquettes; a large submersion tank for reinforced concrete beams; three concrete mixers; an electric furnace for testing materials at a high temperature; and various instruments for measuring deflection, extension, and compression.

Electrical Engineering Laboratories

The electrical engineering department comprises a main laboratory, lecture room, standard room, photometer room, storage battery room and a computating room with tables and reference books for the use of students. The work shops of the Trade School are also at the service of the electrical department for a course in electric wiring, as well as the drawing rooms of the mechanical engineering department for courses in electric machine design, and a great variety of direct-driven machines in the shops and an electric elevator in the Margaret Morrison Carnegie School are available for testing purposes.

The equipment of the main laboratory consists of a distributing

board connecting the power house and storage battery through conduits with all parts of the laboratory, photometer, lecture and standard rooms; a 72-cell storage battery; five Westinghouse shunt motors arranged for direct coupling with five generator units comprising shunt, compound and series direct-current generators and three-phase and two-phase alternating-current generators; an Allis-Chalmers motor-generator group; apparatus for street car equipment; overhead conductors arranged for transmission-line tests; a General Electric motor-generator set, consisting of a 90-horse-power variable-speed direct-current motor with commutating poles, direct-connected to an alternating-current revolving-field generator connected for single-phase, two-phase, three-phase and six-phase supply; a 10-horse-power three-phase variable-speed induction motor; a 7.5-kilowatt double-current generator, which can be run also as a single-phase, two-phase and three-phase rotary converter; a number of 6.6-kilowatt transformers, including a set arranged for the Scott two-phase three-phase conversion; a constant-current transformer; compensators and induction regulators; single-phase, two-phase and three-phase induction motors; a 5-kilowatt, 10,000-volt testing transformer, and an assortment of alternating-current and direct-current arc lamps.

Auxiliary apparatus comprises portable water rheostats, lamp banks, Prony brakes, armature-winding model, reflectors and a rotator for photometry. Among the instruments are an oscillograph of the Duddell type, fitted with three vibrators and a photographic attachment; a Leeds and Northrup potentiometer; precision instruments of the Kelvin balance type; Weston direct-current and alternating-current instruments; a power-factor indicator; a secohmmeter and a dozen sensitive reflecting galvanometers. The department has a very complete equipment of apparatus for electrostatic experiments. Such work, however, as deals with vacuum-tube phenomena, X-rays and the like is carried out by the physics department.

The lecture room is thoroughly equipped with the latest and best apparatus for demonstration, also a lantern and complete set of slides, the latter being largely used for diagrams in preference to the blackboard.

The present temporary power house of the Schools, the machines of which are all available for testing purposes, is equipped with one Westinghouse gas engine, direct-connected to a three-wire direct-current generator having an output of 250-kilowatts; one Westinghouse gas engine with a 75-kilowatt generator; one Bessemer gas engine, chain-geared to a three-wire generator; and a booster set that is used in supplying power to the Margaret Morrison Carnegie School.

Mechanical Engineering Laboratory

The mechanical laboratory occupies two floors of Machinery Hall, and comprises a boiler room and a machinery room.

The boiler room is equipped with two 100-horse-power return-tubular boilers, with feed pumps and injectors arranged for test purposes. The remaining floor space is reserved for a superheater.

The laboratory contains the following steam engineering equipment: A 100-horse-power compound steam engine, a compound air compressor (steam driven), a condenser for 3,000 pounds of steam per hour, a steam nozzle tester, and a 100-horse-power experimental turbine of the Curtis type. These machines are equipped with the necessary measuring instruments, such as weighing tanks, steam meters, gages, thermometers, plain and continuous indicators, tachometers and recording tachographs.

The machinery in the new power house of the Schools (now under construction) is selected and arranged with a view to its use in laboratory work.

For work in connection with elements of machines, the laboratory is equipped with a belt-transmission tester (Lewis type), a gear-efficiency tester, a friction-drive tester, and several machines for measuring the friction in bearings under varying conditions. There is also in the laboratory a machine for testing the properties of oil dashpots and a machine for testing the friction in roller bearings. The testing-machines are so selected that different principles are illustrated in the various machines.

For work in connection with Applied Mechanics the following machines are used: Brake shoe tester; apparatus for testing the friction of water; a machine for studying critical speeds of shafting; chain hoists; transmission dynamometers of the most advanced type; Alden and Prony brakes.

For the study of complete machines the following equipment is used: A 1-ton De la Vergne ice machine; an 8 x 8 belted air compressor; a Watt type engine governor, and a Hartung type engine governor; a motor-driven lathe, 18 inch swing, 10 foot bed; a duplex pump with glass cylinders and glass air chambers; a 1½-horse-power gasoline engine; an 8-horse-power vertical steam engine; and a 5 inch experimental rolling mill.

In addition there are in the laboratory large slotted floor plates to which may be fastened machinery that is not part of the permanent equipment. A great number of different machines are loaned to the Schools for a period of from three to eight months for experimental purposes.

Models are sparingly used, preference being given to full size machines. The following models are used: A 1-20 size working model of a locomotive, models of slide valve and Corliss valve motions, and a set of models for instruction in Kinematics and Machine Design.

Machinery Hall also contains a large and well equipped drafting room. The room is well lighted and ventilated, and fitted with forty-eight individual drawing-tables specially designed for student work. The room is hung with large frames for receiving exhibition drawings, photographs, and similar articles. For the posting of design data, special metal leaf posters have been installed.

Metallurgical Laboratory

The metallurgical laboratory is equipped with pyrometers of various types for illustrating modern methods of pyrometry; furnaces (oven, muf-

fle, regenerative, resistance, and other types) for heat treatment of steel, for making alloys, for assaying, and for roasting copper, silver, lead and gold ores; a Mahler bomb calorimeter; electric furnaces, storage batteries, and tanks for electrometallurgical work; microscopes, polishing apparatus, camera and optical bench, and dark room for microscopical investigation of metals. Use is made of the furnaces in the foundry, and all physical tests are made in the materials testing laboratory.

Facilities are also provided for making laboratory tests in the cyaniding and chlorination of gold ores, and in the lixiviation and amalgamation of silver ores.

In the new buildings of the School of Applied Science there will also be an ore dressing equipment, consisting of crushers, rolls, jigs, trommels and Wilfley table, for testing ores and for illustrating the principles of this important branch of metallurgical work.

The mineralogy laboratory is provided with the necessary equipment for determinative mineralogy and the study of rock, and includes a good collection of minerals, rocks, crystals, crystallographic models, microscopes and polishing machines.

Physics Laboratory

The apparatus for the physics laboratory has been furnished by the best foreign and American makers.

The equipment for teaching mechanics includes a break circuit chronometer by Wm. Bond & Son, a Gaertner chronograph, a Hipp chronograph and several tuning-fork chronographs with attachments devised and constructed in the laboratory for determining the free fall of a body in a vacuum; a Foucault pendulum; a Gibbs pendulum; a large number of precision balances; an automatic dividing engine; a large circular dividing engine; two large precision cathetometers; a Zeiss micrometer with certified scale, and two standard meter bars certified at Sevres and Washington. There is also the usual equipment of small cathetometers, mercurial and aneroid barometers, sextants, stop watches, micrometers of various kinds, metric and English scales, several forms of devices for determining Young's modulus, etc.

The sound apparatus includes a five-stop electro-pneumatic pipe organ, a Helmholtz analyzer, a König synthetic apparatus, an electrically driven siren, a König tuning-fork clock, a collection of forks and organ pipes, and examples of all the orchestral instruments. Instruments of original design for determining the velocity of sound, the frequency of vibrations and the formation of the Lissajous figures have been built in the laboratory.

The equipment in heat includes a solid fuel calorimeter, a gas fuel calorimeter, an apparatus for determining the specific heat of gases at constant pressure, apparatus for determining vapor tension at high and low temperatures, electric resistance thermometers, a Féry radiation pyrometer, thermopiles and several precision galvanometers.

The apparatus for static electricity includes a 60 cm. induction coil,

a complete wireless-telegraphy outfit, a Tesla transformer, a Tudsbury static machine and a very complete collection of tubes illustrating the discharge of electricity through gases.

The light equipment includes a 100 inch photometer bar made by the United Gas Improvement Co., various photometer heads, Lummer-Brodhun, Flicker, Contrast, Bunsen, and a Brodhun street photometer; two large optical benches; Hilger wave length spectroscope; several Geneva spectrometers; monochromatic illuminators; prism glasses and models; self-induction coil for spark spectra; spectro-photometer by Lummer-Brodhun; Michelson interferometer; large polarimeter; apparatus for investigating the invisible portions of spectra; Zeiss total refractometer, etc.

An eleven inch refracting telescope with photographic doublet, a transit instrument, an echelon and a concave grating spectroscope are in process of construction by the firm of John A. Brashear & Co.

Shops

The engineering shops of the Schools are equipped with modern apparatus selected to illustrate as many types of machines as practicable. For a detailed description of shops and shop equipment see pages 108-111 inclusive.

Library

The Carnegie Library of Pittsburgh, containing 75,000 volumes on technical subjects, with a total number of 300,000 volumes, is adjacent to the Schools buildings and is available for the use of students. A branch reading and reference room has been established at the Schools which is open during and after school hours.

The museum of the Carnegie Institute contains many collections of interest to technical students, and the other departments provide exceptional opportunities for general culture.

Inspection Visits

The varied industries of Pittsburgh and vicinity offer the best of opportunities for acquainting the student with the practical operation of large plants, and numerous inspection visits are made for this purpose.

Engineers connected with these industries address the student body at different times during the year upon subjects related to the practical problems of their professions.

Technical Societies

The students in the different courses have formed societies which meet regularly for the discussion of topics connected with the different fields of engineering and chemical practice.

Many of the engineering societies of the vicinity holding their meetings in the Schools buildings have extended the privilege of attendance to students of the Schools.

COURSES OFFERED

The courses of instruction in the School of Applied Science are subject to change from time to time. For the coming year courses are offered in preparation for service in any one of the following engineering professions:

Chemical Engineering Practice
- *a* Industrial Chemistry.
- *b* Electrochemistry.

Civil Engineering Practice
- *a* Structural Design.
- *b* Railroad Construction.
- *c* Hydraulic and Sanitary Engineering.

Electrical Engineering Practice
- *a* Alternating and Direct Current Machine Design.
- *b* Methods of Power Transmission and Distribution.
- *c* Electric Railways.

Mechanical Engineering Practice
- *a* Machine Design.
- *b* Design of Prime Movers.
- *c* Design of Furnace and Mill Machinery.

Metallurgical Engineering Practice
- *a* Manufacture of Iron and Steel.
- *b* Metallurgy of Non-ferrous Metals.
- *c* Electrometallurgy.

Mining Engineering Practice
- *a* Location and Operation of Mines and Quarries.
- *b* Smelting and Refining.

OUTLINES OF COURSES

A brief statement of the aim of each course, and a list of the credit units required for graduation therein, is given in the following pages. The numbers in parentheses following the subjects refer to descriptions of the work offered in the different departments of instruction, to be found on pages 45-59 inclusive.

COURSES IN CHEMICAL ENGINEERING PRACTICE

Two courses are offered in this field: INDUSTRIAL CHEMISTRY and ELECTROCHEMISTRY. Both courses provide a thorough grounding in the principles of general chemistry and prepare the student for work in general chemical practice. In addition to the chemical work, sufficient training is given the student in the elements of engineering to enable him to solve the problems involved in carrying out chemical reactions on a manufacturing scale, as well as to conduct to a successful issue laboratory research on such questions as come before the chemist engaged in the industries. The varied manufacturing interests of Pittsburgh make it possible for the student to see in actual operation on a large scale many of the chemical processes studied in the class room, and much importance is attached to the inspection visits which are conducted by the department during the year. The principal studies are the same in both courses, and the options differ only in the specialty chosen.

(*a*) INDUSTRIAL CHEMISTRY—This course is intended to prepare the student to undertake work in what are commonly called the chemical industries.

(*b*) ELECTROCHEMISTRY—This course is arranged with the view of giving the student opportunity to prepare himself for work in those lines of chemical manufacture which depend on the application of the electric current in bringing about certain chemical reactions.

To obtain the recommendation of the Faculty for a diploma in these courses, the student must present credits as follows:

	CREDIT UNITS.
English (1, 2, 3)	8
Economics (4, 5)	6
Law of Contracts (6)	3
Other non-technical subjects and lectures (7)	20
Advanced Algebra (8)	3
Solid Geometry (when not presented for entrance) (9)	2
Trigonometry (10)	5
Analytic Geometry (12)	6
Calculus (13)	9
Freehand Drawing (56)	1
Mechanical Drawing (55)	7
Machine Design (59)	2
General Chemistry (16)	10
Advanced General Chemistry (17)	6
Analytical Chemistry (19,20,21)	25
Organic Chemistry (23)	8
Physical Chemistry (22)	10
Industrial Chemistry (26) or Electrochemistry (24)	19½
Physics (15)	20
Electricity (42)	3
Applications of Electricity (44)	8
Materials of Construction (31)	4
Elementary Mechanics (65)	3
Applied Mechanics (30)	12
Steam Engines and Boilers (74)	4
Mechanical Laboratory (73)	3
Mineralogy (83)	8
Economic Geology (85)	4
Plane Surveying (27)	1½
Shop Practice (94)	5

COURSES IN CIVIL ENGINEERING PRACTICE

While the field covered by Civil Engineering is so broad that no engineer can hope to become proficient in all its branches, still there are certain fundamental principles which form the basis of this science, and in these the student must be thoroughly grounded in order that he may pursue to advantage any line of Civil Engineering practice.

The early part of these courses is therefore devoted to a thorough drill in these principles, the work in the class room being supplemented by practical applications in the field, drawing room and laboratory. In the more advanced work of the courses opportunity is offered for specialization in any one of three lines of practice: RAILROAD ENGINEERING, STRUCTURAL ENGINEERING, or HYDRAULIC and SANITARY ENGINEERING.

Having laid a broad foundation and devoted enough time to his specialty to give him a fairly good idea of the class of problems he is likely to encounter, a graduate from this department should be prepared to enter upon a successful career in his chosen line of work.

To obtain the recommendation of the Faculty for a diploma in these courses, the student must present credits as follows:

	CREDIT UNITS.
English (1, 2, 3)	8
Economics (4, 5)	6
Law of Contracts (6)	3
Other non-technical subjects and lectures (7)	20
Advanced Algebra (8)	3
Solid Geometry (when not presented for entrance) (9)	2
Trigonometry (10)	6
Analytic Geometry (12)	7
Calculus (13)	10
Freehand Drawing (56)	1
Mechanical Drawing (55)	7
Machine Design (61)	3
Descriptive Geometry (57)	3
General Chemistry (16)	10
Geology (84)	7
Railroad and Highway Engineering (32)	13½
Structures (34)	18
Hydraulics (37)	3
Hydraulic and Sanitary Engineering (38)	5
Graphic Statics (35)	1
Masonry (40)	5
Practical Astronomy and Geodesy (29)	4
Physics (15)	16
Electricity (42)	3
Thermodynamics (69) 4 / Railroad Economics (33) 10	or
Hydraulic Motors (79) 3 / Heating and Ventilating (77) 2 / Hydraulic Design (39) 9	or
Advanced Structural Design (36)	14
Electric Power Plants (48)	6
Materials of Construction (31)	7
Elementary Mechanics (65)	3
Applied Mechanics (30)	12
Engines and Boilers (74)	6
Plane Surveying (27)	1½
Topographical Surveying and Drawing (28)	6
Shop Practice (94)	5

COURSES IN ELECTRICAL ENGINEERING PRACTICE

These courses aim to give the student a thorough training in the underlying principles of electrical measurements and of direct and alternating current phenomena, so that he may be able subsequently to develop along any special lines of electrical work according to opportunity and environment. They provide for training in the subjects fundamental to the general practice of the profession and give instruction in the theory of electricity and in the application of the theory to practical problems in various fields, such as power transmission and distribution, electric railroad work and the design of electrical apparatus. The studies of these subjects in the lecture room run parallel with an extended course in the laboratory, where a thoroughly practical application is made of the principles learned.

During the latter part of the courses the work of the student is directed along one of three optional lines of specialization: ALTERNATING AND DIRECT CURRENT MACHINE DESIGN, METHODS OF POWER TRANSMISSION AND DISTRIBUTION, or ELECTRIC RAILWAYS. Opportunities will be offered later for specialization in such fields as Electric Lighting, Telegraphy and Telephony.

To obtain the recommendation of the Faculty for a diploma in these courses the student must present credits as follows:

	CREDIT UNITS.
English (1, 2, 3)	8
Economics (4, 5)	6
Law of Contracts (6)	3
Other non-technical subjects and lectures (7)	20
Advanced Algebra (8)	3
Solid Geometry (when not presented for entrance) (9)	2
Trigonometry (10)	5
Analytic Geometry (12)	7
Calculus (13)	10
Applied Mathematics (14)	6
Freehand Drawing (56)	1
Mechanical Drawing and Descriptive Geometry (55)	7
Machine Design (58, 60)	10
Physics (15)	22
General Chemistry (16)	10
Advanced General Chemistry / Analytical Chemistry (18)	7
Electrochemistry (25)	7½
Electricity (42)	3
Principles of Direct Currents (45)	6
Direct Current Machinery (49)	6
Electrical Measurements (46)	7
Principles of Alternating Currents (52)	2½
Alternating Current Machinery (50) / Electric Power Transmission (51)	4
Alternating Current Electrical Measurements (47)	3
Operation and Testing of Alternating and Direct Current Machinery (53)	10
Electric Wiring (43)	1½
Alternating and Direct Current Machine Design or Power Transmission and Distribution or Electric Railways (54)	20
Elementary Course in Properties of Materials (31)	1
Elementary Mechanics (65)	3
Applied Mechanics (30)	12
Mechanical Laboratory (73)	5
Surveying (27)	1½
Shop Practice (94)	5

COURSES IN MECHANICAL ENGINEERING PRACTICE

These courses aim to give the student a firm foundation in the general theories underlying the field of mechanical engineering and also to provide thorough instruction for each student in the application of these principles to the designing and testing of a special line of machinery. The theoretical instruction by lectures and text books is paralleled as far as possible by practical problems in the drawing room and laboratories, and the student is thereby given practice in the actual work of the profession and at the same time is taught the necessity of a sound knowledge of the principles upon which the empirical rules of practice are based. During the latter part of the courses the work of the student is directed along one of three optional lines of study: MACHINE DESIGN, DESIGN OF PRIME MOVERS, or DESIGN OF FURNACE AND MILL MACHINERY, with the purpose of preparing him for immediate usefulness in one of these fields.

To obtain the recommendation of the Faculty for a diploma in these courses, the student must present credits as follows:

	CREDIT UNITS.
English (1, 2, 3)	8
Economics (4, 5)	6
Law of Contracts (6)	3
Other non-technical subjects and lectures (7)	20
Advanced Algebra (8)	3
Solid Geometry (when not presented for entrance) (9)	2
Trigonometry (10)	5
Analytic Geometry (12)	6
Calculus (13)	10
Freehand Drawing (56)	1
Mechanical Drawing (55)	7
Machine Design (58)	12
General Chemistry (16)	10
Physics (15)	16
Electricity (42)	3
Electric Power Plants (48)	6
Properties of Materials (31)	4
Mechanics of Materials (31)	6
Materials Laboratory (31)	4
Elementary Mechanics (65)	3
Applied Mechanics (66)	13
Measurements (75)	3
Mechanical Laboratory (71, 72)	13
Kinematics (67)	5
Descriptive Geometry (57)	3
Prime Movers (78, 79, 80)	7
Pumping and Compressing Machinery (76)	2
Hoisting and Conveying Machinery (62)	4
Shop Management (64)	3
Machine Design and Theory of Machines (63) or Prime Movers (81) and Thermodynamics (68, 69, 70) or Rolling Mill Design (82) and Metallurgy (93)	27½
Plane Surveying (27)	1½
Shop Practice (94, 95, 96)	8

COURSES IN METALLURGICAL ENGINEERING PRACTICE

These courses are expected to prepare a man to take up intelligently work in a modern metallurgical plant and to acquire a thorough understanding of the principles and details of modern metallurgical practice.

In addition to the technical training in the special field of metallurgical practice, the student is given instruction in such fundamental subjects as Mathematics, Physics, Chemistry and Applied Mechanics, and in such branches of mechanical and electrical engineering as will familiarize him with the methods of generating, transmitting, and applying power. In the latter part of the courses the student takes up a more extended study of some particular branch for the purpose of preparing himself especially for work in a definite field, such as THE MANUFACTURE OF IRON AND STEEL, THE METALLURGY OF NON-FERROUS METALS (copper, lead, zinc, gold, and silver), or ELECTROMETALLURGY.

To obtain the recommendation of the Faculty for a diploma in these courses, the student must present credits as follows:

	CREDIT UNITS.		CREDIT UNITS.
English (1, 2, 3)	8	Physical Chemistry (22)	6
Economics (4, 5)	6	Physics (15)	18
Law of Contracts (6)	3	Electricity (42)	3
Other non-technical subjects and lectures (7)	20	Applications of Electricity (44)	8
Advanced Algebra (8)	3	Materials of Construction (31)	4
Solid Geometry (when not presented for entrance) (9)	2	Elementary Mechanics (65)	3
Trigonometry (10)	5	Applied Mechanics (30)	12
Analytic Geometry (12)	6	Steam Engines and Boilers (74)	4
Calculus (13)	9	Metallurgy (86, 87)	20
Freehand Drawing (56)	1	Electrometallurgy (89)	2
Mechanical Drawing (55)	7	Metallurgical Design (90)	5½
Machine Design (59)	2	Metallurgical Problems (91)	3
General Chemistry (16)	10	Metallography (88)	2
Advanced General Chemistry (17)	6	Conferences (92)	2
Analytical Chemistry (19,20,21)	25	Geology (85)	4
		Mineralogy (83)	8
		Plane Surveying (27)	2½
		Shop Practice (94)	5

COURSES IN MINING ENGINEERING PRACTICE

The development of the courses in Mining Engineering Practice has been delayed by the lack of adequate accommodations and facilities for instruction in this line, due to the fact that the School of Applied Science is temporarily occupying a part of the buildings of the School for Apprentices and Journeymen. On the completion of the new buildings a circular descriptive of the work of this course will be sent on request.

SUBJECTS OF INSTRUCTION

A brief descripton of the instruction offered in different departments is given in the following pages. The work is not divided into courses as scheduled by terms and years, but is so arranged as to enable prospective students to obtain a general conception of the nature and scope of the work offered.

Department of English and Economics

1. Written English. Brief review of the principles of grammar, followed by a study of sentence structure, paragraphing, punctuation, and outline of themes.

2. Oral English. Training in impromptu speaking and debating.

3. Themes. Descriptive or argumentative themes on technical subjects.

4. Economics. Outlines of the industrial history of the United States, with incidental study of taxation, money and banking, and similar practical topics.

5. Economics. The labor situation, including a study of trade union history and activity, of methods of wage payment, and of socialism.

6. The Law of Contracts. The course in The Law of Contracts includes a year's study of the law of contracts, with especial reference to Engineering Contracts. Actual cases in English and American courts are discussed and the leading text books on the subject are consulted for the principles of law. During the last term of the year, the student also begins the actual work of drafting specifications for various kinds of engineering work, and the contracts based upon them.

The idea of the course is to impart a sound, working knowledge of the principles of contract law, and facility in expressing in legal terms the various conditions of written specifications and contracts.

7. Non-Technical Subjects and Lectures. Lectures will be given throughout the course, in which all students must obtain the required credit units. The first group of lectures will be of a general character and will deal with subjects of general educational value. The second group will outline the different engineering fields and will bear directly upon the student's choice of a profession. In the later lectures particular problems and phases of professional practice and the relation of the technically educated man to the community will be discussed. The lectures will be delivered in part by members of the faculty and in part by professional men engaged in actual practice. During the Spring Term a course of lectures on the "Evolution of Man" will be delivered by the Director to the members of the Senior Class.

Other non-technical subjects will later be introduced into the courses of study, of which detailed announcement will be made at an early date.

Department of Mathematics

Much importance is attached to the study of Mathematics, both for the mental training it affords and as a basis for many of the purely technical studies. The instruction is concentrated on the development of original, logical, practical thinking rather than upon the mere acquisition of specific facts. Unnecessary technicalities are avoided in order that the student may realize the practical value of Mathematics in engineering work.

The following courses are given in this department:

8. Algebra. Quadratics, simultaneous quadratics, indeterminates, maxima and minima, graphics, inequalities, variation, proportion, arithmetical and geometrical series, logarithms, interest, annuities and partial fractions.

9. Solid Geometry. Essential propositions in planes, solid angles, solids, and the sphere.

10. Trigonometry. Angle functions, goniometry, right and oblique triangles, solutions and areas, followed by a brief course in Spherical Trigonometry. Additional work in Spherical Trigonometry is given to students in the course in Civil Engineering Practice.

11. Vectors. Their simple combinations.

12. Analytic Geometry. General conics and elementary higher plane curves.

13. Calculus. Essentials of differentiation and integration with especial reference to areas and moments.

14. Applications of the Calculus. A course in applications of the calculus to definite practical problems in electricity.

Department of Physics

15. Physics. The first year's work in Physics is the same for all students. It consists of a general survey of the principal subjects of Physics, but especial attention is given to the mechanics of solids, liquids and gases. At the beginning of the second year, students who have elected special courses take up work in such branches of Physics as will best satisfy their needs in the special field of engineering which they have chosen.

Students in Civil Engineering have additional work in heat and meteorology as well as a thorough course in light, with especial reference to the telescope, the stadia and other surveyor's instruments.

Students in Chemistry receive instruction in heat with special attention to the freezing point of solutions, the use of various forms of pyrometers and fuel calorimeters. They are taught to determine the index of refraction of various substances, the use of polarized light, the saccharimeter, and study the absorption and emission of spectra with many forms of the spectroscope.

Students in Electrical Engineering receive advanced instruction in

heat, light and electricity, including the study of light sources, light production, and methods of wireless communication.

Students in Mechanical Engineering pay especial attention to the study of heat and to temperature measurements. They are also given a thorough course in light.

Students in Metallurgy are given special work with the fuel calorimeter and pyrometer, to which is added a short course in light.

All students receive careful instruction in the lecture and class rooms, which is in every case supplemented by a thorough course of laboratory work in the subjects which are most closely connected with the work that the student will do after leaving the School.

Department of Chemistry

16. GENERAL CHEMISTRY. Recitations, lectures, demonstrations and laboratory work. The course treats of the fundamental laws and conceptions of chemical science; atoms, molecules, chemical symbols and formulae, oxidation and reduction, metals and non-metals, acids, bases, salts, electrolysis, ions; the general study of applications of chemistry in arts and industries, such as the manufacture of iron and steel, ferro-alloys, other economic metals and alloys, glass, explosives, coal tar products, petroleum products, gas, paints, electric-furnace and electrochemical products.

17. ADVANCED GENERAL CHEMISTRY. Lectures, recitations, demonstrations and laboratory work. The course provides for a review of fundamental laws and conceptions of chemistry, and in addition for the study of velocity of reaction, kinetic molecular theory, solution, electrolytic dissociation theory, the periodic system of the elements, chemical equilibrium, the non-metallic elements and their reactions, the alkali and alkaline earth metals with compounds and reactions, and of important negative radicals.

18. SHORT COURSE IN GENERAL AND ANALYTICAL CHEMISTRY. Lectures and laboratory work. This course offers a study of non-metallic and metallic elements, with special reference to electrochemical and electrothermal methods of preparation and purification, elementary organic chemistry, including hydrocarbons, alcohols, animal and vegetable oils, rubber and insulating materials.

Elementary qualitative and quantitative analysis is then taken up, which includes the separation and identification of the common metals and acids, acidimetry, alkalimetry, chlorimetry and similar topics.

19. QUALITATIVE ANALYSIS. Lectures, laboratory work and visits to chemical industries. A study is made of the methods of separation and identification of the economic metals with practice in the qualitative analysis of commercial alloys, ores and pigments, in the identification of acid radicals, and in the methods of identification of common organic compounds, such as alcohols, aldehydes, fats and hydrocarbons.

20. ELEMENTARY QUANTITATIVE ANALYSIS. Lectures and laboratory work. The general technique of quantitative analysis is devel-

oped by practice in analysis of chemically pure salts, preparation of standard solutions of volumetric analysis, application of volumetric analysis to the analysis of bleaching powder, alkalies and acids.

21. Technical Quantitative Analysis. Lectures and laboratory work. Separate courses are given in technical analytical methods adapted to the following options in the courses in Metallurgy and Chemistry: Ferrous Metallurgy, Non-Ferrous Metallurgy, Electrochemistry, Industrial Chemistry. In each course laboratory practice is given in the analysis of the raw materials, intermediate and finished products, especial stress being placed on the study of the rapid methods required in these industries.

22. Physical Chemistry. Lectures and demonstrations. A study of the simple gas laws, specific heats, the periodic law, solubility, fusion and solidification, vaporization and condensation, the kinetic theory of gases, the phase rule, thermochemical change, the determination of molecular weights, relation of physical properties to composition and constitution, theory of solution, electrolytic dissociation theory, rate of chemical transformation, chemical equilibrium, hydrolysis.

23. Organic Chemistry. Recitations and laboratory work. The course begins with an historical sketch of the development of organic chemistry, and then takes up the study of the nature of carbon, homology, isomerism, stereochemical isomerism, rational formulæ, nomenclature, classification of organic compounds; the alcohols, aldehydes, litmus, acids, esters, ethers, carbohydrates, and amines of the methane series; the aromatic hydrocarbons and derivatives, phenols, acids, diazo and azo compounds, synthetic dye stuffs, the pyridine derivatives, alkaloids and related substances, terpenes and camphors.

24. Electrochemistry. Lectures, recitations, demonstrations and laboratory work. A study of modern theories of electrolytic dissociation, electrolysis of substances in solution, electrolysis of fused compounds, osmotic theory of galvanic cells, reduction cells, oxidation cells, concentration cells, solution pressure and electromotive force, polarization, accumulators.

Applications of electrochemical and electrothermal principles in chemical manufacturing and other industries; manufacture of alkalies and chlorine, chlorates, hypochlorites, the manufacture of pigments by electrolysis electroplating, the electric furnace industries, phosphorous manufacture, carbon bisulphide manufacture, electrolytic oxidation and reduction applied to organic synthesis, electrolytic methods of water purification.

25. Short Course in Electrochemistry. Recitations, lectures and laboratory work. This course treats of the modern theories of solution and electrolytic dissociation applied to primary and secondary batteries, concentration cells, electrometers, electrolytic processes of metal refining, electrolytic processes for manufacture of alkalies and chlorine, hypochlorites and chlorites, pigments, electroplating, and electrolytic methods of water purification.

26. Industrial Chemistry. Recitations, lectures and visits to manu-

facturing plants. This course covers the following subjects: Materials used in the construction of apparatus for manufacture of chemicals; principal types of apparatus and machines; study of methods of purification of chemicals and chemical products on a large scale; the manufacture of common acids, alkalies and salts; glass manufacture; the clay industries; the fermentation industries; starch, glucose and sugar; coal tar products and synthetic dye stuffs; animal and vegetable oils; petroleum products; paints and pigments; varnish manufacture, the rubber industry, the cellulose industries, etc.

Department of Civil Engineering

27. SURVEYING. This course, consisting of lectures, field work and drawing, is given to all members of the Plebe Class during the Spring term. It is intended to teach the applications of Trigonometry to the simpler surveying problems, and to familiarize the student with the more common surveying instruments. This work is continued in the second year by those who elect Civil Engineering. Electrical Engineering students who choose the optional work in Power Transmission and Distribution, or Electric Railways, receive in the third year some additional work in Surveying to enable them to co-operate intelligently with Civil Engineers in preparing preliminary reports.

28. TOPOGRAPHICAL SURVEYING. As soon as the Civil Engineering students have become familiar with the use of the more common instruments and with general surveying methods, an actual topographical survey is made. The transit and stadia, plane table, and various smaller instruments are used for this purpose. A topographical map is then made from the field notes and many problems involving the preparation and use of contour maps are worked out in the drawing room.

29. PRACTICAL ASTRONOMY AND GEODESY. This course covers a discussion of the figure of the earth, methods of conducting a geodetic survey, including the measurement of base lines, triangulation, precise leveling, and methods of making observations for the determination of azimuth, latitude, longitude and time.

30. APPLIED MECHANICS. As this science forms the foundation of a large proportion of the work of the engineering courses it is especially important that the student obtain a thorough working knowledge of the subject. For this purpose the work is so arranged that each student is required to solve a great number of practical problems involving the application of the fundamental principles which are taught by means of lectures and recitations. The following subjects are given in this course:

Statics—Composition and resolution of forces; center of gravity; laws of friction; virtual velocities; simple machines; the funicular polygon.

Kinetics—Rectilinear and curvilinear motions; effect of variable forces; constrained motion; work and energy; moment of inertia; rotary motion.

Mechanics of Materials—Stress in pipes, hoops, cylinders, spheres, and riveted joints; simple overhanging, fixed, and continuous beams, both

of uniform section and uniform strength; columns; shafts; combined stresses; compound structures; resilience; impact and fatigue; thick cylinders; rollers, spheres and plates; mechanics of granular materials; crooked beams; springs.

31. Materials of Construction. The work in this subject includes both class room exercises and experiments in the laboratory. The class room work deals with the manufacture, general properties, and use of iron, steel and some of the minor metals, lime, cement, mortar and concrete, brick, stone and timber. In the laboratory actual tests are conducted for the determination of physical properties of the various materials and their behavior when they are subjected to stresses of various kinds. Especial emphasis is laid upon tests made upon full-sized pieces under the conditions found in practice.

The work of the students in the different courses is so arranged as to give each the training which is considered of greatest value for the subsequent work of his course. The instruction given the students in courses in Chemistry and Metallurgy is of a somewhat general character, while that given the students in Civil and Mechanical Engineering is more extended and relates closely to their special fields of work.

32. Railroad and Highway Engineering. The course in Railroad Engineering is given by lectures and recitations in the class room and practice in the field and drawing room. The work in the class room covers a thorough course in the theory of curves and the various methods of computing earthwork, with lectures on construction and maintenance. Many practical problems are solved in the field and a complete survey is made, including reconnaissance, preliminary and actual location of a short railroad line. In the drawing room the necessary maps and profiles of the location survey are prepared, and various other drawings are made, such as earthwork diagrams, mass diagrams and switch layouts.

The course in Highway Engineering covers the location, construction and maintenance of roads and the construction and maintenance of street pavements.

33. Railroad Economics. This course takes up the economics of railroad location as affected by curvature, grade, and other special conditions. Some attention is also given to the organization of the forces and to the method of keeping railroad accounts.

34. Structures. This course treats first of those fundamental principles by means of which the stress in any given truss can be computed when the external loads are known.

Next, simple frame structures, such as roof and bridge trusses, viaducts and cranes are studied; and the probable loads, their position to give maximum stress in each member, the value of these stresses, and the distortion caused by them are made the basis of numerous examples.

Finally, indeterminate bridges are studied. Turntables, drawbridges and other continuous structures, cantilever and suspension bridges, arches with or without hinges, are investigated in a manner similar to that employed for simple trusses.

35. GRAPHIC STATICS. This course deals with the stresses in simple framed structures and differs from the course in Structures only in the substitution of the drawing board as a means of determining stresses and changes of shape.

36. STRUCTURAL DESIGN. Under this head are taken up for class room discussion the methods of making beams, columns, and ties from the raw structural materials, wood, wrought iron, steel, cast iron, and cast steel. Considerable attention is devoted to shop processes. Next is considered the combination of these elements to form buildings, bridges, viaducts, cranes, etc., attention being confined to simple structures. In the drawing room for different examples of these types strain sheets and details are made which illustrate the more important principles of structural work.

Students choosing the structural option also take up in the class room the design of turntables, drawbridges, and other continuous structures; of cantilever and suspension bridges; of arches with or without hinges. This work is further exemplified by preparation of estimates, strain sheets and details in the drawing room.

37. THEORETICAL HYDRAULICS. The instruction in this subject is given by class room exercises and by experiments conducted in the field and laboratory. It covers briefly a study of the fundamental laws of hydrostatics, flow of water through orifices, nozzles, short tubes and pipes, through conduits and open channels and over weirs.

38. HYDRAULIC AND SANITARY ENGINEERING. This course follows that in Theoretical Hydraulics and deals with the practical application of the principles there taught to various lines of engineering work. It embraces the following subjects:

Water Supply—Including a determination of the quantity required, source of supply and quantity available, purification, storage and method of distribution.

Sewerage—Including the disposal of household waste for isolated buildings, complete sewerage systems for cities and methods of sewage disposal.

Water Power—Including the determination of the quantity of water available, and the construction of dams, canals, etc., for its utilization.

Irrigation—Including the various methods of impounding the water and applying it to the soil.

39. HYDRAULIC DESIGN. This is a continuation of the preceding course for those students who choose the Hydraulic and Sanitary option. Special attention is given to the study of actual construction and to the preparation of plans and estimates for dams, water supply and sewerage systems, etc.

40. MASONRY. This course covers a description of the various classes of masonry and their use in the construction of arches, dams, foundations, bridge abutments and piers, retaining walls and culverts.

The use of reinforced concrete is given special prominence in this course. In addition to the class room work a considerable amount of time is devoted to the designing and preparation of plans for various structures of masonry.

41. Inspection Trips. The location of the Schools in the center of a great industrial field affords students in the engineering courses exceptional opportunities for studying engineering operations which are being carried out on a large scale. Through the courtesy of the officials in charge of these enterprises, frequent inspection trips are made to furnaces, terminals, the filtration plant, cement plants, mines, manufacturing plants, and other points of interest within easy access of the Schools.

Department of Electrical Engineering

42. Electricity. The aim of this course is to give the student a thorough training in fundamental principles and, at the same time, place him in a position to decide intelligently whether or not he should specialize in Electricity.

43. Electric Wiring. A short course intended to teach the fundamental requirements in the wiring of buildings and give the student a knowledge of underwriter's rules.

44. Application of Electricity. The metallurgist and the chemist frequently employ electricity as an agent in various processes. This course of lectures with the accompanying laboratory work is intended to furnish the student with a practical knowledge concerning electrical machines and their distributing circuits.

45. Principles of Direct Currents. The elementary principles and laws given during the first year are reviewed and studied more in detail. The study of electromagnetic quantities is taken up; the student is then taught the application of the foregoing elements to measuring instruments of all kinds, storage batteries, incandescent and arc lamps, systems of low potential power, distribution, etc.

46. Electrical Measurements. This laboratory course runs parallel with the lecture course, "Principles of Direct Currents," and is an application of this course to measurements of electrical and magnetic quantities, special stress being laid upon methods applicable to commercial tests. The course also includes a series of selected experiments in precision measurements and standardization.

47. Alternating Current Electrical Measurements. In this laboratory course, the student is called upon to deal with those cases of measurement in which the fact that the current is alternating and not direct introduces new principles, new quantities, and new methods.

48. Electric Power Plants. This course is intended to acquaint students in Civil and Mechanical Engineering with the main facts concerning electrical machinery, special reference being made to power house installation and equipment, line construction and railways and such other details as are likely to come within the scope of their profession.

49. Direct Current Machinery. Starting with Faraday's laws of magnetic induction, the evolution of the forms of machines used in practice is shown and their characteristics and construction are demonstrated in such a way that the student can handle, repair and adjust them, and can

draw up a specification covering machines that shall be suitable for a given duty.

50. ALTERNATING CURRENT MACHINERY. The same may be said of this course as of that in direct current machinery, and in addition instruction will be given with a view to enabling the student to decide in what cases it is advantageous to use alternating current in place of direct current and what particular type of machine will be best suited to the duty in hand, whether the duty be grinding, rolling, hauling, machine tool driving, or traction.

51. TRANSMISSION OF POWER. The cost of electric power transmission and the means of controlling this cost are explained with the aim of enabling the student to specify in any given case, the most efficient system of current voltage, size of conductor, etc. Then follows a study of power line construction, the insulation of lines and the strain in them, the wiring of towns, the laying of conduits and the erection and maintenance of trolley systems.

52. PRINCIPLES OF ALTERNATING CURRENTS. The phenomena peculiar to alternating current circuits are taken up first in single-phase, then in polyphase systems. This is followed by the study of the principles of the transformer, the alternator, and the various alternating current motors.

53. OPERATION AND TESTING. The student is prepared to take a shift in a power station; to superintend the operation of electrical machinery installed in factories, and to make tests as to the performance of the machines to determine whether they come up to their guarantee and whether they are suitable for the duties required of them.

54. OPTIONS. During the latter part of the course the student is offered opportunity to specialize in a particular branch of electrical engineering practice. The options at present offered are: DESIGN OF ALTERNATING AND DIRECT CURRENT MACHINERY, METHODS OF ELECTRIC POWER TRANSMISSION AND DISTRIBUTION, AND ELECTRIC RAILWAYS. The work in the laboratory will be concentrated upon the particular line of study chosen, and frequent visits to the different electrical industries in the vicinity will be made for the purpose of studying the methods of actual practice.

Department of Machine Design

55. MECHANICAL DRAWING. In this course mechanical drawing is first treated as a language for the writing of illustrated specifications. This part of the course covers the mechanical drawing as a commercial quantity and as a means of transmitting exact manufacturing information. Then follows a series of problems in third-angle projection, intersections and developments, isometric and perspective projection. Finally, complete sets of working designs and tracings are made from machines taken apart, sketched and measured up by the student.

56. FREEHAND DRAWING. This is not a course in art work, but is intended to cultivate such facility with the pencil and such eye for proportion as will enable the student to make a neat, readable freehand sketch of a detail of mechanical construction.

57. Descriptive Geometry. This is essentially an advanced course in third-angle projection, consisting of lectures followed by problem work. Its purpose is distinctly two-fold: First, to develop imagination in connection with the shapes and relative positions of objects in space. Second, to enable the draftsman to solve problems as they arise in practice, where simple projection either fails or is cumbersome.

58. Elements of Machine Design. This course has in view two definite objects:

First, to familiarize the student with the most important and the most frequently used details and elements of machine construction. Lectures followed by problems and work at the board cover the following ground: All kinds of fasteners and fastening devices, as rivets and riveted joints; bolts and screws, keys and pins, shrink-, pressure-, and clamp-fastenings; bearings in general, plain, roller and ball; means of transmitting motion and power, especially toothed-gearing, belt, rope and chain drives, and cams; also such mechanisms and mechanical devices as are most commonly used in the design of hoisting machinery, machine tools and automatic machines.

Second, to develop the quality of mind upon which the practical success of a designer depends. Throughout the course the student is given frequent opportunities to do original work, in which he must independently size up a situation, discover governing conditions, state the problem, and find a practical solution. In connection with work of this kind the student has access to handbooks and especially posted data and illustrations bearing upon the problem in a general way.

59. Machine Design. This course is intended to give students in the courses in Chemical and Metallurgical Practice a practical understanding of the principal elements of machine design, especially all forms of fasteners and fastening devices, bearings and means of transmitting motion and power, and an acquaintance with the line of machines used in the metallurgical and chemical industries.

60. Machine Design. This course deals with the design of electrical machines and apparatus. It is so arranged that the work done in the electrical laboratory and class room either prepares for or supplements that done at the board.

Students make all necessary calculations for direct current generators and for alternators, and make complete designs with details for an engine type machine of each class.

61. Transmission, and Hoisting and Conveying Machinery. This is a course of lectures with occasional problem work. It is intended to familiarize students in Civil Engineering Practice with some of the more important elements of those machines that consist largely of structural work. The problems deal particularly with means of transmitting motion and power. The lectures, illustrated with lantern slides, take the student through the development of the most common forms of hoisting and conveying machinery, having in mind the various applications of structural work in machinery design.

62. HOISTING AND CONVEYING MACHINERY. Lectures. The main purpose of the course is to give the student a general acquaintance with hoisting and conveying machinery, machine tools and automatic machines. The lectures are profusely illustrated with lantern slides; the development of each type of machine is briefly sketched, and the essential features, covering uses, efficiency, cost and the comparative merits of different types are briefly discussed.

63. MACHINE DESIGN OPTION. This course is intended to prepare for general machine design work, and is for those students who do not wish to specialize in either Design of Prime Movers or Furnace and Mill Machinery. The general lectures of the preceding course on hoisting and conveying machinery, machine tools and automatic machines are planned as an introduction to this option.

As in the work in elements of machine design, the problems are so given as to call for the exercise of originality and ingenuity, each student being expected to attack a problem independently and to find a practical solution.

64. SHOP MANAGEMENT. The purpose of this course is to acquaint the student with modern methods of shop management and to show the value of system and how to prevent system from deteriorating into "red tape."

The lectures given are followed by discussions. The ground covered may be briefly summed up as follows: The routine of business from the receipt of a customer's order to the shipping of manufactured machine; shop equipment; drafting room equipment; time and cost keeping; distribution of plant charges; depreciation; principles involved in the designing of printed forms; premium and piece work plans of payment; the keeping of records; the laying out of shops; the design of a model plant.

Department of Mechanical Engineering

65. ELEMENTARY MECHANICS.. This course forms a careful study of the principles of mechanics. Force, mass, velocity, acceleration, their dimensions and units; work and energy, momentum and impulse are explained.

The principles of superposition of actions and the principles of virtual velocities are studied. As a preparation for later work moments of force and moments of inertia are considered; also the resistance of beams and shafts, solid and rolling friction and direct impact.

66. APPLIED MECHANICS. The course is a continuation of the work begun in elementary mechanics, but applications and more difficult problems are studied, particularly roof trusses, equilibrium polygons, graphic statics, and centroids. The dynamics of rotation, vibration and critical speeds, and the gyroscope are also taken up.

In kinematics the subjects are reviewed and in addition the dynamics of rotation, vibration and critical speeds, and the gyroscope are taken up.

The latter part of the course is devoted to hydrostatics and hy-

draulics, with particular reference to their applications in hydraulic machinery (turbines, pumps, and elevators).

67. Kinematics. The relations of position, velocity and acceleration in the moving parts of machinery are studied. The course takes up the general theory of mechanism, centrodes, cams, and gears; the theory of spherical motion (universal joint) and of helical motion (skew gearing).

68. Thermodynamics. The thermodynamics of permanent gases and of gas engine cycles.

69. Thermodynamics. The thermodynamics of steam and of steam engines.

70. Thermodynamics. The thermodynamics of steam turbines in their relation to steam turbine design.

71. Mechanical Laboratory. In this course experiments and tests are made illustrating principles of mechanics, machine elements, and measurements.

72. Mechanical Laboratory. This course consists of the study of complete machines along the line chosen by each group of students. Machines are investigated with regard to efficiency and durability, and the principles underlying each machine and the design are studied. The experiments are so selected that the majority of the theories studied in the class room are reviewed and illustrated.

73. Mechanical Laboratory. This course consists of a number of experiments selected with the object of familiarizing students in the courses in Chemical and Electrical Engineering practice with the generation of power by engines and turbines and with boilers and condensers. Opportunity is also offered to study the mechanical part of electrical machinery, particularly high speed bearings, belts and gears.

74. Steam Engines and Boilers. This is a descriptive course of the theory, construction and operation of engines and boilers from the standpoint of the user. In connection with this course measurement of power required or absorbed, of pressure, of temperature is taken up.

75. Measurements. This course treats of the technical measuring, recording and calculating instruments and methods used in mechanical engineering and shop practice for measuring time, length, force, velocity, areas, volumes, power, pressure, temperature, heat, and moisture.

76. Pumping and Compressing Machinery. This course is a descriptive study of theory, design and construction of reciprocating pumps, compressors, and blowing engines.

77. Heating and Ventilating Engineering. This course takes up the methods of heating and ventilating and their hygienic value; air filtration; the mechanical apparatus for producing ventilation. It treats of the various methods of heating by fireplaces, hot air, steam and water; the heat losses of buildings and heating by exhaust steam in connection with power plants.

78. Prime Movers. This is a descriptive course and treats of steam engines, boilers, steam turbines and accessories of steam power plants. It considers the steam engine as a machine and as a heat engine.

79. PRIME MOVERS. This course deals with hydraulic motors and turbo-pumps. It takes up the theory, design and construction of water wheels, turbines, turbo-pumps, governors, and accessories of hydraulic power plants.

80. PRIME MOVERS. This course deals with gas, gasoline, and oil engines, and gas producers.

81. PRIME MOVER DESIGN. (*a*) Lectures. The methods of designing the parts of engines, boilers, turbines, and pumps with regard to strength, rigidity, wear, efficiency, and cheapness of production. (*b*) The design and analysis of complete machines, such as engines, turbines, boilers, pumps. Students are given detail drawings of high-class machines as illustrations of modern practice.

82. ROLLING MILLS. (*a*) Lectures and Recitations. In the early part of the course rolling mill accessories are studied, such as tables, saws, shears, etc. Later the various types of mills proper are analyzed with regard to design. Finally, the layout of entire mills, including facilities for production and for handling of raw and finished materials is studied. The course is supplemented by frequent visits to the numerous mills of the Pittsburgh district. (*b*) Drawing Room. A number of typical accessories and mills are completely designed by the students. Their own work is supplemented by the study of modern types of existing mills.

Department of Metallurgy

83. MINERALOGY. The course consists of lectures on elements of crystallography, mineralogy and rock classification, with laboratory work in determinative mineralogy.

84. GEOLOGY. A course consisting of lectures on dynamical and structural geology, elementary crystallography, and classification of rocks; and laboratory work in the determination of common minerals, with study of minerals and rock specimens in collections belonging to the department and to the Carnegie Institute. The aim is to familiarize the students with different classes of rocks, their origin, characteristics and modes of occurrence.

85. ECONOMIC GEOLOGY. This course presents such general considerations as are of importance in connection with economic deposits, particular attention being paid to a discussion of the origin, methods of occurrence and uses of the principal deposits in this country.

86. METALLURGY. A course of lectures dealing first with the properties of metals, general principles of metallurgy, fuels, fumes, slags, types of furnaces and processes; and later taking up in detail the current methods for iron and steel, gold, silver, copper, lead, zinc, aluminum and ore dressing.

87. METALLURGICAL LABORATORY. The course in metallurgical laboratory consists of experimental work in pyrometry, calorimetry, heat treatment of steel, roasting of ores, and extraction of metals. The course is designed to give a broad understanding of the principles underlying metallurgical processes and to give the student training in experimental and research work.

88. Metallography. The course in metallography consists of lectures and laboratory work on iron and steel and other alloys. Special attention is paid to correlating the structure, heat treatment, and resulting physical properties of metals and alloys.

89. Electrometallurgy. A brief course of lectures on the general principles of electrometallurgy, and its present day applications to iron, steel, copper, lead, zinc and aluminum; also, experimental work in electrolysis and with electric furnaces.

90. Metallurgical Design. Each student is given a problem in the general and detailed design of some kind of metallurgical plant, with estimates of approximate cost of installation and operation under specified conditions.

91. Metallurgical Problems. A course in metallurgical calculations, embodying the applications of the principles of thermochemistry and thermophysics to metallurgical operations and equipment.

92. Conferences. One hour each week devoted to discussion of questions arising in laboratory or design work, and to consideration of current technical literature.

93. Furnace Design. A course in the design of iron and steel furnaces, consisting in part of lectures on the principles of iron and steel making as bearing on furnace design, and in part of actual work in the general and detailed design of some particular furnace.

Shop Practice

94. General Courses. All students are required to complete courses of instruction in the Machine, Pattern, Forging and Smith Shops, and in the Foundry. The object of this work is to familiarize the student with shop practice by providing systematic training in operations fundamental to the different trades and in the functions and practical manipulation of various tools, machines and other appliances.

The instruction is given by means of a series of carefully selected exercises of gradually increasing difficulty, each new problem or operation being described and discussed before the actual work is begun. Training is given in the care, sharpening and adjusting of tools; and upon the proper cutting angles, speeds, and feeds for the various materials worked. Special attention is given to the principal properties and characteristics of materials used, the sources from which they are obtained, and the reason for their selection for certain purposes.

95. Pattern Making. The student is given a number of patterns to make, each of which is especially designed to illustrate certain distinct requirements. Each exercise is preceded by a lecture and demonstration of the subject under consideration.

The course provides instruction upon the arrangement and management of the shop, and the relation of the work to other industrial processes.

96. Machine Shop. The course in machine shop practice provides instruction in construction and operation of tool grinders, drilling machines, boring machines, lathes, planers, shapers, milling machines, and

other machine tools used in modern machine shop practice, and is supplemented by lectures on and demonstrations of the theory of measuring instruments, methods of preparation and of placing work in machines, character and position of tools, cutting speeds and feeds, and general matters connected with the management of a Machine Shop.

REQUIREMENTS FOR ADMISSION

An applicant for admission to the Day School of Applied Science should bear in mind that the broader his intellectual training in any direction and the more extensive his experience the greater will be the benefits derived from a technical course. The most advantageous age for entrance depends on the student's academic preparation, his maturity, both physical and mental, and on his natural aptitude for the line of study pursued. The average age at entrance of students who have made satisfactory progress is about eighteen years, and this may properly be taken as a guide. No student will be admitted to the School who is not at least sixteen years of age.

In order that the School may be assured that the candidate has satisfactorily covered the subjects upon which the courses are built and has sufficient mental and physical maturity to enable him to grasp the instruction offered, all candidates are required to submit to the following tests:

1. A personal interview to disclose natural aptitude for an engineering profession, and the personality of the applicant.

2. A certificate or other evidence of the completion of a high or preparatory school course of approved type, or its equivalent in practical training and experience.

3. An examination in subjects fundamental to the course to be taken.

The requirements in each of these tests are given in detail in the following paragraphs:

1. *Personal Interview*—All candidates should present themselves for personal interview, at which they are rated as approved or not approved. Approved candidates who fail to pass the necessary entrance examinations may be allowed admission for a limited period under conditions. These conditions must be removed during the first year of attendance and no student having an unremoved entrance condition at the beginning of his second year of residence is allowed to enter his classes until such condition is removed.

A student not approved in the personal interview will not be granted admission unless he shall satisfactorily meet the requirements of all the other entrance tests.

Students examined at a distance from Pittsburgh who present satisfactory certificates, but who are not able to present themselves for a personal interview, are required to maintain credit rank in scholarship during the first term.

2. *Certificates*—Candidates are required to present certificates from

high or preparatory schools, as evidence of the completion of a course of study of approved type.

In the absence of such certificate, a candidate must give evidence of experience in practical work of a technical nature, and present a statement from his employer certifying to his character and general ability. The applicant must also convince the entrance examination committee that he has had sufficient preparation to enable him to carry the work of the course for which he is a candidate. No candidate asking admission in this way will be eligible unless he is at least nineteen years of age.

3. *Entrance Examinations*—Candidates are required to pass satisfactory examinations in four of the following subjects:

1. Algebra through Quadratics.
2. Plane Geometry.
3. Solid Geometry.
4. English (Spelling, Grammar and Composition)
5. High School Physics or High School Chemistry.

Entrance Examinations will be held at the Schools buildings in June and September of each year. Examinations may be divided between these two periods at the option of the student.

High schools and other preparatory schools of approved standing may make arrangements for holding entrance examinations in their own localities for applicants who live at a considerable distance from Pittsburgh. Applications for such examinations must be received by the Registrar or the Secretary of the Schools prior to June or September. Papers containing the results of such examinations must be delivered at the office of the Schools, under sealed cover, not later than June 20 or September 16. Failure to comply with these conditions will make the examinations void.

A fee of two dollars will be charged for admission to entrance examinations in Pittsburgh, which will be credited towards the tuition fee for the first year of students who enter the Schools. A candidate who is rejected will be required to pay a second fee if he repeats the examinations, and his original fee will not be credited to him if he is ultimately admitted. A candidate dividing his examination will be required to pay one fee only. Fees must be paid the cashier before examinations are taken.

ADVANCED STANDING

Applicants for advanced standing who have completed at least one year's work in an approved college or technical school, and who present explicit and official certificates describing their course of study and scholarship and testifying to their good character, are admitted to advanced standing without examination, except such as may be necessary to determine their credits in the course they wish to enter.

Applicants for advanced standing in any course who have not completed a year's college work in an approved college must pass satisfactory entrance examinations as well as examination in all the subjects which have been pursued by the class for which they are candidates.

TUITION FEE

For residents of the City of Pittsburgh.....$20.00 per year
For all others..... 30.00 per year

The tuition fee must be paid in advance.

A deposit of $5.00 must be made by each student at the beginning of the school year to cover locker rental, breakage and incidental fees. The unused portion will be returned on application at the end of the year.

Every student should provide himself with a set of drawing instruments. These instruments, as well as all necessary text books and other supplies, can be obtained at the Schools at cost.

SPECIAL FEES

In addition to the deposit mentioned above a breakage deposit of $5.00 will be required of all students who elect the courses in Chemical, Metallurgical, or Electrical Engineering Practice. The unused portion of this fee will be returned at the end of the year.

The following laboratory charges will be made for students who have completed the preliminary work common to all courses and who are registered in technical courses:

Students registered in the courses in Electrical, Civil, and Mechanical Engineerng Practice, $3.00 per year.

Students registered in the courses in Chemical and Metallurgical Practice, $10.00 per year.

ATHLETIC FIELD DUES

Payable upon registration as per statement on page 19.

DORMITORIES

Applicants for admission to the dormitories in connection with the Schools are referred to the Secretary of the Schools, who will supply the necessary information. To those not wishing to enter these dormitories, a list of approved boarding and lodging houses in the immediate neighborhood of the Schools will be supplied on request.

School of Applied Science

NIGHT SCHOOL

The School of Applied Science offers night courses to students who cannot attend the Day School and who have been properly prepared to pass entrance requirements equal to those demanded of the day students. These courses will particularly appeal to men of more mature years than those attending the Day School, who may have had a considerable amount of practical experience, but feel the need of further instruction in the technical subjects related to their work. Applicants for admission to these night courses must give evidence of a natural aptitude for technical and scientific studies.

The courses of study offered in the Night School are identical with those given in the Day School, and the same number of credit units are required for a diploma in a given course. The greater maturity of the night student enables him, however, to obtain the credits in a given subject in a smaller number of lesson hours, and full credit will be given him for practical experience in any line included in the course of study.

The courses in this school require attendance upon from three to five nights in the week, depending upon the schedule arranged for the different classes. Owing to the limited number of lesson periods available, the completion of a course of study requires a longer period of attendance than in the Day School. While no time limit in years is specified, it may be stated that the minimum time in which a student may hope to obtain the required credit units in the Night School is five years.

Arrangements will be made for the opening of shops and laboratories at such times as will not conflict with the day schedule to enable the candidate for a diploma in the Night School to obtain the necessary credits in these departments.

COURSES OFFERED

The courses of instruction in the Night School of Applied Science are subject to change from time to time. For the coming year courses are offered in preparation for service in any one of the following engineering professions:

CHEMICAL ENGINEERING PRACTICE

a Industrial Chemistry.
b Electrochemistry.

METALLURGICAL ENGINEERING PRACTICE

a Manufacture of Iron and Steel.
b Metallurgy of Non-Ferrous Metals.
c Electrometallurgy.

CIVIL ENGINEERING PRACTICE

a Structural Design.
b Railroad Construction.
c Hydraulic and Sanitary Engineering.

ELECTRICAL ENGINEERING PRACTICE

a Alternating and Direct Current Machine Design.
b Methods of Power Transmission and Distribution.
c Electric Railways.

MECHANICAL ENGINEERING PRACTICE

a Machine Design.
b Design of Prime Movers.
c Design of Furnace and Mill Machinery.

MINING ENGINEERING PRACTICE

a Location and Operation of Mines and Quarries.
b Smelting and Refining.

OUTLINES OF COURSES

For a brief description of the aim of each course, and a list of the credit units required for graduation therein, see pages 39-44 inclusive.

REQUIREMENTS FOR ADMISSION

Applicants for admission to the Night School of Applied Science must be at least eighteen years of age and have a natural aptitude for a technical or scientific career.

In order that the School may be assured that the candidate has satisfactorily covered the subjects upon which the courses are built and has sufficient mental and physical maturity to enable him to grasp the instruction offered, all candidates are required to submit to tests which may be described in general as follows:

1. A personal interview to disclose natural aptitude for an engineering profession, and the personality of the applicant.
2. A certificate or other evidence of the completion of a higher or preparatory school course of approved type, or its equivalent in practical training and experience.
3. An examination in subjects fundamental to the course to be taken.

The requirements in each of these tests are given in detail in the following paragraphs:

1. *Personal Interview*—All candidates should present themselves for personal interview, at which they are rated as approved or not approved. Approved candidates who fail to pass the necessary entrance examinations may be allowed admission for a limited period under conditions. These conditions must be removed during the first year of attendance and no student having an unremoved entrance condition at the beginning of his second year of residence is allowed to enter his classes until such condition is removed.

A student not approved in the personal interview will not be granted admission unless he shall satisfactorily meet the requirements of the other entrance tests.

2. *Certificates*—Candidates are required to present certificates from high or preparatory schools, as evidence of the completion of a course of study of approved type.

In the absence of such certificate, a candidate must give evidence of experience in practical work of a technical character, and present a statement from his employer certifying to his character and general ability. The applicant must also convince the entrance examination committee that he has had sufficient preparation to enable him to carry the work of the course for which he is a candidate. No candidate asking admission in this way will be eligible unless he is at least nineteen years of age.

3. *Entrance Examinations*—Candidates are required to pass satisfactory examinations in four of the following subjects:

1. Algebra through Quadratics.
2. Plane Geometry.
3. Solid Geometry.
4. English (Spelling, Grammar and Composition).
5. High School Physics or High School Chemistry.

Entrance Examinations will be held at the Schools buildings in June and September of each year. Examinations may be divided between these two periods at the option of the student.

A fee of one dollar will be charged for admission to entrance examinations, which will be credited towards the tuition fee for the first year of students who enter the Schools. A candidate who is rejected will be required to pay a second fee if he repeats the examinations, and his original fee will not be credited to him if he is ultimately admitted. A candidate dividing his examinations will be required to pay one fee only. Fees must be paid the cashier before examinations are taken.

TUITION FEE

For residents of the City of Pittsburgh.....$5.00 per year
For all others..... 7.00 per year

The tuition fee must be paid in advance.

A deposit of $3.00 must be made by each student at the beginning of the school year to cover locker rental, breakage, and incidental fees. The unused portion will be returned on application at the end of the year.

SPECIAL FEES

A deposit of $5.00 to cover breakage will be required of all students who elect the courses in Chemical, Metallurgical, or Electrical Engineering Practice. The unused portion of this fee will be returned at the end of the year.

The following laboratory charges will be made for students who have completed the preliminary work common to all courses and are registered in technical courses:

Students registered in the courses in Electrical, Civil, and Mechanical Engineering Practice, $1.50 per year.

Students registered in the courses in Chemical and Metallurgical Practice, $5.00 per year.

ATHLETIC FIELD DUES

Payable upon registration as per statement on page 19.

PREPARATORY NIGHT COURSES

Students with practical experience, but limited school preparation, who are at least eighteen years of age and who desire to complete a course in the School of Applied Science, are offered courses of instruction which will assist them in preparing for the regular entrance examinations.

No students will be admitted to these courses without a personal interview, and the number that can be accommodated is limited. Members of this class are not enrolled as regular students, but they will receive preference over other applicants for admission to the regular courses, conditional on their obtaining the required number of points on the entrance examinations. This, in some instances, may require more than a single year, and the School does not guarantee to prepare students for admission to the School of Applied Science in any particular time.

Interviews for admission to these preparatory night courses will be held on September 28th and 29th, at 7:00 P.M.

During the coming year two separate preparatory courses will be maintained.

TWO-NIGHT COURSE

The first course will require attendance on two nights of the week, as in preceding years, and will provide instruction as follows:

Tuesday Night (7:30-10:30)	Thursday Night (7:30-10:30)
Mathematics.	Mathematics.
English.	English.
Chemistry.	Physics.

Credit toward admission to the regular night classes of the School of Applied Science will be allowed for all work satisfactorily completed in this class as far as it covers requirements, but owing to the limited time available no assurance can be given that the student will be ready for regular work in one year.

FOUR-NIGHT COURSE

The second course will require attendance on four nights of each week and will offer instruction as follows:

Monday and Friday Nights (7:30-9:30)	Tuesday and Thursday Nights (7:30-9:30)
Algebra Recitation.	Geometry.
Algebra Practice.	English.

Students completing requirements in the subjects of this course will be admitted to the first year night class without entrance examinations.

TUITION FEE

For residents of the City of Pittsburgh.....$5.00 per year
For all others..... 7.00 per year

The entire tuition fee for the year must be paid in advance.

List of Students
1907-1908
Day Students
Senior Class

Applegate, Norman C.	Civil.	Pittsburgh.	303 S. Dithridge St.
Axtell, John H.	Elec.	Homestead.	34 Dithridge St., Pgh.
Boyd, David F.	Mech.	Pittsburgh.	5487 Hays St.
Burnside, Gordon A.	Elec.	Pittsburgh.	183 Belonda St.
Campbell, Thomas F.	Elec.	Pittsburgh.	615 Hale St.
Colmery, Charles A.	Elec.	Braddock.	1109 Walnut St., Wilk'b'g
Coursin, John B.	Civil.	McKeesport.	Coursin Heights.
Cunnings, Arthur McV.	Elec.	Oakmont.	
Espy, John S.	Elec.	Pittsburgh.	4751 Liberty Ave.
Ferguson, Harry R.	Mech.	Ben Avon.	109 Laurel Ave.
Foster, Frederic E.	Metal.	Methuen, Mass.	23 Mawhinney St., Pgh.
Garber, J. Arthur.	Mech.	Pittsburgh.	229 Halket St.
Gittins, Arthur W.	Metal.	Pittsburgh.	606 Braddock Ave.
Givens, Earl V.	Elec.	Pittsburgh.	291 Main St.
Halferty, Guy.	Civil.	Pittsburgh.	Homewood Station
Hamnett, Whitney S.	Metal.	Pittsburgh.	355 Atlantic Ave.
Hatch, Charles W.	Mech.	Pittsburgh.	255 S. St. Clair St.
Henderson, Albert.	Civil.	Pittsburgh.	1407 Wightman St.
Heslep, John H.	Mech.	Cleveland, O.	Oakland Apartments, Pgh.
Hunt, Fred L.	Elec.	Munhall.	
Huntley, Louis Grow.	Metal.	Glenshaw.	5137 Woodlawn Ave., Pgh.
Jacobs, Walter A.	Metal.	Pittsburgh.	608 Webster Ave.
Koethen, Frederick L.	Chem.	Pittsburgh.	5524 Stanton Ave.
Leippe, Edgar F.	Mech.	Reading.	839 Holland Ave., Wilk'b'g
Lucas, Samuel M.	Elec.	Pittsburgh.	7810 Bennett St.
Lytle, Bruce H.	Elec.	Pittsburgh.	3323 Ward St.
McCracken, Jay S.	Mech.	Pittsburgh.	2 Old Heidelberg Apts., Braddock Ave.
McKee, Harry L.	Mech.	Wilkinsburg.	706 Coal St.
Martin, Parker B.	Elec.	Dayton, O.	306 S. Craig St., Pgh.
Martin, Samuel J.	Mech.	Pittsburgh.	713 College Ave.
Merrill, Ralph K.	Mech.	Pittsburgh.	363 Lehigh Ave.
Narrance, Guy T.	Elec.	Loudonville, O.	234 Union St., Wilk'b'g.
Neudorfer, Frank E.	Mech.	Pittsburgh.	608 Kirtland St.
Niles, Charles A.	Civil.	Babylon, N. Y.	7225 Idlewild St., Pgh.
Noll, Roy G.	Elec.	Hannibal, O.	5824 Rural St., Pgh.
Olnhausen, John R.	Elec.	Minerva, O.	43 Branch St., N. S., Pgh.
Parsons, Robert.	Elec.	New Hartford, Conn.	303 S. Dithridge St., Pgh,
Pfeil, Walter H.	Metal.	Pittsburgh.	95 Washington Ave.
Provost, John McF.	Civil.	Fairhaven.	
Rahhal, Thomas T.	Mech.	Pittsburgh.	78 Congress St.
Rieger, William H.	Metal.	Pittsburgh.	201 Stratford Ave.
Rigdon, Lawrence D.	Elec.	Pittsburgh.	1217 Hazel St.

Rinehart Alfred W. . .	Mech.	.Pittsburgh.	.363 Meyran Ave.
Rinehart, William W. .	Mech.	.Pittsburgh.	.363 Meyran Ave.
Sampson, James M. . .	Metal.	.Erie.	.5143 Woodlawn Ave., Pgh.
Schumacher, Elmer L. .	Mech.	.Woodsfield, O. . . .	.5143 Woodlawn Ave., Pgh.
Siesel, Sidney M. . . .	Civil.	.Pittsburgh.	.1633 Denniston Ave.
Sivitz, William I. . . .	Chem.	.Pittsburgh.	.1229 Franklin St.
Slocum, Winthrop W. .	Elec.	.Pittsburgh.	.5500 Irwin Ave.
Synder, John C.	Elec.	.Altoona.	.3384 Webster Ave., Pgh.
Stevenson, William C. .	Mech.	.Pittsburgh.	.923 N. St. Clair St.
Thurston, Victor C. . .	Mech.	.Richmond, Va. . . .	.6755 Penn Ave., Pgh.
Tingley, Tracy W. . . .	Civil.	.Scranton.	.5143 Woodlawn Ave., Pgh.
Ulrich, Benjamin H. . .	Elec.	.Pittsburgh.	.30 Washington Ave.
Vassilaros, Nicholas D. .	Elec.	.Pittsburgh.	.549 Sixth Ave.
Vincent, Samuel McM. .	Civil.	.Otto.	
Wallace, Hugh R. . . .	Mech.	.Utica.	.34 Dithridge St., Pgh.
Westbrook, George H. .	Civil.	.Huntingdon. . . .	.5143 Woodlawn Ave., Pgh.
Wisner, John L.	Elec.	.Pittsburgh.	.1158 Murrayhill Ave.

Junior Class

Anderson, Harry S. . .	Civil.	.Pittsburgh.	.626 Lincoln Ave.
Anderson, James C. . .	Civil.	.Pittsburgh.	.626 Lincoln Ave.
Barnes, Robert M. . .	Elec.	.New Castle. . . .	.5137 Woodlawn Ave., Pgh.
Bates, Walter C. . . .	Mech.	.Steubenville, O. . .	.5137 Woodlawn Ave., Pgh.
Beck, Carl W.	Civil.	.Wilkinsburg. . . .	.1207 Franklin Ave.
Beck, Harold E.	Chem.	.Sharon.	.448 Arabella St., Knoxville.
Beeken, Lewis L. . . .	Chem.	.Fanwood, N. J. . .	.5143 Woodlawn Ave., Pgh.
Best, George D.	Elec.	.Buffalo, N. Y. . . .	.5137 Woodlawn Ave., Pgh.
Bevier, George M. . . .	Metal.	.Pittsburgh.	.5837 Alder St.
Bieler, Oscar.	Elec.	.Pittsburgh.	.253 Pacific Ave.
Bonsall, Charles D. . .	Mech.	.New Kensington.	
Boughner, Harry R. . .	Civil.	.Sistersville, W. Va.	.3608 Bouquet St., Pgh.
Brobst, Arthur S. . . .	Civil.	.Fairmont, W. Va.	
Casey, Dennis A. . . .	Elec.	.Pittsburgh.	.254 S. Euclid Ave.
Chambers, Charles A. .	Mech.	.New Castle.	.34 Dithridge St., Pgh.
Chancellor, William C. .	Metal.	.Parkersburg, W. Va.	.5143 Woodlawn Ave., Pgh.
Charles, John S.	Metal.	.Pittsburgh.	.4524 Fifth Ave.
Chartener, Victor, Jr. .	Mech.	.Pittsburgh.	.47 Allen Ave.
Close, Walter E. . . .	Mech.	.Pittsburgh.	.206 Mayflower St.
Cope, Fletcher B. . . .	Civil.	.Irwin.	
Crawford, David McL. .	Elec.	.Mifflintown. . . .	.34 Dithridge St., Pgh.
Dillon, George M. . . .	Civil.	.Braddock.	.27 Holland Ave.
Dobbins, Myron G. . .	Elec.	.Pittsburgh.	.4593 Forbes St.
Dornberger, R. S. . . .	Civil.	.Pittsburgh.	.207 N. Craig St.
Dowling, Eugene. . . .	Mech.	.Pittsburgh.	.205 Lothrop St.
Eggers, John E.	Elec.	.De Haven.	
Exline, Lynn E.	Civil.	.Hancock, Md. . . .	.4219 Fifth Ave., Pgh.
Fahnestock, James M. .	Elec.	.Pittsburgh.	.9 Marshall Ave., N. S.
Felkel, Dot J.	Metal.	.Pittsburgh.	.1234 Greenfield Ave.
Fiddler, Lyle D.	Civil.	.New Brighton. . . .	.618 Thirteenth Ave.
Fleishman, George S. .	Mech.	.Pittsburgh.	.1534 Denniston Ave.
Friederick, William H. .	Elec.	.New Brighton. . . .	.5137 Woodlawn Ave., Pgh.

Gaston, Fred I.	Metal.	Pittsburgh.	5143 Woodlawn Ave.
Gibson, Marshall B.	Elec.	Bellevue.	31 Bryant Ave.
Gibson, Wilbur S.	Elec.	Aspinwall.	
Glass, Charles.	Chem.	Pittsburgh.	62 Blackadore Ave.
Gloekler, William E.	Elec.	Hazelwood.	100 Glencaladh St.
Gray, Walter.	Mech.	Pittsburgh.	5724 Bartlett St.
Griffith, Augustus L.	Civil.	Crafton.	
Hammond, Ross B.	Civil.	Pittsburgh.	1106 Jancey St.
Hanford, Raymond C.	Mech.	Norwalk, O.	3440 Bouquet St., Pgh.
Hartman, H. W., Jr.	Elec.	Ellwood City.	231 Bouquet St., Pgh.
Hartman, L. A., Jr.	Metal.	Pittsburgh.	1735 Reynolds St.
Henry, Frank E.	Mech.	Vandergrift.	4622 Forbes St., Pgh.
Herrmann, William A.	Civil.	New York City.	230 Carver St., Pgh.
Holmes, Henry A.	Chem.	Jamestown.	231 Bouquet St., Pgh.
Hunter, Earl R.	Elec.	New Brighton.	400 Seventh Ave.
Hutchison, C. W.	Metal.	Pittsburgh.	706 Belmont St., N. S.
Imhoff, Wallace G.	Metal.	Pittsburgh.	6805 Penn Ave.
Jamieson, Frank B.	Civil.	Homestead.	336 Ninth Ave.
Kann, Stanley J.	Metal.	Pittsburgh.	336 Atlantic Ave.
Kerr, Thomas H.	Mech.	Kittanning.	3425 Ward St., Pgh.
Ketter, George W.	Civil.	St. Louis, Mo.	5143 Woodlawn Ave., Pgh.
Kirk, Lawrence.	Elec.	Pittsburgh.	6 Wilmot Square.
Kohler, Herbert R.	Mech.	Marathon, Texas.	5143 Woodlawn Ave., Pgh.
Kraft, Harry.	Civil.	Pittsburgh.	2811 Bedford Ave.
Latham, James L.	Civil.	Pittsburgh.	4749 Friendship Ave.
Lebzelter William F.	Civil.	Lancaster.	305 S. Craig St., Pgh.
Lewis. Dean S.	Mech.	Wilkinsburg.	1107 Jane St.
Loyd, Alfred G., Jr.	Civil.	Pittsburgh.	Jancey St., nr Stanton Ave.
Lubowsky, Simon.	Chem.	Lodz, Russia.	1808 Linton St., Pgh.
McCune, Harry B.	Civil.	Pittsburgh.	542 Clawson St.
McEllroy, George S.	Elec.	Edgewood Park.	115 Maple Ave.
Macfarlane, James W.	Mech.	Pittsburgh.	7137 Penn Ave.
McKee, James H.	Mech.	Pittsburgh.	1309 Poplar St., N. S.
McLaughlin, C. R.	Elec.	Delmont.	5452 Broad St., Pgh.
McWilliams, W. W.	Mech.	Pittsburgh.	5446 Broad St.
Mason, Howard P.	Civil.	Pittsburgh.	5500 Hays St.
Moore, Charles A.	Civil.	Pittsburgh.	7713 Waverly St.
Myers, Jeremiah B.	Civil.	Swissvale.	1112 Milton Ave.
Nicholson, Paul B.	Civil.	Wilkinsburg.	601 Wallace Ave.
Oetting, Oscar W. A.	Elec.	Pittsburgh.	206 Pacific Ave.
Orr, Newell H.	Civil.	Pittsburgh.	5440 Rosetta St.
Patterson, David W.	Elec.	Beaver Falls.	5137 Woodlawn Ave., Pgh.
Phillips, Clifford S.	Mech.	Ben Avon.	Ridge Ave.
Potts, Samuel L.	Mech.	Toronto, Canada.	Wilkins & Beeler Sts., Pgh.
Ramp, William H.	Civil.	Parkersburg, W. Va.	5143 Woodlawn Ave., Pgh.
Redpath, Cargill W.	Civil.	Pittsburgh.	7 Lydia St.
Reilly, John F.	Mech.	Niagara Falls, N. Y.	Wilkins & Beeler Sts., Pgh.
Reinartz, Leo F.	Chem.	East Liverpool, O.	4613 Center Ave.
Rent, Lawrence E.	Elec.	Pittsburgh.	7324 Susquehanna St.
Rudolph, Reese E.	Chem.	Pittsburgh.	1406 Western Ave., N. S.
Satler, Louis L., Jr.	Metal.	Glenshaw.	34 Dithridge St., Pgh.
Saulters, George C.	Elec.	Pittsburgh.	49 Clifton Ave., N. S.
Schmucker, F. A., Jr.	Civil.	Ben Avon.	249 Ridge Ave.

Sellner, Sydney	Metal.	Elmira, N. Y.	3910 Fifth Ave., Pgh.
Silvernail, Alfred K.	Civil.	Buffalo, N. Y.	5137 Woodlawn Ave., Pgh.
Smail, James A.	Metal.	Leechburg.	4622 Forbes St., Pgh.
Smith, Abraham.	Elec.	Pittsburgh.	60 Roberts St.
Smith, Charles H.	Elec.	Youngstown, O.	4622 Forbes St., Pgh.
Smith, John H.	Mech.	Pittsburgh.	7907 Susquehanna St.
Sprague, James B.	Metal.	Pittsburgh.	415 S. Rebecca St.
Sprengle, William L.	Elec.	Uniontown.	5137 Woodlawn Ave., Pgh.
Starzynski, Harry A.	Civil.	Pittsburgh.	1111 Carson St.
Swearingen, Thomas J.	Civil.	Pittsburgh.	419 Atwood St.
Thomson, Meldrim.	Metal.	Savannah, Ga.	5137 Woodlawn Ave., Pgh.
Todd, Jared P.	Elec.	Titusville.	4518 Forbes St., Pgh.
Turner, Burt A.	Mech.	Pittsburgh.	5137 Woodlawn Ave.
Tustin, Herbert P.	Mech.	Pittsburgh.	1207 Esplanade St., N. S.
Van Horn, Charles H.	Civil.	Homestead.	348 Twelfth Ave.
Verner, Alfred N.	Mech.	Pittsburgh.	1103 King Ave.
Wallace, William W.	Mech.	Youngstown, O.	5137 Woodlawn Ave., Pgh.
Walton, Marshall R.	Mech.	Belton, Texas.	5143 Woodlawn Ave., Pgh.
Watrous, Benjamin.	Civil.	Scranton.	Wilkins & Beeler Sts., Pgh.
Weidlein, Luther B.	Mech.	Kansas City, Kan.	5143 Woodlawn Ave., Pgh.
Whitman, Clair M.	Elec.	Pittsburgh.	7709 Lyman St.
Williams, Max L.	Metal.	Pittsburgh.	241 Fisk St.
Wilson, Charles E.	Elec.	Bellevue.	45 Dawson Ave.
Wilson, Joseph S.	Metal.	Toronto, O.	Morningside Ave., Pgh.
Wright, George Van V.	Elec.	Forest Glen, Md.	3139 Breckenridge Av., Pgh.
Zittermann, August O.	Mech.	Luzerne.	

Plebe Class

Abbott, William Lincoln, Jr.	Pittsburgh.	1807 Cliff St.
Agnew, John George.	Beaver Falls.	3021 Fourth Ave.
Allen, Charles.	Ellsworth, O.	Wilkins & Beeler Sts., Pgh.
Archer, Merton Thomas.	Pittsburgh.	1716 Ann St.
Ashe, Henry Tobias.	Connellsville.	714 Mill St., Wilkinsburg
Baker, Albert Moore.	Pittsburgh.	322 Melwood St.
Baker, Sydney Sheldon.	Jamestown, N. Y.	Wilkins & Beeler Sts., Pgh.
Banker, Fred Payne.	Sheridanville.	
Barclay, Harry Alonzo.	Pittsburgh.	5151 Woodworth St.
Barrett, George Barker.	Pittsburgh.	255 N. Craig St.
Bascom, Robert Platt.	Fort Edward, N. Y.	3608 Bouquet St., Pgh.
Beecher, Ward.	Youngstown, O.	5137 Woodlawn Ave., Pgh.
Bickley, Everett Huckel.	Marietta, O.	4819 Morewood Ave., Pgh.
Boots, Edmund Rutledge, Jr.	New Brighton.	1201 Fifth St.
Borschneck Charles Frank.	Knoxville.	410 New Zara St.
Bright, Alan.	Pittsburgh.	127 Roup St.
Brilhart, William W., Jr.	Indiana.	2831 Center Ave., Pgh.
Brill, Abraham.	Pittsburgh.	7 Scott St.
Brindel, Harold Franklin.	Shamokin.	1111 Mellon St., Pgh.
Buckingham, Francis Marion	Pittsburgh.	1828 Morningside Ave.
Buhl, William, Jr.	Pittsburgh.	233 Amber St.
Burgham, Edwin Oliver.	New Kensington.	
Bussman Amos George.	Pittsburgh.	524 Aspen St.

Day Students.

Butler, Harold White. . . .	Oakmont.	
Cadman, Wilson Kennedy. . .	Edgewood Park. . . .	155 Washington St.
Carter, Robert A., Jr. . . .	Pittsburgh.	309 Iroquois Apartments.
Cassidy, William Herschel. .	Oakdale.	
Challinor, Thomas Lloyd. . .	Pittsburgh.	5859 Hobart Ave.
Church, Brooks.	Bellevue.	14 Bayne Ave.
Clark, John Alex.	Pittsburgh.	14 Grace St.
Coen, James Bennett. . . .	Homestead.	116 E. Third Ave.
Cohen, Samuel.	Pittsburgh.	1 Shipton St.
Coldren, Ralph Becker. . . .	Schulyhill Haven. . .	Wireton.
Coles, William Henry. . . .	Wiconisco.	74 Dithridge St., Pgh.
Colwell, Curtis Colfax. . . .	Rutherford, N. J. . .	107 Mifflin Ave., Wilkinsb'g
Cornelius, Hugh Byron. . .	Grove City.	Wilkins & Beeler Sts., Pgh.
Crawford, John Earle. . . .	Parnassus.	
Crownover, Arthur White. . .	Greensburg.	
Crumley, Floyd Glendale. . .	New Kensington. . .	514 Fourth Ave.
Cullinan, Edward Joseph. . .	Pittsburgh.	235 S. Fairmount Ave.
Cummings, William Ralph. . .	Sistersville, W. Va. . .	3608 Bouquet St., Pgh.
Cunningham, Otto Herron. . .	Leechburg.	
Davidson, Truesdell Clarke. . .	Edgewood Park. . . .	104 Ivy St.
Decker, Raymond Boyd. . . .	New Rochelle, N. Y. . .	Wilkins & Beeler Sts., Pgh.
Dittman, Willis Arthur. . . .	St. Petersburg. . . .	319 Rebecca St., Wilkinsb'g
Dobbins, Earl Woods. . . .	Pittsburgh.	4593 Forbes St.
Dodds, James Allison. . . .	Oakdale.	
Dyer, Alvin.	Tarentum.	
Eastman, Earl Lyman. . . .	Coraopolis.	
Eberhardt, William Robert. .	Pittsburgh.	5709 Irwin Ave.
Edmundson, Thomas Perrine. .	Pittsburgh.	3509 Fifth Ave.
Ehrenfeld, Ralph.	Leechburg.	
Elliott, John Lloyd.	Canonsburg.	23 Central Ave.
Ellis, Lester D.	Sheridanville.	P. O. Box No. 81
Fisher, Joseph Peter, Jr. . .	Pittsburgh.	5503 Margaretta St.
Fisher, Uber L.	Oakmont.	
Gettman, Wilbur Peter. . . .	Pittsburgh.	5424 Center Ave.
Geyer, George Leo.	Pittsburgh.	206 Elysian Ave.
Gibson, William L. G. . . .	Pittsburgh.	1509 Shady Ave.
Graham, Frank Elliott. . . .	New Brighton.	611 Fourth Ave.
Haines, John Edgar.	Pittsburgh.	218 Mathilda St.
Harrison, Philip Newell. . . .	Pittsburgh.	205 N. Negley Ave.
Harter, David Joseph. . . .	Pittsburgh.	107 E. Pearl St., N. S.
Hasness, Carlisle Duane. . . .	Scottdale.	3 Mawhinney St., Pgh.
Hatcher, Emmet J.	Pittsburgh.	620 Jackson St., N. S.
Henson, William John. . . .	Pittsburgh.	100 Freeland St.
Hiroki, Takeo.	Tokyo, Japan.	600 North Ave., West, N. S., Pgh.
Hobbs, James Clarence. . . .	Cocoanut Grove, Fla . .	Wilkins & Beeler Sts., Pgh.
Hornbake, Earl Rodney. . . .	California.	304 Ninth Ave., Homestead
Horton, Reuben Harland. . .	Bellevue.	61 Forest Ave.
Hune, Arnold William. . . .	East Liverpool, O.	
Johnson, Carl Johannes. . . .	Lincoln Place.	
Johnson, Roy Williamson. . .	Butler.	809 Holland Ave., Wilk'b'g
Jones, James Wilford. . . .	Youngstown, O. . . .	5137 Woodlawn Ave.
Jones, Joseph Rothwell. . . .	Pittsburgh.	3456 Bouquet St.

Keck, Frank Miller	Delmont	811 Franklin Ave., Wilk'b'g
Kennedy, Robert Maurice	Pittsburgh	George Apts., Oakland Ave.
Lawrie, Ritchie, Jr.	Sewickley.	
Leonard, Perry Thomas	Ravenna, O.	Wilkins & Beeler Sts., Pgh.
Light, Ray William	Lebanon	Wilkins & Beeler Sts., Pgh.
Linderman, Andrew Lyle	Pittsburgh	904 Adelaide St.
McCandless, Charles Henry	Pittsburgh	5549 Black St.
McCartney, Scott Lowry	Jamestown	19 Maple Ave., Pgh.
McClain, John Russel	Edgewood Park	131 Edgewood Ave.
McCorkle, Henry James	Dallas, Tex.	5143 Woodlawn Ave., Pgh.
McIntire, Lloyd Woods	Pittsburgh	7945 Madeira Ave.
Marcus, Morris Max	Pittsburgh	Cor. Dinwiddie & Rose Sts.
Martin, Park Hussey	Bellevue	74 Meade Ave.
Mead, Arthur DeVine	Glens Falls, N. Y.	3608 Bouquet St., Pgh.
Meyer, Albert Henry	Pittsburgh	908 Cedar Ave., N. S.
Milleisen, John Thompson	Mechanicsburg	4593 Forbes St., Pgh.
Mitchell, Donald Dalrymple	Great Barrington, Mass.	816 Braddock Ave., Pgh.
Miyasaki, Seiichi	Tokushima, Japan	4621 Center Ave., Pgh.
Moser, Frank Wattles	Schuylkill Haven	34 S. Dithridge St., Pgh.
Mueller, Nathan	Pittsburgh	151 Elm St.
Naismith, Donald McInnes	Pittsburgh	6312 Butler St.
Neel, Hiram Alexander	Dravosburg.	
Nicols, Lowell Warden	Sewickley.	
Noble, Robert Elliott	Aspinwall	Ninth St.
Nuzum, Will Palmer	Fairmont, W. Va.	Wilkins & Beeler Sts., Pgh.
Paull, Joseph Victor	Pittsburgh	2214 Forbes St.
Phillips, Harry Homer	Pittsburgh	1120 S. Negley Ave.
Phillips, Reginald Frank	Castle Shannon.	
Pitcairn, Arthur Edward	Pittsburgh	1018 N. Negley Ave.
Porter, George McCandless	Pittsburgh	3333 Forbes St.
Porter, Russell	Beaver.	
Poste, Emerson Peck	Lewisburg, Pa.	4624 Forbes St., Pgh.
Reed, Cameron	Pittsburgh	38 Wabash Ave.
Reilly, Charles Gilbert	Pittsburgh	Fifth Ave. & Darrah St.
Robinson, Delevan Clark	Howe Cave, N. Y.	331 Meyran Ave., Pgh.
Ross, Harry Earl	Pittsburgh	208 Greentree Ave., N. S.
Roura, Joseph, Jr.	Brooklyn, N. Y.	5137 Woodlawn Ave., Pgh.
Scholl, Louis August	Pittsburgh	846 Chislett St.
Schultz, Clinton Henry	Ravenna, O.	Wilkins & Beeler Sts., Pgh.
Seldon Henry William	Verona.	
Shoop, Paul Jamison	Crafton	14 Hawthorne Ave.
Smith, George Sidney	Etna	402 Butler St.
Smith, Roy Lee	Avella	30 Norton Ave., Pgh.
Snyder, Calvin Ellsworth	Everett	4511 Winthrop St., Pgh.
Speer, Julian Stanbery	Newark, O.	17 East End Ave., Pgh.
Stein, Hyman	Kief, Russia	1930 Bedford Ave., Pgh.
Stevenson, Frederick Henry	Youngstown, O.	Wilkins & Beeler Sts., Pgh.
Stone, John	Pittsburgh	508 North Ave., West, N. S
Swartz, Joseph Marcus	Pittsburgh	1407 Webster Ave.
Taggart, Eugene Bushfield	Wilkinsburg	828 Holland Ave.
Toogood, Richard Clyde	Pittsburgh	112 Charles St., N. S.
VanWegen, Lloyd Dennis	Coraopolis.	
Wagner, Ralph Samuel	New Florence	5137 Woodlawn Ave., Pgh.

Wagner, William Huff. . . .	Carnegie.	Rowland Ave.
Wallace, Robert Bruce . . .	Wilmerding.	325 Marguerite Ave.
Warne, Harold Alfred. . . .	Bellevue.	42 Division St.
Wasson, Theron.	Springville, N. Y. . . .	5143 Woodlawn Ave., Pgh.
Waters, William Sidney. . .	Pittsburgh.	5125 S. Atlantic Ave.
White, Ralph Pollock. . . .	Youngstown, O.	Wilkins & Beeler Sts., Pgh.
Wick, Roy.	West Sunbury.	203 Anderson St., N. S., Pgh.
Wilson, Howard Clifton. . .	New Haven, Conn. . . .	3608 Bouquet St., Pgh.
Wilson, Jean Vernon. . . .	Bellevue.	45 Dawson Ave.
Wilson, Joseph, Jr.	New Brighton.	533 Thirteenth Ave.
Wise, Joseph Michael. . . .	Mansfield, O.	6232 Butler St., Pgh.
Witte, Herman, Jr.	Pittsburgh.	939 St. James St.
Wolfe, John Miller.	Oil City.	340 Meyran Ave., Pgh.
Wylie, Fred Hamlin.	Wellsville, O.	4613 Center Ave., Pgh.
Young, Samuel Eccles. . . .	Pittsburgh.	3451 California Ave., N. S.

Night Students

Third Year Class

Abrahams, Isaiah S. . .	Civil.	Brooklyn, N. Y. . . .	908 Hartje Bldg., Pgh.
Appel, Harry G. . . .	Civil.	Pittsburgh.	171 Manton St.
Archibold, Everett F. .	Civil.	Pittsburgh.	390 Coltart Sq.
Armstrong, Roland H. .	Elec.	Avalon.	106 Harrison Ave.
Baumann, Carl A. . . .	Mech.	Pittsburgh.	235 Millvale Ave.
Bowery, Frederick J. .	Civil.	Pittsburgh.	419 Third St., N. S.
Braun, Karl F.	Mech.	Pittsburgh.	Hallock St.
Brosius, William O. . .	Civil.	Wilkinsburg.	477 Campbell St.
Brown, Thomas P. . . .	Civil.	Pittsburgh.	5135 Dearborn St.
Burgess, George L. . .	Metal.	Pittsburgh.	213 Bell Ave., N. S.
Chambers, Howard C. .	Mech.	Coraopolis.	
Considine, John W. . .	Mech.	Washington, D. C. . .	220 Bigham St., Pgh.
Cornell, Sidney.	Mech.	East Orange, N. J. . .	89 First St., Duquesne
Culbertson, Roy K. . .	Elec.	Alliance, O.	413 South Ave., Wilkinsburg
Danner, Emil C. . . .	Mech.	Pittsburgh.	241 McKee Place
Dibble, Robert H. . . .	Metal.	Wilkinsburg.	900 Hill Ave.
Fager, Paul.	Elec.	Harrisburg.	34 Dithridge St., Pgh.
Fischer, Charles L. . .	Mech.	Pittsburgh.	38 Hamilton St., N. S.
Frank, Lewis C. . . .	Elec.	Pittsburgh.	3 Lafayette Apt., Louisa St.
Garratt, Frank.	Metal.	McKeesport.	1004 Park St.
George, Edward M. . .	Mech.	Hazelwood.	4626 Chatsworth Ave.
Gottfried, Henry W. . .	Elec.	Pittsburgh.	7506 Kelly St.
Grote, Ludwig I. . . .	Civil.	Pittsburgh.	Winterburn Ave.
Herron, James W. . . .	Civil.	Pittsburgh.	702 Fifth Ave. Extension
Hirtle, William A. . . .	Civil.	Lunenburg, N. S. . .	5815 Rural Ave., Pgh.
Huff, Edward I.	Civil.	Wilkinsburg.	1020 Wallace Ave.
Kenton, Robert McF. .	Elec.	Centreville, Md. . . .	2703 Fifth Ave., Pgh.
Koshkin, Victor.	Elec.	Rostoff on Don, Rus.	366 Meyran Ave., Pgh.
Lauderbaugh, Moss. . .	Elec.	Coraopolis.	
Lautenschlaeger, H. L. .	Mech.	Pittsburgh.	Hastings & Reynolds Sts.
Lebowitz, Samuel V. . .	Elec.	McKees Rocks. . . .	818 Linden Ave., East Pgh.

Leitch, George K. . . .	Metal.	.Pittsburgh.	.3601 Terrace Ave.
McCollum, Caleb A. . .	Mech.	. Wilkinsburg. . . .	.494 Boundry Ave.
McCurdy, Herbert P. .	Mech.	.Pittsburgh.	.63 Federal St. Ext., N. S.
McHose, Kern W. . . .	Mech.	.Pittsburgh.	.7434 Tioga St.
McNulty, Samuel W. .	Metal.	. Washington. . . .	.Pearl & Boyle Sts., N. S., Pgh.
Mason, Harry V. . . .	Chem.	.Pittsburgh.	.Rear 9 Blackadore Ave.
Masters, Frank M. . .	Mech.	. Beachly.	.506 N. St. Clair St., Pgh.
Miller, Maynard C. . .	Mech.	. Bellevue.	.233 Rodgers Ave.
Moore, Edward.	Mech.	. Cork, Ireland. . . .	.5148 Keystone St., Pgh.
Moore, Ralph W. E. . .	Elec.	. New Lexington. . .	.448 Franklin Ave., Wilk'b'g
Munn, Donald S. . . .	Mech.	.Pittsburgh.	.312 Hale St.
Newcomer, David V. . .	Civil.	. Lancaster.	.329 Atwood St., Pgh.
Noonan, Edward F. . .	Mech.	.Pittsburgh.	.4418 Calvin St.
Northam, Manley P. . .	Civil.	. Baltimore, Md. . .	.740 Browne St., Pgh.
Peters, Bernard D. . .	Civil.	. McKeesport. . . .	.1110 Park St.
Reed, James K.	Mech.	. Ingram.	.234 Prospect Ave.
Reid, David K.	Mech.	.Pittsburgh.	.265 Forty-sixth St.
Rhodes, Frederick W. .	Elec.	. McKeesport. . . .	.1612 Fifth Ave.
Robie, George R. . . .	Civil.	. Aspinwall.	.311 Third St.
Roemhild, Edmund O. .	Chem.	.Pittsburgh.	.2015 Carson St.
Rowe. Martin L. . . .	Mech.	.Pittsburgh.	.1731 Verona Ave.
Schaedle, Leo J.	Civil.	.Pittsburgh.	.242 Winterburn Ave.
Schall, Howard S. . . .	Metal.	.Pittsburgh.	.4414 Fifth Ave.
Schmidt, Edmund B. .	Civil.	. McKeesport. . . .	.801 Market St.
Skeehan, John L. . . .	Mech.	.Pittsburgh.	.5124 Carnegie St.
Smith, George H. . . .	Mech.	. Aspinwall.	.28 Fourth St.
Steinkirchner, E. L. . .	Civil.	.Pittsburgh.	.306 Forty-sixth St.
Stevens, William H. . .	Civil.	.Pittsburgh.	.7918 Tacoma St.
Summers, Albert LeR. .	Mech.	. Wheeling, W. Va. . .	.329 Atwood St., Pgh.
Swartz, Plummer A. . .	Civil.	. Wilkinsburg. . . .	.207 Gray Bldg.
Taxis, John H.	Elec.	. Wilkinsburg. . . .	.325 Pitt St.
Taylor, Walter S. . . .	Civil.	.Pittsburgh.	.5144 Dearborn St.
Thompson, J. Everett. .	Civil.	.Pittsburgh.	.5448 Wilkins Ave.
Underwood, Weeden B. .	Elec.	. Wilkinsburg. . . .	.900 Hill Ave.
Urling, Walter C. . . .	Mech.	.Pittsburgh.	.939 N. Negley Ave.
Viehman, Harry W. . .	Civil.	. Mt. Oliver.	.251 Boulevard
Wallach, Carl D. . . .	Civil.	. Ambridge.	. Care American Bridge Co.
Weckler, Herrman L. .	Mech.	.Pittsburgh.	.1924 St. Marks Pl., N. S.
Weick, Henry B. . . .	Mech.	. Oakland, Cal.	
Williams, William W. .	Metal.	. Cambridge, Mass. . .	.81 First St., Duquesne
Withum, Alexander L. .	Civil.	.Pittsburgh.	.Eunice St.

Second Year Class

Abel, Albert Ernest.	.Pittsburgh.	.246 Mathilda St.
Anderson, Harold Stanley. . .	.Pittsburgh.	.707 Southern Ave.
Archbold, Henry L.	.Pittsburgh.	.368 Meyran Ave.
Armstrong, Frank.	.Pittsburgh.	.919 Carson St.
Barchfeld, Herman Charles.	.Carrick.	.1513 Brownsville Road
Bate, Harley Alexander. . .	.Glenshaw.	
Boardman, Fred William. .	.Pitcairn.	.Third & Wall Ave.

Bracht, Henry William. . .	Pittsburgh.	4421 Calvin St.
Brown, Louis King.	Pittsburgh.	604 Mellon St.
Bundy, Perley Jasper. . . .	Pittsburgh.	68 Clifton Ave.
Cohill, Thomas Haskins. . .	Pittsburgh.	Bryant & N. Highland Ave.
Davis, Fremont Emerson. . .	Homestead.	234 Third Ave.
Dean, Vernon Hays.	Pittsburgh.	5600 Walnut St.
Dixon, William John. . . .	Pittsburgh.	1416 Federal St., N. S.
Dougherty, James William.	Pittsburgh.	5159 Carnegie Ave.
Drake, Leon Lorenzo. . . .	Pittsburgh.	6 Melba Place
Ela, Edward Campbell. . . .	Pittsburgh.	1320 Woodland Ave., N. S.
Elliott, Edwin Charles. . . .	Pittsburgh.	14 Meridan St.
Fitzpatrick, John Hyacinth.	Pittsburgh.	410 Orchard St.
Fleming, Willerton.	Pittsburgh.	201 Bon Air Ave.
Floyd, John William. . . .	Quaker City, O. . . .	3426 Forbes St., Pgh.
Geyer, Frederick William. .	Pittsburgh.	1251 Woodland Ave., N. S.
Glasser, William Frederick.	Mechanicsburg. . . .	2012 Forbes St., Pgh.
Gloetzner, Alvin A. A. . . .	Washington, D. C. . .	616 Penn Ave., Wilkinsburg
Grabert, Gustave Eugene, Jr	Pittsburgh.	300 Calliope St.
Groetzinger, Walter August.	Pittsburgh.	59 S. Oakland Sq.
Gump, Harry Franklin. . .	Wilkinsburg.	
Hague, Joseph Robert. . . .	Pittsburgh.	16 Melba Place
Hallas, John Grier.	West Elizabeth.	
Hays, Albert James.	Wilkinsburg.	417 Pitt St.
Hess, George Christian, Jr.	Pittsburgh.	2501 Hallet St.
Hodgdon, Thomas Guy. . . .	Avalon.	Chester Ave.
Johnson, Frank Maynard. . .	New Brighton.	404 Third Ave.
Kline, Claire Benton. . . .	Pittsburgh.	538 Aspen St.
Kline, Robert Stevenson. . .	Pittsburgh.	538 Aspen St.
Laithe, Henry Merritt. . . .	Jenkintown.	6329 Marchand St., Pgh.
Leff, David.	Pittsburgh.	1222 Colwell St.
Lincoln, Rollo Basil.	Swissvale.	7322 Denniston Ave.
Lininger, Clarence Roy. . .	Bellevue.	
Locke, Raymond Adrian W.	Pittsburgh.	1829 Carson St.
Lockwood, Rex Barnum. . .	Ambridge.	
Ludwig, Frederick Carl. . .	Pittsburgh.	318 Oakland Ave.
McCall, Clarence Henry. . .	Pittsburgh.	312 Euclid Ave., N. S.
McCully, Harry McKee. . .	Braddock.	112 Talbot Ave.
McDavitt, James Albert. . .	Lawrence, Mass. . . .	839 N. St. Clair St., Pgh.
McIlvried, Edwin John. . .	Macon, Miss.	Simpson & Perchment, Pgh.
McIlvried, Howard George. .	Macon, Miss.	905 Lang Ave., Pgh.
Mackay, Murray Payne. . .	Pittsburgh.	429 N. Fairmount Ave.
Mackay, William.	Pittsburgh.	429 N. Fairmount Ave.
McMillin, Oliver Benton. . .	Etna.	81 Wilson St.
Martin, Charles William. . .	Pittsburgh.	443 Evaline St.
Mauch, Frank Albert. . . .	Pittsburgh.	213 Washington Ave.
Miller, Robert Neilson. . . .	Pittsburgh.	312 Brownsville Ave.
Moore, Benjamin Seaman. .	Pittsburgh.	7959 Tioga St.
Morgan, David Garfield. . .	Pittsburgh.	197 Hoosac St.
Morlan, Frederick Andrew. .	Pittsburgh.	3815 Bates St.
Munk, William Lewis. . . .	Wilkinsburg.	1108 Glenn Ave.
Nevins, Clyde Louis.	Braddock.	115 Third St.
Oren, Jesse Joseph.	New Cumberland. . .	1407 Martha St., Munhall
Pauli, Friederick Wilhelm. .	Lubeck, Germany. . .	3331 Fifth Ave., Pgh.

Pitcairn, Robert Fulton. . . .	Wilkinsburg.	.196 Meade St.
Pringle, Oscar Lee.	Wilkinsburg.	.714 Mill St.
Raup, William Sharpless. . .	Pittsburgh.	.5427 Howe St.
Rensland, Fred William. . . .	Pittsburgh.	.506 McKee Place
Rushton, Edwin Ernest. . . .	Wilkinsburg.	.511 McNair St.
Savage, Luke Francis.	Blair Station.	
Schrock, Ralph Cecil.	Pittsburgh.	.3200 Craft Place
Scott, James Lounsbery. . . .	Pittsburgh.	.67 Maple Terrace
Shannon, Edward John. . . .	Mt. Oliver.	.810 Southern Ave.
*Southard, Allen Hughes. . .	Dorchester, Mass. . .	.811 Holland Ave., Wilk'b'g
Stamm, Albert Frederick. . .	Pittsburgh.	.42 S. Twenty-second St.
Surenda, Andrew.	Pittsburgh.	.293 McClure Ave.
Taylor, Edgar Bowman. . . .	Alliance, O.	.413 South Ave., Wilkinsb'g
Terletsky, Stephen.	Pittsburgh.	.4 Benton St., N. S.
Terrell, Howard Morton. . . .	Aspinwall.	
Thompson, Jay Kyle.	Economy.	.Box 299
Van Dyke, Alexander Dean. .	Princeton, N. J. . . .	.3309 Fifth Ave., Pgh.
Waxman, Jerome Harry. . . .	Pittsburgh.	.219 Evaline St.
White, Audley Donaldson. . .	Avalon.	.623 Hemlock St.
Whitehead, George Arthur. . .	Pittsburgh.	.323 Evaline St.
Wilharm, Frederick Charles. .	Pittsburgh.	.6428 Winslow St.
Williams, James Louis. . . .	Pittsburgh.	.1212 Bingham St.
Woods, Harry Thomas.	Ingram.	.24 Union Ave.
Workman, William Delbert. .	Pittsburgh.	.4050 Howley Ave.
Yenny, Walter John.	East Pittsburgh. . . .	.805 Linden Ave.

First Year Class

Ankeny, Harry M.	Pittsburgh.	.1320 Pitt St.
Ayres, Thomas Grayson. . . .	Pittsburgh.	.326 Morewood Ave.
Barritt, John Willard.	East Pittsburgh. . . .	.Box 195
Bayne, Richard Cecil.	McKeesport.	.502 Fifth Ave.
Benkner, Karl Hermann . . .	Pittsburgh.	.117 Walter St.
Bennett, Harry James. . . .	Duquesne.	.1008 Grant Ave.
Brady, Huber Roth.	Pittsburgh.	.427 East End Ave.
Brown, Henry Hulton.	Avalon.	.207 Harrison Ave.
Carpenter, Mack B.	Williamsport.	.468 Biddle Ave., Wilkinsb'g
Carroll, William Joseph. . .	Pittsburgh.	.7041 Kedron Ave.
Chalmers, Thomas Mabon. . .	Pittsburgh.	.Friendship Ave. & Ella St.
Cole, Joseph Bishop.	Pittsburgh.	.807 Southern Ave.
Crosby, John Wilmot.	Pittsburgh.	.128 S. Graham St.
Cullison, Jesse Albert, Jr. . .	Pittsburgh.	.2215 Wylie Ave.
Davidson, William Andrew. .	St. Thomas, Ont. . . .	.403 Biddle Ave., Wilkinsb'g
Dierst, John Richardson. . .	Swissvale.	.1621 Oak Grove Ave.
Dillon, Michael Alan.	Pittsburgh.	.70 S. Twentieth St.
Dorrington, Glen Kennedy. . .	Pittsburgh.	.Bell Ave., N. S.
Eger, Oscar Andrew.	Pittsburgh.	.5817 Baum St.
Emery, Warren Alexander. . .	Pittsburgh.	.Park Place No. 2, Alger St.
Erwin, Charles Marion. . . .	Beaver Falls.	.821 Second Ave.
Farrell, Hugh Dempsey. . . .	Pittsburgh.	.1826 Forbes St.
Finch, Frank Hamilton. . . .	Pittsburgh.	.421 Atwood St.

*Deceased.

Fleck, George Dare	Indiana	810 Ross Ave, Wilkinsburg
Frame, Floyd Hill	Pittsburgh	4611 Filmore St.
French, James Emerson	Wilkinsburg	403 Pitt St.
Galley, John Atkinson	McKeesport	313 Whigham St.
Gilliard, Sam	Braddock	616 Fourth St.
Grapp, Edward Hoffman	Pittsburgh	5173 Liberty Ave.
Griffiths, Daniel	Pittsburgh	2541 Allequippa St.
Griffiths, Rees	Pittsburgh	2541 Allequippa St.
Hassler, Harry John	Bellevue	Keystone Ave.
Hecker, Arthur Walter	Pittsburgh	3442 Bouquet St.
Helm, Karl Henry	Pittsburgh	19 S. Wheeler St.
Hindman, Wilbert Losson	Port Deposit, Md.	531 Neville St., Pgh.
Hoffman, John LeRoy	Avalon	511 Taylor Ave.
Holland, Clayton Clark	Pittsburgh	538 Park Ave.
Hooton, Harry Raymond	Pittsburgh	206 Stanwix St.
Humes, Albert Leroy	Aspinwall	310 Second St.
Humes, Howard Arthur	Aspinwall	314 Third St.
Iffarth, William Casper	Pittsburgh	1442 Loraine St.
Jackson, John Edward	McKeesport	313 Tilo St.
Josephson, Samuel	Philadelphia	5800 Rural St., Pgh.
Keagy, Walter Robert	Braddock	552 Lobinger Ave.
Kearns, Andrew Uriah	Pittsburgh	736 Independence St.
Keefer, Charlie Henry	Greenwich, O.	244 Fifth Ave., Pgh.
Kinsley, Charles Nathan	Franklin	615 Bellefonte St., Pgh.
Krepp, Albert Pierce	Pittsburgh	1449 Fayette St., N. S.
Kurtz, Lloyd E	Sharpsburg	1514 N. Canal St.
Laboon, John Frank	Pittsburgh	2114 Ann St.
Laughlin, Samuel McCurdy	Pittsburgh	7504 Kelly St.
Lawler, John Joseph	Pittsburgh	32 Gist St.
Leety, Ralph John	Pittsburgh	7129 Hermitage St.
Light, Herman Benjamin	Pittsburgh	1930 Bedford Ave.
Lonergan, Jerome Aloysius	Pittsburgh	4511 Winthrop St.
Lucas, Raymond Andrew	Pittsburgh	Box 103, Station A
McCowen, William Addison	Pittsburgh	1048 Steuben St.
McCreery, Joseph Spencer	Munhall	868 Eighth Ave.
McCreery, William Bailey	Munhall	Martha & Eleventh Ave.
McDade, John William	Pittsburgh	7030 Frankstown Ave.
McElligott, William Jerome	Pittsburgh	1806 Arch St.
McIntyre, Samuel Blaine	Pittsburgh	501 Collins Ave.
McLaughlin, Richard Francis	Aspinwall	129 Freeport Ave.
McTurk, Nicholas	Swissvale	2343 Manor Ave.
Magill, Robert Armstead	Pittsburgh	City View, N. S.
Maisch, John Bernard	Pittsburgh	314 Gross St.
Merten, William John	Pittsburgh	7306 Fleury St.
Moran, Thomas Joseph	Victoria, Australia	9 Brown Ave., Turtle Creek
Morgan, Joseph Ignatius	Braddock	432 Frazier St.
Newell, Thomas David, Jr	Pittsburgh	623 Lincoln Ave.
Newman, Jay Rothschild	Braddock	629 Margaretta St.
Niemann, Erich	Braddock	28 Lundin St.
Parker, John Clinton	Philopolis, Md.	1106 McClure St., Homest'd
Ralston, Foster Stewart	Pittsburgh	321 Lehigh Ave.
Reese, David Mason	Homestead	103 E. Fourteenth Ave.
Ressler, Elmer Bruce	Pittsburgh	6725 Atwell St.

Richard, Charles Augustine.	Vincennes, Ind.	1233 Resaca Pl., N. S., Pgh.
Ricketts, Scott McDowell.	Pittsburgh.	5532 Forbes St.
Roberts, Thomas Paschall, Jr.	Pittsburgh.	519 Aiken Ave.
Robinson, James Lee.	Pittsburgh.	134 Sycamore St.
Rodger, Hubert Horst.	Edgewood Park.	616 Duquesne Ave.
Ryman, Floyd Jay.	Carrick.	109 Woodlawn Ave.
Sackett, Walter Morgan.	Fredonia, N. Y.	413 Pitt St., Wilkinsburg
Sample, Joseph Frey.	Pittsburgh.	603 N. Dallas Ave.
Schulman, Harry.	Pittsburgh.	21 Wooster St.
See, David Levoid.	Economy.	
Shipman, William Pit.	Shamokin.	916 Mellon St., Pgh.
Simonds, Clark Weston.	Homestead.	
Skeehan, Regis Thomas.	Pittsburgh.	5124 Carnegie St.
Sloss, Robert Leander.	Pittsburgh.	1304 Gibbon St.
Smith, Charles Horne, Jr.	Knoxville.	319 Charles St.
Smith, James Ravenel.	Pittsburgh.	225 Halket St.
Snoder, John Charles.	Pittsburgh.	1419 Sedgwick St., N. S.
Stear, Lawrence Ezra.	Pittsburgh.	1707 Meade St., N. S.
Stewart, Robert Russell.	Pittsburgh.	1505 Nixon St., N. S.
Swinbank, John Joseph.	Pittsburgh.	44 Wyoming St.
Tritschler, John Howard.	Pittsburgh.	1210 Carson St.
Velte, Ralph Chester.	Pittsburgh.	4703 Ben Venue Ave.
Walton, George Henry.	Pittsburgh.	4923 Rosetta St.
Watt, Samuel George.	Pittsburgh.	5733 Kentucky Ave.
Wayman, John Harris.	Pittsburgh.	38 Cowan St.
Weber, Edward.	Pittsburgh.	509 Knoll St., N. S.
Weller, Robert Carleton.	Belle Vernon.	
Wentzel, Carl Walter.	Swissvale.	7209 Whipple St.
Werry, Frederick Charles.	Pittsburgh.	179 Belonda St.
Wetstein, Edward Lewis.	Crafton.	62 Emily St.
Wibner, Albert John.	Pittsburgh.	184 Devilliers St.
Wolff, Carl William.	Pittsburgh.	5438 Homer St.

Preparatory Class

Alexander, Charles Donnelly.	Beaver Falls.	1603 Sixth Ave.
Allcroft, Albert Edward.	Pittsburgh.	7412 Hermitage St.
Applegate, John Raymond.	Williamsport.	105 W. Montgomery Ave., N. S., Pgh.
Averbach, Jacob Edward.	Pittsburgh.	2136 Center Ave.
Bagley, Arthur Charles.	Pittsburgh.	317 N. Craig St.
Barry, James Ignatius.	Pittsburgh.	4525 Plummer St.
Bauer, Harold Glenn.	Oak Station.	
Baumgartner, Henry John.	Swissvale.	7318 Schley Ave.
Beal, John Phillip.	Pittsburgh.	6348 Jackson St.
Bean, James Gordon.	Pittsburgh.	7066 Kelly St.
Beckley, Edgar Crisman.	Wilkinsburg.	508 Jeannette St.
Beeson, Charlie Elmer.	Pittsburgh.	Lydia St. & Greenfield Ave.
Bell, Eugene.	Swissvale.	1923 Wayne St.
Bell, John Grant.	McKeesport.	1617 Manor Ave.
Benner, William Harvard.	Pittsburgh.	220 Taylor St.
Berg, John Rudolph.	Pittsburgh.	1089 Brownsville Ave.

Bird, Walter Michael	Pittsburgh	4622 Henry St.
Boehmig, Edwin Carl Julius	Pittsburgh	Tinsbury St., N. S.
Bovard, William Paul	Elderton	1015 South Ave., Wilk'b'g
Boyd, John Ridinger	Pittsburgh	Jasper St.
Brinkhoff, William Harry	Pittsburgh	1800 Chislett St.
Brown, Frank James	West Homestead	602 Doyle Ave.
Bruce, John Franklin	Wilkinsburg	457 Ella St.
Buckwalter, John Snavely	Lancaster	814 Penn Ave., Wilkinsb'g
Buffington, Robert Ernest	Wilkinsburg	411 McNair St.
Burton, William Lasage	Pittsburgh	502 Cedar Ave., N. S.
Byers, Ephraim	Pittsburgh	210 Greentree Ave., N. S.
Bygate, Ralph Bingham	Wilkinsburg	409 Center St.
Calder, John Thomas	Pittsburgh	3603 Penn Ave.
Callaghan, Thomas Joseph	Crafton	621 Fifth Ave., Pgh.
Cameron, John Lewis	Belle Vernon	1002 Franklin Ave.,Wilk'b'g
Carver, Clayton LeRoy	Pittsburgh	347 Oakland Ave.
Cessna, Lorenzo Dow	Pittsburgh	5629 Hays St.
Chambers, Clarence Wesley	Pittsburgh	531 Rosedale St.
Charles, Howard Buckwalter	Wilkinsburg	812 Coal St.
Cline, James Meredith	Turtle Creek.	
Clymer, Charles Clarence	Denver, Colo	East Pittsburgh
Combs, William Crawford	Tariff, W. Va	1425 Mill St., Wilkinsburg
Connell, Harry Clifford	Wilkinsburg	410 West St.
Cooper, Morris	Pittsburgh	1620 Clark St.
Craig, Grier Lawson	Pittsburgh	426 Fourth Ave.
Cree, John Wesley	Newport	502 Kelly St., Wilkinsburg
Creely, Michael	Pittsburgh	25 Edith Place.
Cunningham, Fletcher Wm	Wilkinsburg	1107 South Ave.
Cupples, Andrew Jackson	Swissvale	7505 Ormond St.
Cupples, William Heins	Pittsburgh	146 Whipple St.
Curran, Walter Vincent	Pittsburgh	Buck'gh'm Apts., Craft Ave.
Daniels, William, Jr.	McKees Rocks.	
Danks, Alfred Clement	Wilkinsburg	331 West St.
Danzilli, Alfred Mikeal	Pittsburgh	242 Omega St.
Deibel, Harry John	Pittsburgh	31 Somerset St., N. S.
Dunn, Guy Brown	Bland, Va	753 South Ave., Wilkinsb'g
Dunn, Robert Edward	Pittsburgh	4703 S. Atlantic Ave.
Erskine, Fred H	Carnegie	302 Sixth Ave.
Estep, Harry Doyle	Swissvale	7020 Blackhawk St.
Eunson, William Harvey	Verona.	
Evans, Albert Even	Youngstown, O	420 Camp Ave., Braddock
Evans, Thomas George	Knoxville	242 Zara St.
Everson, David Milton	Pittsburgh	424 Lincoln Ave.
Ewens, Harold Guy	Pittsburgh	350 Atwood St.
Fankhauser, Elmer Oscar	Bellaire, O	91 Hawkins Ave., Braddock
Feick, Carl	Pittsburgh	513 Sheridan Ave.
Ferman, Joseph	Roumania	1604 Center Ave., Pgh.
Flanders, Charles Albert	Carrick	210 Phillips Ave.
Forney, Charles Cyril	Pittsburgh	Rear No. 12 Sylvania Ave.
Foust, Luther Raymond	Pittsburgh	405 Alpine Ave., N. S.
Frohnerath, Fred	Pittsburgh	3320 Camelia St.
Frye, Oliver Scott	Pittsburgh	1655 Fallowfield Ave.
Funcke, Max	Pittsburgh	514 Albion St.

Gallagher, Alphonsus Francis.	Pittsburgh.	260 Charles St.
George, Frank Richmond.	Pittsburgh.	7953 Hill Ave.
George, Gerald Joseph.	Braddock.	751 Coalmont St.
Giles, David John.	McKeesport.	2826 Cronemeyer Ave.
Goldstein, Jacob.	Pittsburgh.	2 Chauncey St.
Grau, Otto Phillip.	Pittsburgh.	1506 Howard Ave.
Griffith, Lawrence Wright.	Pittsburgh.	718 N. Euclid Ave.
Griswold, James Arthur.	Pittsburgh.	807 Bluff St.
Gross, Conrad.	Walsh, Ill.	3379 Madison Ave., Pgh.
Gutberlet, Walter Bernard.	Pittsburgh.	127 S. Eighteenth St.
Hardern, William Thomas.	Pittsburgh.	5833 Ellsworth Ave.
Harper, Samuel Hill.	Avalon.	221 Birmingham Ave.
Hassel, George Earl.	McKeesport.	1007 S. Evans Ave.
Hasson, Leo Joseph.	Braddock.	422 Frazier St.
Heckmon, Charles Joseph.	Pittsburgh.	2922 Penn Ave.
Hedrick, Burl Henry.	Crafton.	
Heinemann, Wilhelm Gustav	Hadmersleben, Germany.	2916 Penn Ave., Pgh.
Hess, William F.	Pittsburgh.	251 Carroll St., N. S.
Hewitt, True Nelson.	Williamsburg.	410½ Colonial Bldg., Wkbg.
Higham, Ebb Braithwaite.	Pittsburgh.	515 Sheridan Ave.
Hodgdon, Charles Raymond.	Avalon.	Chester Ave.
Hoffman, William Guy.	Carnegie.	Mary St.
Huff, Ernest Louis, Jr.	Swissvale.	7313 Alice Ave.
Hugo, Victor John.	McKeesport.	1303 Fifth Ave.
Hutchinson, James.	Wilkinsburg.	457 Ella St.
Inglis, John Albert.	Beaver.	
Irwin, David Carlin.	Pittsburgh.	5148 Liberty St.
James, James Edward.	Pittsburgh.	2035 Tustin St.
James, Mark.	Edgewood Park.	106 Swissvale Ave.
Jones, Chester Daniel.	Avalon.	514 California Ave.
Jones, David Richard.	Pittsburgh.	302 Atlantic Ave.
Jones, David Williams.	Pittsburgh.	425 Atwood St.
Jordan, Allen Fanton.	Homestead.	124 Seventh Ave.
Kalnin, John.	Pittsburgh.	43 Reed St.
Kassmir, Morris.	Pittsburgh.	1627 Center Ave.
Kelly, John Francis.	Bridgeville.	
Kempe, Anthony Victor.	Pittsburgh.	16 Cliff St.
Kennedy, James Leo.	Braddock.	Cor. Second & Mills Ave.
Kimmich, George Henry.	Pittsburgh.	262 Main St.
Kimmich, Walter.	Pittsburgh.	262 Main St.
Kinnan, William John.	Du Bois.	Box 196, East Pittsburgh
Kirk, Allan D.	Edgewood.	118 Lincoln Ave.
Klesa, Albert Herman.	Pittsburgh.	105 Travella Blvd.
Kneeland, Harry Carroll.	Pittsburgh.	414 Sherman Ave., N. S.
Kœnig, Henry George.	Pittsburgh.	32 Sweetbriar St.
Kœpp, George Gottlieb.	Pittsburgh.	1201 N. Lang Ave.
Kopp, Felix Sylvester.	Swissvale.	7621 Roslyn St.
Koser, Gilbert Sangree.	Alexandria.	706 Collins Ave., Pgh.
Kress, Harry Ferdinand.	Crafton.	18 Grace St..
Kuhns, Hayes Rutherford.	Wilkinsburg.	1417 Hunter St.
LaCrosse Emmart.	Hampton, Va.	809 West St., Wilkinsburg
Lamb, Howard Standly.	Pittsburgh.	3905 Forbes St.

Langan, Thomas Robert. . . .	Brooklyn, N. Y.	516 Kelly St., Pgh.
Lazier, Alexander.	Pittsburgh.	2106 Bedford Ave.
Levin, Ben.	Pittsburgh.	927 Vickroy St.
Lewis, George Harold.	Wilkinsburg.	704 Whitney Ave.
Lindenberg, Meyer Edward. . .	Pittsburgh.	4 Scott St.
Low, Joseph McMillan. . . .	Wilkinsburg.	747 Franklin St.
Lowe, William Thomas. . . .	Pittsburgh.	124 Henderson St.
Lucas, Cloyd Isaac.	Pittsburgh.	7810 Bennett St.
Ludolph, Charles Clifford. . .	Pittsburgh.	3501 Melwood Ave.
Lynch, John Frederick.	Pittsburgh.	5642 Second Ave.
Lyon, George D.	Pittsburgh.	1402 Ohio St., N. S.
McCaffrey, Daniel Michael. . .	Sheridanville.	
McClintock, John Crawford. .	Carrick.	341 Fourth Ave., Pgh.
McCloy, Arthur Sheldon. . . .	Pittsburgh.	4747 Friendship Ave.
McConnell, Albert Milligan. .	Pittsburgh.	1932 Lithgow Ave., N. S.
McConnell, Forbes Holton. . .	Pittsburgh.	422 Brushton Ave.
McConnell, Robert Oliver. . .	McKeesport.	713 Converse St.
McCoy, Harry Dellselle. . . .	Aspinwall.	
McCrae, James Valentine. . .	McKeesport.	1007 High St.
McEvoy, Harry Chester. . . .	Amherstburg, Ont. . . .	435 Shady Ave., Pgh.
MacEwan, Andrew Johnston. .	Pittsburgh.	700 Collins Ave.
McEwen, Dayton Clair. . . .	Irvona.	223 Homestead St., Pgh.
McGregor, Charles Paul. . . .	Pittsburgh.	732 Boggs Ave.
McIntire, Burrell Gilchrist. .	Pittsburgh.	7945 Madeira Ave.
McIntosh, James.	Edgewood Park. . . .	312 Laurel Ave.
McKee, David Oliver.	Pittsburgh.	7941 Tioga St.
McKee, James Jerome.	Pittsburgh.	213 N. Euclid Ave.
McKelvey, Earl Craig.	Ligonier.	7342 Denniston Ave, Swsvl.
McMonigle, Chester Clyde. . .	Pittsburgh.	3330 Fleming Ave., N. S.
McMonigle, Earl Emery. . . .	Pittsburgh.	3330 Fleming Ave., N. S.
McWilliams, Ira Mendall. . .	East Pittsburgh. . . .	515 Ridge Ave.
Madgett, Clarke John.	Hamilton, Can. . . .	5910 Rippey St., Pgh.
Mahla, Richard August. . . .	Ingram.	48 McKee St.
Manning, John Paul.	Munhall.	1215 Margaret St.
Markley, Nelson S.	Pittsburgh.	515 Cato St.
Marsh, David Garfield. . . .	Pittsburgh.	6718 Simen St.
Marshall, Joseph Barckley. . .	Pittsburgh.	5721 Walnut St.
Martin, Robert Coulter. . . .	Pittsburgh.	713 College Ave.
Mayer, Adolph, Jr.	Pittsburgh.	12 Diana St., N. S.
Moldenhauer, Carl William. .	Pittsburgh.	1834 Pioneer Ave.
Morrison, Paul Hayes.	Coraopolis.	P. O. Box 197.
Murphy, Michael Charles. . .	Pittsburgh.	220 Darrah St.
Myers, William Ellsworth. . .	Pittsburgh.	5106 Dearborn St.
Mytinger, John Roy.	Wilkinsburg.	807 Wood St.
Nelson, Leslie Alan.	Pittsburgh.	7520 Kelly St.
Newman, Sidney Julius. . . .	Braddock.	629 Margaretta St.
Northart, Paul Ray.	Pittsburgh.	2117 Liberty Ave.
Nycum, Simon Regis.	Wilkinsburg.	413 Kelly Ave.
O'Brien, William Clarence. . .	Pittsburgh.	6409 Dean St.
O'Connell, Presly Morris. . . .	Pittsburgh.	3428 Forbes St.
O'Neill, Frank.	Pittsburgh.	3 McKee St.
Palmer, Jay Rhodes.	Pittsburgh.	5916 Rippey St.

Patterson, William	Webster Mills	5919 Alder St., Pgh.
Popp, Theodore Harris	Wilkinsburg	531 Jeannette St.
Porter, Edward Milligan	Pittsburgh	5810 Rippey St.
Raphael, Benjamin	Pittsburgh	143 Washington St.
Rebstock, Joseph Boniface	Carrick	48 Stewart Ave.
Rhodes, Arthur William	Swissvale	1912 Wayne St.
Richards, Brinley James	Pittsburgh	311 Buckingham Apts.
Riding, Joseph	Pittsburgh	54 Almeda St.
Robinson, Charles Eldon	Williamsport	800 Sherman Ave., N. S.
Rollins, Mathias Clark	Pittsburgh	Omaha St.
Rosenfield, Samuel David	Pittsburgh	501 Cato St.
Rowan, William Hugh	Pittsburgh	717 Arch St., N. S.
Rupp, Clarence Rhinehart	Pittsburgh	606 Greenfield Ave.
Ryan, Frank James	Pittsburgh	5320 Gertrude St.
Sanon, Ernest Etienne	Munhall	
Saur, Harry Earl	Carnegie	821 Ridge Ave., N. S.
Scheider, John Martin	Mt. Oliver	124 Sherman St.
Schleicher, Lawrence	Sharpsburg	618 High St.
Schmitt, August Joseph	Pittsburgh	2319 Jane St., S. S.
Schneider, Aloysius Andrew	Crafton	22 Creighton Ave.
Schnurmann, Paul	Pittsburgh	333 Denniston Ave.
Schreiber, Howard Jacob	Pittsburgh	7536 Hamilton Ave.
Schumann, Lloyd Benedict	Pittsburgh	542 Graham St.
Scott, William Collier, Jr.	Aspinwall	Sixth St.
Selheimer, David Crawford	Wilkinsburg	305 Penn Ave.
Selkovits, Harry	McKeesport	934 Market St.
Shaffer, William Henry, Jr.	Pittsburgh	1723 Sarah St.
Shourek, Theodore Luke	Pittsburgh	811 East View St.
Shrum, Wade Nelson	Pittsburgh	1013 Penn Ave.
Siefert, Martin Homer	Pittsburgh	24 Richey Ave., N. S.
Smith, David Middleton	McKees Rocks	826 Island Ave.
Smith, Michael Lawrence	Pittsburgh	2818 Sarah St.
Snow, John Hopkins	Pittsburgh	4900 Liberty Ave.
Snyder, Louis Anthony	Pittsburgh	7825 Hamilton Ave.
Stern, Abe	Pittsburgh	2108½ Wylie Ave.
Stevenson, Harry Willis	Nadine	
Stewart, Charles Adderly, Jr.	Pittsburgh	605 Hampton Ave.
Stewart, Edward Leo	Ambridge	532 Melrose Ave.
Suck, Edward Charles	Pittsburgh	227 Dilworth St.
Swan, Peter Christison	Sharpsburg	127 Twenty-third St.
Taft, Stanley Cole	Pittsburgh	7135 Kedron Ave.
Taggart, Charles Morrison	Pittsburgh	39 Junilla St.
Tessmer, Paul Frederick	North Braddock	
Thomas, Harold Burgess	Homestead	Eighth & Amity St.
Threnhauser, John Clyde	Carrick	323 Spencer Ave.
Thropp, Claude Ridgley	Pittsburgh	3432 Forbes St.
Vaughn, Richard Earl	Knoxville	233 Jucunda St.
Vetter, Carl Michael	Sheridanville	
Welch Albert Arthur	London, England	6428 Penn Ave., Pgh.
Weller, Paul C.	Pittsburgh	50 Miller St.
Wells, Oliver Andrew	Pittsburgh	7600 Bennett St.
Wheatley, Robert Stephen	Salineville, O.	254 Addison St., Pgh.
White, John Stanley	Avalon	623 Hemlock St.

Wible, Joseph Edward. . . .	Hollywood, Md.	Turtle Creek.
Williams, Albert Delmont. . .	Pittsburgh.	314 N. Lang Ave.
Williams, Edward Thomas. . .	Pittsburgh.	1840 Jancey St.
Wilson, Robert Anderson. . .	Pittsburgh.	5526 Graham Place.
Wilson, Tom.	Homestead.	107 E. Eleventh Ave.
Wood, Homer Dow.	Pittsburgh.	7401 Race St.
Work, James Gillespie.	Pittsburgh.	21 Allen Ave.
Yost, Elmer Philip.	Mt. Lebanon.	2034 Penn Ave., Pgh.
Young, Raphael Nesbit. . . .	Pittsburgh.	5903 Broad St.
Zoeller, Howard Scott. . . .	Oak Station.	
Zuver, George Henry.	Pleasantville.	912 Wallace Ave., Wlk'b'g.

Carnegie Technical Schools

Pittsburgh, Pa.

School for Apprentices and Journeymen

Trade Courses in
Manufacturing and Building Industries

Day School Night School

Announcement

1908-1909

This School has three distinct divisions offering separate courses of instruction:

1 DAY COURSES
- In Mechanical Drawing.
- In Stationary Engineering.
- In the Machinery and Building Trades.

2 NIGHT COURSES
- For Apprentices in the Machinery and Building Trades.
- For Journeymen in the Machinery and Building Trades.
- For Stationary Engineers.
- For Foundry Foremen.

Calendar

1908

	DAY	NIGHT
Closing Dates	Friday, May 1, 4 P.M.	For Journeymen, Thursday, April 30, 10.30 P.M. For Apprentices, Friday, May 1, 10.30 P.M.
Interviews for Admission	Monday, Sept. 28, 10 A.M. to 4 P.M. Tuesday, Sept. 29, 10 A.M. to 4 P.M.	Thursday, Oct. 8, 7 P.M. Friday, Oct. 9, 7 P.M.
Registration and Payment of Tuition Fees	Monday, Oct. 5, 9 A.M. to 12	Thursday, Oct. 15, 7 P.M. Friday, Oct. 16, 7 P.M.
School Year Begins	Monday, Oct. 5, 1 P.M.	Monday, Oct. 19, 7:30 P.M.

1909

Closing Dates	Friday, April 30, 4 P.M.	For Journeymen, Thursday, April 29, 10.30 P.M. For Apprentices, Friday, April 30, 10.30 P.M.
Interviews for Admission	Monday, Sept. 27, 10 A.M. to 4 P. M. Tuesday, Sept. 28, 10 A.M., to 4 P.M.	Thursday, Oct. 7, 7 P.M. Friday, Oct. 8, 7 P.M.
Registration and Payment of Tuition Fees	Monday, Oct. 4, 9 A.M. to 12	Thursday, Oct. 14, 7 P.M. Friday, Oct. 15, 7 P.M.
School Year Begins	Monday, Oct. 4, 1 P.M.	Monday, Oct. 18, 7:30 P.M.

Day sessions will be held every week-day except Saturday, beginning at 9 o'clock.
Night sessions will be held every week-day except Saturday, beginning at 7:30 o'clock.
Courses for Apprentices, Monday, Wednesday and Friday.
Courses for Journeymen, Tuesday and Thursday.

Vacations and Holidays

There will be no sessions on Thanksgiving day or the Friday following.
Christmas recess begins Friday, December 18, at 10:30 P.M., and ends Monday, January 4, 1909, 9 A.M.
Holidays are Lincoln's Birthday, February 12; Washington's Birthday, February 22; Founder's Day, last Thursday in April; Decoration Day, May 30, and Election Day, November 3, 1908.

Faculty

Arthur A. Hamerschlag, Sc.D.	Director
Clifford B. Connelley	Assistant to the Director. Head of School for Apprentices and Journeymen.
Charles C. Leeds	Assistant to Head of School for Apprentices and Journeymen. Instructor in Mechanical Drawing.
William Pfouts	Instructor in Pattern Making.
Thomas F. Payne	Instructor in Plumbing.
David Burns	Instructor in Mathematics.
Hugh A. Calderwood	Instructor in Electric Wiring.
John T. Morris, A.M.	Instructor in Shop Mathematics.
Benjamin E. Birge	Instructor in English.
Robert B. Leighou, Sc.B.	Instructor in Chemistry.
John H. Nolen	Instructor in Bricklaying.
Charles H. Day, M.M.E	Instructor in Mechanism and Materials.
John S. Taylor	Instructor in Smithing and Forging.
Peter W. Hepburn	Instructor in Machine Work.
William H. Dosey	Instructor in Foundry Practice.
Jay R. Brown, B.S.	Assistant Instructor in Mechanical Drawing.
Edwin H. Smith	Assistant Instructor in Pattern Making.
William J. Hamilton	Assistant Instructor in Machine Work.

Part Time Instructors

Frederick Giffin, B.Ar.	Instructor in Plan Drawing.
Alva G. Corrao	Instructor in Mathematics.
Charles W. Motts	Instructor in Sheet Metal Work.
John F. Driscoll	Instructor in Plumbing.
John P. Otterson	Instructor in Sign Painting.
Richard F. Tischer	Instructor in House Painting and Hardwood Finishing.
F. E. J. Litot	Assistant Instructor in Electric Wiring.
Max Graman	Assistant Instructor in Machine Work.
M. A. Houston, A.M.	Assistant Instructor in Mathematics.
Samuel R. Bachtel	Assistant Instructor in Mechanical Drawing.
Samuel A. Curry	Assistant Instructor in Mathematics.
Edward H. Kurtz	Assistant Instructor in Sheet Metal Work.
Sydney S. Baker	Assistant Instructor in Mechanical Drawing.
Warren A. Emery	Draftsman.

Officers of administration are members, ex-officio, of the faculty.

Standing Committees

Committee on Faculty Organization

MR. CONNELLEY — MR. FIELD

MR. LEETE

Committee on Entrance Requirements

MR. MORRIS — MR. PAYNE

MR. BROWN

Committee on Student Organizations and Publications

MR. FIELD — MR. PFOUTS

MR. BIRGE

Committee on Inter-Schools Relations

MR. LEEDS — PROFESSOR MCGOODWIN

PROFESSOR CRABTREE — MISS BALDWIN

Committee on Education, Curriculum and Standing

MR. LEETE — MR. DAY

MR. LEEDS — MR. TAYLOR

MR. CALDERWOOD — MR. LEIGHOU

The Director and Mr. Connelley are members, ex-officio, of all committees.

School for Apprentices and Journeymen

GENERAL STATEMENT

THE School for Apprentices and Journeymen provides courses of instruction which are essential to an industrial or trade education.

This School offers three distinct groups of courses:

1. Day Industrial Courses.
2. Night Trade Courses for Apprentices.
3. Night trade Courses for Journeymen.

The system of instruction adopted in these courses has been designed to give the student a broader knowledge than it is possible to obtain under the prevailing system of specialization, or minute sub-division of trades, which has succeeded the well tried European system of apprenticeship and made it difficult for the American mechanic to acquire a general training in his trade.

The School for Apprentices and Journeymen does not attempt, in either the day or the night courses, to develop skilled mechanics, but offers instruction to supplement the usual apprenticeships; to strengthen the reasoning faculties; to teach both the theory and the practice of the trades to those who are gaining most of their knowledge through the practical operations of their employment, and to prepare them for more advanced positions in their chosen lines. Nothing that is produced in the School shops will be offered for sale. The articles made will be used in other departments of the School for purposes of instruction, or will be reduced to stock.

The money value of training such as is given in this School depends upon the individual student's skill and determination to succeed when he completes his course. He is assured, however, of a market for his services at an average rate of pay sufficiently remunerative to be attractive, and to compensate him for the time spent in the Schools.

The following chart shows the money value of skilled and unskilled labor. Clerks, bookkeepers, stenographers, etc. earn an average rate of pay considerably less than that paid to skilled mechanics.

STATISTICS FROM THE UNITED STATES BUREAU OF COMMERCE AND LABOR

BUILDING TRADES

Plumbing	$.5392		
Painting	.3842		$ .476 per hour.
Bricklaying	.6205	Average:	3.73 per day.
Electric Wiring	.4281		22.37 per week.
Sheet Metal	.4283		
Unskilled Labor			$ .1956 per hour.
			1.74 per day.
			10.45 per week.

MACHINERY TRADES

Blacksmithing	$ .3130		
Machinist Work	.2922		$ .316 per hour.
Molding (Brass)	.3064	Average:	2.95 per day.
Molding (Iron)	.3217		17.70 per week.
Pattern Making (Wood).	.3491		
Unskilled Labor			$ .1692 per hour.
			1.61 per day.
			9.69 per week.

METHODS OF TEACHING

The method of teaching adopted in the School is as nearly as possible individual, the rate of progress being determined by the completion of one exercise, drawing, or experiment before the next is taken up. Related subjects are taught in parallel, i. e., at the same time. The academic studies are interspersed with practice. Therefore, the student's progress in securing his credit units depends upon himself, his industry, and his ability to complete the allotted tasks creditably, in the minimum period of time.

ARRANGEMENT OF WORK

English, shop problems, mathematics and drawing will receive emphasis during the early part of the course; practice in the shops, estimating and accounts, and the theory underlying practical applications, toward the end of the course.

IMPORTANT SUBJECTS—Each class room is a laboratory for crystallizing the fundamental principles of the same subject in different ways.

In order to understand the trade names and processes, *English* is necessary.

In order to describe the work, *Drawing,* the graphical means of expression, is taught.

In order to understand computation of quantities in practical problems, *Mathematics* is highly important.

In order to understand how to construct intelligently and to know how and why a thing is done, knowledge of the *Theory* of physical and chemical laws is necessary.

In order to appreciate relative values, *Estimates, Accounts* and *Costs* are studied.

In order to produce results, skill and practical experience are required. *Shop practice,* therefore, is given to as large an extent as possible, in order that knowledge obtained in the other subjects may be tested and used.

The work offered in all courses may accordingly be classified as follows:

1. MATHEMATICS AND ENGLISH. 2. MECHANICAL DRAWING. 3. THEORY UNDERLYING THE WORK. 4. SHOP WORK.

Mathematics and English

Instruction in Mathematics begins with the general processes of arithmetic fundamental to all trades. The advanced work is planned to be especially useful and interesting to the students of each trade. Individual instruction is given in all cases where practicable, and the classes are so arranged that individual effort is recognized.

The work in English is designed to give practice in spelling, in oral and written expression, and an understanding of trade and technical terms.

Mechanical Drawing

The fundamental exercises in drawing are of the same general nature for all students, and are applicable alike to all trades. After the initial lessons, the work for the machinery trades is of an entirely different character from that for the building trades, and the work for the latter trades is again subdivided to suit each trade, after certain work of a general nature has been finished. The instruction is individual and each student may progress as fast as he is able to grasp the work, entirely independent of the progress made by his classmates.

Theory Underlying the Work

Instruction consists of lectures and demonstrations to bring out clearly the basic principles of the work of each trade, and to teach the chemical and physical properties of the materials of construction estimating of costs, etc.

Shop Work

The various shops of the School are provided with complete and modern equipment such as is found in the best commercial shops, and the instruction consists of explanation of the construction, use and care of the different machines, tools and fixtures, and the selection of materials.

DAY INDUSTRIAL COURSES

These courses are offered, primarily, to meet the existing demand for proficient men in the machinery and building trades, where a reasonable amount of technical information and trained intelligence is essential. In each of these industries men who are trained to reason, to act quickly, and to organize and efficiently direct groups of men are in constant demand to occupy positions of trust and responsibility. By necessity such positions are now filled from the ranks by gradual selection, men being promoted from lower to higher posts though frequently lacking in some of the requisites demanded by the advanced positions. It is to meet this particular need that this system of instruction is offered.

Students who are already employed, and who wish to enter the day classes, may do so by spending a portion of each year in commercial employment and a portion in the shops, class rooms, or drawing rooms of the School. Modern conditions make it imperative that the future mechanic or foreman shall be partially trained in a school of this type in the same way and with the same efficiency as the modern engineer is partially trained in the engineering school. In view of the great growth of the manufacturing and building industries, men who are thus prepared will be in demand, when they have completed their preliminary or combined training in school and industry. The instruction offered should fit those who have already selected a vocation and have had some experience to secure positions as foremen, assistant superintendents, or master mechanics, and eventually to become employers of skilled labor, as building contractors or manufacturers.

These courses are equally effective for those who have been deprived of an early schooling; for those who do not find that the high schools afford the preparation required to fit them for immediate entrance upon industrial employment; and for those who have had practical experience in the shop, mill or factory. They will find here provided a course of instruction which demands for admission comparatively little educational equipment. This foundation is supplemented by special instruction, during the latter part of the course, in that particular division of an industry which the student wishes to make his occupation. The fundamentals of the curriculum are English, Shop Mathematics, Drawing, Principles of Mechanisms, Chemical Properties of the Materials of Construction, and Shop Practice.

LENGTH OF COURSE

The time required to complete the work, by all students who are candidates for certificates of the Day Industrial Courses, will necessarily vary with the student's prior preparation and experience, as well as with his work while a student in the School.

Students with reasonable preparation should be able to secure the necessary number of credit units for a certificate in approximately two

years. Students with less preparation may require an additional year. Men of more maturity, and longer experience, may find it possible to complete the work in less time.

It is not essential that the years be in sequence, as it may be necessary to have an interval of a year or two between periods, to enable the student to earn the necessary funds to maintain himself during his school attendance. It is urged that the intervening time, however, be in every case spent in the chosen vocation.

The average young man who is ambitious to fit himself for a vocation can, by reasonable effort, find the time to acquire the training which is offered in these Schools.

AGE FOR APPLICANTS

The ideal age for applicants depends upon two factors: First, the amount of preparation which the applicant has acquired in other schools; second, the character of the environment the graduate must face when he leaves this School. At sixteen years, the earliest age at which a student can appreciate the responsibility and the intensity of his work, good intellectual preparation, equivalent to a year or two of high school, combined with at least an average physique, is desirable.

Some vocations demand more maturity than others; the building trades demand more than the manufacturing; drafting and operative stationary engineering, more than either of the above named. The ideal entrance age is, for the Machinery Trades, minimum 16, preferably 18; for the Building Trades, minimum 17, preferably 19; for Draftsmen and Stationary Engineers, minimum 18, preferably 20.

This information is given for the guidance of both parents and students, so that they may be fully informed concerning conditions which militate favorably or unfavorably to the student, after he leaves this School.

ENTRANCE REQUIREMENTS

First. A personal interview to discover the candidate's adaptability and personality with respect to the course he selects. Applicants, on this interview, are either approved or not approved. An applicant who is not approved on personal interview may be admitted on probation for one term, but will be dropped at the end of that term unless he shall have maintained creditable standing in his course of study.

Second. Evidence of prior training or experience: Letters from teachers in high schools, preferably of the manual training type, giving a list of the studies completed, grade marks, etc., will be considered in determining the candidate's adaptability and preference for admission. Letters of reference from previous employers, giving evidence of practical experience in shops or trade, will be accepted in lieu of letters from a high school.

Special Students. Applicants who are not candidates for a certificate may be admitted, after a personal interview, in consideration of circumstances, as special students for any one of the individual subjects of the course, if such a plan seems to the best advantage of the individual.

COURSES OFFERED

For the year 1908-1909 two-year Day Courses are offered in the following trades:

Mechanical Drafting
Stationary Engineering
Machinery Trades
Building Trades

OUTLINES OF COURSES

The following statements outline the subjects taught in each of the separate courses, and show the required number of credit units which must be obtained in order to secure a certificate.

For the further guidance of the student, a credit unit is defined as the amount of credit allowed for the satisfactory completion of the assigned work of a term in a course of one hour a week of recitation or lecture or two hours a week of drawing, shop or laboratory practice.

Mechanical Drafting	Credit units.
Properties of Materials	6
Drawing	20
English	8
Mathematics	16
Principles of Mechanisms	10
Shop Practice (Machine, Pattern, Forge and Foundry)	18
Total	78

Stationary Engineering.	
Properties of Materials	6
Drawing	6
English	8
Mathematics	16
Principles of Mechanisms	5
Shop Practice (Machine, Pattern, Forge and Foundry)	17
Stationary Engineering	20
Total	78

MACHINERY TRADES

Properties of Materials	7
Drawing	10
English	8
Mathematics	15
Principles of Mechanisms	5
Shop Practice (Machine, Pattern, Forge and Foundry)	33
Total	78

BUILDING TRADES

Properties of Materials	5
Drawing	6
English	11
Mathematics	16
Principles of Mechanisms	6
Shop Practice (Plumbing, Bricklaying and Electric Wiring)	34
Total	78

A student who can satisfactorily pass an examination in any of the above subjects will receive credit in that subject.

The School is in session six hours a day for five days a week, or approximately eight hundred hours in a year. The school year is divided into two terms; the first term ends at the Christmas holidays, the second term at the conclusion of the school year.

TUITION FEE

For residents of the City of Pittsburgh.....$20.00 per year
For all others..... 30.00 per year

The entire tuition fee for the year must be paid in advance.

A deposit of $5.00 must be made by each student at the beginning of the school year to cover breakage, locker rental and incidental fees. The unused portion will be returned, upon request, at the end of the year.

Each student is expected to buy his drawing instruments and supplies, which may be secured at the school at cost price.

ATHLETIC FIELD DUES

Payable upon registration as per statement on page 19.

COST OF LIVING

Students not residing in Pittsburgh may obtain information concerning living quarters by applying at the general office, which provides a carefully selected list of houses in the neighborhood of the Schools, at which board and lodging may be obtained at rates ranging from $5.00 a week upward.

SUBJECTS OF INSTRUCTION

A brief outline of the instruction offered in the different subjects of the various courses follows:

Mathematics

(Day and Night)

All the principles, methods, and formulas in Mathematics will be applied to practical problems, with direct reference to the course or trade to be followed, short and rapid methods of using principles being considered more important than merely memorizing processes.

ARITHMETIC. Special drills in fractions, decimals, involution, evolution, ratio, proportion, percentage and mensuration, involving practical problems that occur in the respective trades.

ALGEBRA. Elementary processes, factoring, highest common factor, least common multiple, fractions, simple equations, involution, evolution, indices, surds and quadratic equations.

GEOMETRY. Elementary Plane and Solid.

PLANE TRIGONOMETRY. Trigonometric functions, logarithms and the solution of plane triangles for draftsmen and students in the Machinery Trades.

English

(Day and Night)

Students are given practice in spelling, writing, and speaking, to the end that ability to state thoughts correctly may be obtained. Spelling ordinary and technical words, writing business letters, writing essays on scientific and trade subjects, impromptu discussions of pertinent questions and criticism of written work, constitute the first year's work. A course of home reading under the guidance of the teacher is also required.

After a considerable knowledge of ordinary forms and skill in their use has been acquired, the writing and reading of specifications will receive attention, in addition to practice in writing on general topics. Debates will be frequently held, that ability to think and speak with ease and correctness before others may be acquired.

Principles of Mechanisms

(Day and Night)

The work begins with a general elementary study of mechanics. First, forces are studied, then simple machines, work, power and the simpler motions. This part of the course is intended to teach the student to apply his mathematics, and to give the principles which are used in machines.

After the student has become familiar with the general principles, the course becomes more specific, and special stress is laid on those principles

which directly pertain to the different trades. Thus, the machinery trades take up more advanced work on pulleys, calculating the size of gears, etc., while the building trades take up the subject of blocks and sheaves and the windlass; the plumbers, the study of elements of hydraulics, flow of water through pipes, etc. The work consists of recitations, demonstrations, and visits to machine shops, buildings under construction, etc., and gives the student not only a theoretical knowledge, but also shows him how these theories are used in actual practice.

Next, the physical properties of materials are studied, including simple tests of their strength in tension and compression. This part of the course is intended to show the student why different materials are best adapted for different purposes.

The latter part of the course takes up the strength of machine parts, beams, girders, masonry work, pipes, fittings, etc., and is supplemented with problems in design.

Chemical Properties of Materials for Courses in the Building Trades

(Day and Night)

This work is designed primarily for a study of the composition of the materials used in the building trades; the effects of various disintegrating agents constantly at work upon them, and methods of combating these attacks. Work is given both in the lecture room and laboratory, and in addition outside investigation, where buildings are under construction. The characteristics and properties of the materials used are discussed, as well as their preparation and treatment.

Only that part of the *general theory* of chemistry is given which is necessary for an understanding of the particular problems of the building trades.

Some of the specific subjects considered are the properties of building materials in general, of woods, bricks, mortars and cement of various kinds; the qualities and changes of the alkaline earths, clays, and sands; the properties of the various metals and their alloys; the composition of solders; galvanizing; septic sewage treatment, etc.

Chemical Properties of Materials for Courses in the Machinery Trades

(Day and Night)

In this work, as in that for the building trades, only the necessary fundamentals of chemistry are taught. A study is made of the chemistry of iron; action of oxygen; action of acids; the reduction of iron compounds; the making of steel; and the effect of the various forms of carbon, of sulphur, phosphorous, silicon, manganese, nickel, etc., upon iron and steel; the reactions in the cupola; the chilling and annealing of steel; the making of malleable castings; and the micro-structure of steel.

Mechanical Drawing

(Day and Night)

This work is taken up with the assumption that the student has had no previous experience or knowledge of the subject.

The instruction is individual, each student progressing as fast as his ability will allow.

The use of models is almost entirely dispensed with, the aim being to stimulate the students' faculty for making mental pictures, and to develop men who will think for themselves.

The work varies with the different courses, the aim of each course being kept in view in the preparation of this work.

Draftsmen's Course. The object of the draftsmen's course is to develop thoroughly practical detail draftsmen—young men who are prepared to earn their livelihood with a practical knowledge of drafting and elementary machine design. Briefly, the work consists of the following: Fundamental exercises to familiarize the student with draftsmen's tools, their uses and the proper method of handling; lettering; sketching; tracing; a study of projection; machine details; drawing to scale; engineering curves; toothed gearing; intersections and developments; drawing from specifications; complete detail and assembly drawings; a study of cams; elementary machine design.

Machinery Trades. The work for the students in the Machinery Trades is prepared for the purpose of familiarizing them with working drawings; the aim being to teach them to read and use these drawings as readily as they do the other tools of their trades.

Fundamental exercises; sketching; tracing; a study of projection, machine details; drawing to scale; toothed gearing; complete detail and assembly drawings of several machines.

Building Trades. As in the machinery trades, the work for students in the building trades is prepared for the purpose of teaching them to read and thoroughly understand building plans.

This work consists of exercises to familiarize the students with drawing tools and their uses; sketching; tracing; a study of projection; floor plans of simple dwelling houses; plans of apartment houses; special work which applies to each trade.

Stationary Engineering

(Day and Night)

This subject is taught by lectures, demonstrations, and inspection trips to power houses in and around Pittsburgh. Actual operation of steam and gas engines and electrical machinery is also required of all students in this course who have not had practical experience in such work.

This work requires employment for at least five months in a power house, which can be had during the summer months.

The lecture course covers, first, the underlying principles of the generation of power and includes such parts of physics and chemistry as are

required. Then the study of coals, liquid and gas fuels, and water is taken up. The rest of the course is divided into four parts, viz., boiler room practice, engine room practice, gas engines and their fuels, and inspection and maintenance of electrical equipment.

The work is covered in the following order:

BOILER ROOM PRACTICE. Furnaces; types of boilers; size of boilers; essential points of good boilers; boiler troubles; boiler tests; losses in boilers; chimneys; draft (natural and mechanical); economizers; feed water heaters; feed pumps; heating and ventilating systems.

ENGINE ROOM PRACTICE. Simple engines (high and low speed); condensers; valves; indicator cards; governors; compound engines; economy of steam engines; steam engines and steam turbines; steam engines vs. steam turbines.

GAS ENGINES AND THEIR FUELS. Natural gas, coal gas, producer gas; producer gas plants; gas engines, theory and practice; types; troubles; economy; gas engines vs. steam engines.

INSPECTION AND MAINTENANCE OF ELECTRICAL EQUIPMENT. The operation of electrical generators and motors, their care and inspection; switchboards; electrical measuring instruments; testing for grounds; arc and incandescent lights, their operation and care.

A number of inspection trips are taken during the year, the purpose of which is to show the student how conditions affect the design and operation of the various power houses. Each student is required to write a report of the trip, not only describing the equipment, but also the special features of the plants visited.

Shop Work

In the shop work, theory and practice are combined and the instruction so shaped as to maintain them in proper balance. The object sought is to develop the ability to execute, as well as to plan, in order that the hands may skillfully put into concrete form the conceptions of the mind. Mere manual dexterity is not the chief end of this training, but equal effort is exerted to cultivate the powers of observation, foresight, judgment, order, and discipline, upon which depend success in the organization or direction of business undertakings.

MACHINE SHOP WORK

In the Machine Shop, by means of lectures and demonstrations, the student is taught the names, use, and care of hand tools; instruments for precise measurements; the principles, construction, adjustment and general operation of machine tools, such as drilling, boring, planing and shaping machines and lathes of all descriptions, together with their correlation in the economical production of the manufactured article; the various methods of manipulating metals of different character; tool making; jigs and their uses; floor-work; laying-out and assembling.

Each lecture and demonstration is followed by exercises, or drills, which enable the student to apply the instruction received and to acquire

a considerable amount of skill. All work is done from blue prints and special instruction in reading drawings is part of the course.

The exercises begin with chipping and filing, involving a study of the tools used, with reference to their shape, size and cutting angles. The work includes chipping chamfers, flat, concave, and convex surfaces, keyways, and "chipping to shoulder;" study of the names and classification of files; discussion of the "cut," tooth—angles, and uses of each form, and methods of holding, and "laying out" the work; exercises in cross filing, draw filing, freehand filing, etc.

Instruction is given in the mechanism of machine tools used, careful attention being paid to various adjustments for the work in hand. The advantages, methods of use, and limits of accuracy of each of the different measuring tools and devices are studied. As each cutting tool is taken up, its cutting angles and general adjustments are discussed, together with the "feed," and cutting speeds suitable for different materials and machines.

The course includes instruction in centering; squaring; straight and taper turning and fitting; outside and inside screw cutting; chucking; reaming; finishing and polishing; drilling; tapping; mandrel making; grinding; lapping; boring; brass turning and finishing; the use of milling machines; gear cutting; tool making, such as the making of taps, drills, reamers, milling cutters, and cylindrical gauges; designing and making of jigs.

PATTERN MAKING

The work in pattern making provides thorough training in the sharpening, adjustment, care and use of bench and machine tools; the selection of supplies (lumber, shellac, glue, etc.); and the storage and seasoning of lumber.

The exercises include sawing, planing, chiseling, wood turning (as applied to pattern making) and measuring, as a preliminary step toward making a student skillful enough to carry out the course, which includes the reading of drawings, and the making of a number of patterns, each of which is especially designed to demonstrate certain distinct requirements in draft, core prints, core boxes, allowance for shrinkage, etc.

Each exercise is preceded by a lecture and demonstration of the subject under consideration.

The student then receives general information in making, marking, and storing of patterns, and in the arrangement and management of the shop.

FOUNDRY

Practice is given in tempering sand, and in moulding with dry loam and green sand; the use and care of tools and flasks for bench- and floor-work.

Bench-work will consist of making sheaves, rollers, brackets, test bars, pulleys, face plates, etc.

Floor-work will consist of moulding sprocket wheels in green and dry sand, moulding cylinders, sweeps and templates, cylinder heads, pistons, drums, "tees," "ells," etc.

Core making—The making, drying, venting, handling, and setting of cores.

Core sand mixtures—Green and dry sand facings, preparation and management of cupola lining, drying and care of ladles.

Mixtures of iron—For cylinders, pulleys, beds, and other shapes.

Lectures will be given during the course on related subjects, such as moulds,—their ramming, venting, gating, pouring, etc.; castings,—cleaning, chipping, pickling, etc.; tools, flasks, sands, cupolas, cores, moulding, and floor work.

COURSE FOR FOUNDRY FOREMEN

A course designed to illustrate in a systematic way the variation in the properties of metals due to variations in chemical composition or to other conditions at the command of the foundryman.

The course of instruction offered includes a study of the quality and quantity of various substances used in foundries; the effect of silicon, sulphur, phosphorus, manganese, combined carbon, graphitic carbon, etc., on the properties of cast iron; methods of melting and testing iron; making malleable and chilled castings, steel castings, brass castings, etc.

Different mixtures of iron, planned to illustrate the effect of each variant, will be melted in a small cupola, cast into test bars, and tested in the different testing machines and by other methods, in order to secure a complete record of physical properties in each case.

This course which is offered to Foundry Foremen and Superintendents is of a special nature, therefore special requirements for admission are demanded. First—A personal interview to ascertain the earnestness of purpose of the individual applying for instruction. Second—Evidence that the applicant holds a position as foreman or superintendent in a foundry or kindred shop.

There will also be given a course of lectures on the metallography and composition of cast iron.

This course is indeterminate in length, and is offered to night Journeymen only. No certificate will be issued at its completion.

FORGING

This course furnishes practical instruction in the use of each tool in the shop; the study of each material used, with an explanation of its various grades and the proper methods of treatment for each; and the discussion of methods for making small and large forgings.

The ground covered includes instruction in the building and care of fires; description of fans and forges; names and purposes of tools; pointing of iron—square and round points; forging of staples, gate hooks, and S hooks; squares, octagon and hectagon shapes; shaft keys, bending angles, pipe clamps, I beams, brackets; upsetting and scarfing for scarf weld, lap

weld, or butt weld; making chains; forging solid rings, thumb screw nuts, etc.; forging and tempering of machinists' chisels (hot and cold); dressing shop tools; forging and shaping of lathe, milling, shaper, planer and boring mill tools.

Demonstrations are given showing the difference in composition of iron and steel; in annealing, forging, tempering, testing, and case hardening of iron and steel; interspersed with lectures on the history and manufacture of these materials.

PLUMBING

This course consists of lectures on methods and materials and practical exercises in the different branches of the plumbing trade, in the following order,—Lead and solder working; calking and installing cast iron pipe; installing and bending brass pipe; installing the Durham system of drainage; making drain traps and miscellaneous work; advanced work, such as setting up sinks, water closets and other fixtures; fitting up bath-rooms, etc.

Lectures with demonstrations of ventilation, syphonage, construction of traps, fixtures, etc.

Lectures on the history of plumbing, and technical improvements in the construction of such fixtures as water closets, and their tanks, valves, etc.; also on the different principles upon which valves are made, such as gate, compression, balanced, short lever, slow-closing, etc.; modern plumbing in tall buildings; pumps, ejectors, sewerage, etc.

BRICKLAYING

The bricklaying course consists of practical exercises in, and lectures on, the different branches of the trade. It will cover the following points: Tools—their use and care; proper handling of mortar; striking of different kinds of joints; building straight walls of different thicknesses; angles, piers, arches, fire-places; setting of different walls, frames and caps; building of scaffolding,—inside and outside; the application of fireproofing upon steel structural shapes; brick and terra cotta, floor arches, etc.; ornamental cornices; the use of concrete in building; pressed brick work; placing drain pipes, etc.

The following lectures will be given during the course: The setting of centers; fireproof work; fireproof and red-clay brick; outside scaffolding; facing with pressed brick where stone or iron is to have a bearing; excavating to put in a footer course of concrete, stone, or brick; damp proofing; preparing mortar and cement, and the coloring of mortar; the uses of vitrified brick; setting stone and terra cotta walls; laying out and building arches.

ELECTRIC WIRING

This course is designed to furnish instruction in electric wiring, which embraces wiring for and placing in position arc, incandescent and other

electric lamps, and lighting fixtures; wiring for and connecting dynamos, motors, bells, annunciators, burglar alarms, interior telephones, etc.

Electric wiring deals with the practical details of the installation of commercial electrical apparatus in buildings, and not with the theory and design of such apparatus; hence, it must be clearly understood that it is not the intention or expectation to make the student an electrical engineer, but rather to equip him with a working knowledge of the theory and practice of the trade.

Shop work in electric wiring consists of instruction in the names, proper handling and care of the tools used, and correct posture of the workmen; the trade names and other usual designations of fittings, apparatus and materials in common use, such as the various wires, cables, insulators, switches, cut outs, etc.; and the operation, care and adjustment of the machine or apparatus under consideration, together with a study of its principles and construction.

By means of a series of carefully selected exercises, beginning with simple operations and methods common to all kinds of wiring, followed by tasks of gradually increasing difficulty, the student is led from making joints and splices, running wires on insulators, in mouldings, etc., to laying out systems of distributions, calculating sizes of conductors, and installing and connecting motors, etc.; particular stress being laid upon neatness and dexterity, and the observance of the rules of the National Electrical Code where they apply.

Lectures bearing upon the work in hand are given from time to time, each new problem being explained and discussed before proceeding with the actual work.

The students install operative systems of various kinds, special structures being erected for the purpose, and current is turned into them for tests. Some of the subjects treated are the following: Electric light and power wiring; exposed porcelain knob-work; cleat-work; concealed knob-and-tube-work; iron conduits; fixture wiring; panels and switchboards; electric bell and annunciator wiring; bells in multiple and in series; return-calls; house and hotel annunciators, burglar alarms; watchmen's clock systems. Telephone wiring; interior telephones, switchboard and intercommunicating systems; the telephone and its parts,—receiver, transmitter, induction coil, etc.; laboratory work; experiments in electricity and magnetism.

SHEET METAL AND CORNICE WORK

The course in sheet metal and cornice work consists of instruction in the care and use of hand tools and machines; soldering fluxes and their uses; the cutting out, forming and assembling of work; the different methods of erecting work under various conditions; machine and hand raised work.

DRAWING. Geometrical drawing; projection of points, lines and solids, sections and intersections of solids; principles of pattern drafting—parallel method, radial line method, triangulation.

DETAILING. Application of the above principles to the following list of problems: Square, panel and octagon miter; miter at any angle; round elbows; "T" joints in round pipes of different diameters; pilaster; conductor and exhaust heads; ventilators; balustrades; finials; pediments; moulding octagon in plan and elevation; raking brackets; gable mould against wash; dormer windows mitering against different shaped roofs; bull's eye window on dome; bay window base; wall mask mitering against head block; pinnacle; involved miters; transition pieces of different shapes; Y branches; tapering and compound elbows; automobile wheel guard; roof collars; problems in square duct work; skylights, development of spheres in gores and frustrums of cones, single pitch and double pitch, hipped, turret, open sash.

LECTURES. Shop equipments; best method of erecting work; galvanized iron, its use and misuse; copper, its adaptability and durability; the demand for good mechanics; pattern drafting as a profession; the field foreman, his duties, responsibilities, etc.; the shop superintendent; estimating—cost of production, quantities, etc.

HOUSE PAINTING, HARDWOOD FINISHING AND GRAINING

(Night only this year)

This department includes such branches of the painting trade as general house-painting, hardwood-finishing, kalsomining and tinting, glazing, graining, etc.

The class work consists chiefly of practical trade talks and lectures upon essential principles underlying practical application; the nature and qualities of different surfaces—wood, brick, stone, plaster, metal, etc., and their respective requirements and treatments; the elements, qualities, and combining of paints; the study of color—analyses of colors; tints and shades; harmonizing, contrasting, blending and toning of colors; nature of pigments and vehicles; their sources, relations and combining qualities; modern manufacturing of paints, oils, varnishes, etc.; the figuring of plans and estimating of work.

Shop work begins with the nature, care, and uses of brushes and tools; mixing and applying of paints; cutting and setting of glass; puttying, sand papering, and all the steps of proper development of work. Each student is required to mix and select needed materials; choose, harmonize and combine colors; apply same, and take entire charge of work under treatment, under the supervision of the instructor. Hardwood-finishing is a prominent feature of this department. The different processes and methods of treatment—stains and staining, filling, shellacing, varnishing, rubbing, polishing, refinishing, graining, etc., are carefully studied and applied.

SIGN PAINTING

(Night only this year)

This course consists of exercises to train the hand and eye in laying out, spacing, and forming letters; in the use and care of tools; in the mix-

ing and blending of colors; interspersed with lectures on the work to be performed and topics relative to the trade.

The work begins with an introductory lecture on the origin and history of Sign Painting, embracing a brief description of the different alphabets and their relative value for various kinds of work; the materials and tools used; the preparation and coating of wood, metal, brick and other surfaces for sign purposes, etc.

Shop work consists of drills in handling and care of tools; mixing and blending colors; preparation of various surfaces for sign purposes, coating wood, metal, brick, etc.; use of dryers; gilding on wood and glass; the use of the "lettering-pencil"; the use of "fitches," or stiff brushes; practice in lettering.

Lessons, during the early periods, will be almost entirely on paper, though students who have had some shop practice may be permitted to use sign boards. Carefully graded exercises will be given to train the hand and eye in laying out, spacing and forming letters; drawing straight lines and curves with chalk, etc. As students advance, more difficult letters and problems in "laying out" will be employed, and special instruction given in handling large signs, and in the various methods of executing brick wall work.

Students will be required to mix all the colors they use, and during the term each will be required to make a complete sign board.

Cleanliness, neatness and thoroughness are essentials, and will be insisted upon, and in no case may these points be slighted for the sake of speed.

Lectures, with demonstrations, will be delivered from time to time on the following subjects: Colors and their mixture; choice and blending of colors for special effects; style and proportion; design, decoration and commercial picture writing; bulletin-painting; wall-lettering; show-card writing; stencil-cutting; etching and embossing on glass; brass signs; mixing "composition," "cutting," acid bath, "filling," baking and paste fillers for metal signs; japanned tin signs; the use of ladders and swings; rope-splicing, knotting and making ties.

A number of lectures on business features of the trade will also be given, such as the commercial value of work, estimating, contracting, shop and trade work, etc.

LABORATORY AND SHOP EQUIPMENT

Principles of Mechanisms Laboratory

The equipment of this department is as simple as it is possible to make it, the idea being to show clearly the principles involved without confusing the mind of the student by using elaborate apparatus necessary in obtaining a high degree of accuracy.

Besides balances, measuring instruments, models of the simple machines, etc., this department has apparatus for showing uniformly accelerated motion, Newton's laws, and the other important principles of mechanics and hydraulics.

For the work on the strength of materials the Materials Testing Laboratory of the School of Applied Science is used. This laboratory contains standard machines for making tests of materials in tension, compression, torsion and bending, also a complete equipment for mixing and testing cements, bricks, etc.

Properties of Materials Laboratory

The lecture room and laboratory are on the ground floor in the western end of the building of the School for Apprentices and Journeymen. The lecture room, with a seating capacity for thirty, is fitted with a large glass covered demonstration table which is supplied with water, gas and air pressure connections.

The laboratory immediately adjoins the lecture room. It is supplied with table space and equipment for 144 students. Each table is fitted with water, gas and air pressure connections, and ventilation is maintained by down draft hoods. A strong exhaust from an electrically driven fan is available for use when working with noxious gases.

Drafting Rooms

The drafting rooms are large, well lighted and well ventilated. These rooms are equipped with drawing tables, stools, boards and T squares. Cabinets are furnished in which students may keep their drawing supplies. The students purchase all the necessary supplies for the course, such as instruments, triangles, scales, etc. These may be obtained from the school store room at cost prices.

Stationary Engineering Equipment

No special shop equipment except that of the Machine Shop is provided for this course, that in the Principles of Mechanisms and the Properties of Materials Laboratories being used in lectures and experiments, while the boilers, engines, dynamos, motors, and other working apparatus about the school buildings are employed in demonstrations and practical tests.

Machine Shop

The Machine Shop is arranged in accordance with the best modern commercial practice with respect to the character of the machine tools installed, and the method of driving them.

Electric motors are used exclusively, the current being supplied from the general power house belonging to the Schools. In order to obtain the greatest economy and efficiency in operation, and to familiarize the students with the different methods of power application, certain of the machines are grouped and driven by belts from countershafts operated by large constant speed motors, while others are direct-driven by individual, constant or variable speed motors employing various standard types of transmission, viz., direct-connection, gearing, chain, and belt drive as the character of the machines may demand.

The tool room in this department is a notable feature. It is well supplied with a complete and varied assortment of small tools, and instruments for precise measurements, and is strictly conducted on the "check" system. The students thus become accustomed to the order and discipline of shop system, and are taught method and its commercial value as part of the course.

The following equipment is installed: Twenty-four benches for vise work; one 14" Pratt & Whitney belt-driven engine lathe with various attachments; one 16" Hendey-Norton belt-driven engine lathe with taper attachment; one 18" Lodge-Shipley Patent Head belt-driven engine lathe; one 14" American belt-driven engine lathe, equipped with turret on carriage; one 14" Flather belt-driven engine lathe. These lathes are all of the quick-change gear type.

One 20" Prentice Improved Pattern high speed, quick-change gear engine lathe, motor-driven; one 14" Putnam belt-driven engine; one 20" Schumacher & Boye engine lathe, equipped with quick-change gear and taper attachment, motor-driven; one 14" Reed belt-driven engine lathe; one 14" Bradford belt-driven engine lathe, with taper attachment. All of the above belt-driven lathes are group-driven by a 10 H. P. motor.

One 7" x 32" Pratt & Whitney bench lathe with full equipment; one Warner & Swasey 2" Hollow-hexagon turret lathe; one 18" Springfield Fox Monitor brass lathe, motor-driven; two 14" Blount speed lathes, motor-driven; one 36" radial drill, equipped with gear-drive, swiveling and swinging box table, motor-driven; one 28" Cincinnati Heavy Pattern upright drill, motor-driven; one 20" Hamilton upright drill, equipped with tapping attachment, belt-driven; one Dwight slate sensitive drill, belt-driven; one Wiley motor-driven sensitive drill; one No. 3-B Binsse horizontal boring mill; one No. 2-A Brown & Sharpe universal milling machine, with complete equipment, motor driven; one No. 2 Cincinnati Plain milling machine with various attachments; one No. 1 Cincinnati universal cutter and tool grinder, with complete equipment, belt-driven; one No. 2 Bath universal grinding machine with complete equipment, belt-driven; one Gisholt tool grinding machine, belt-driven; one Bridgeport grinding

machine, motor-driven; one No. 1 Blount combination grinding, polishing and buffing machine, belt-driven; two Yankee drill grinders, motor-driven; one 24" x 24" x 60" Putnam planer, motor-driven; one 18" Gould & Eberhardt crank shaper, with motor-drive; one 15" Hendey pillar shaper, friction-drive, belt-driven; one No. 2 Mitts & Merrill key-seating machine with complete equipment, motor-driven; one 36" upright Bullard boring machine with turret head, motor-driven; one No. 5 Higley cold saw, belt-driven; one power hack saw; one Greenerd Arbor Press. All of the miscellaneous belt-driven machines are group-driven by a 7½ H. P. motor.

Pattern Shop

In the Pattern Shop the following equipment is installed: Twenty-eight work benches with maple tops and fitted with Tole's, Emmert, Massey and Abernathy's rapid-acting vises, each bench being supplied with necessary tools for ordinary work; one Oliver universal saw bench; one Oliver 38" type B band saw; one Oliver 16" hand jointer; one Baxter Whitney surfacer; one Buffalo automatic knife grinder; one Bolton automatic band saw filer; one Greaves & Klausman 16" lathe; one Fay & Scott 16" lathe; one each of the following speed lathes: Oliver, Reed, Putnam and Fay & Scott. All of the above mentioned machines are direct-motor-driven with the exception of the lathes which are grouped and driven by one motor.

The following equipment is also available: Two No. 1 Oliver wood trimmers; one No. 2 Oliver wood trimmer; one No. 6-F Fox wood trimmer; one No. 107 Baldwin-Tulhill & Bolton circular saw filing vise; one No. 87 A. B-T. & B. band and hand saw filing vise; one band saw setting machine; one Wetmore glue heater (two pot); one steel lumber rack (twenty-five hundred feet capacity); one steel pattern rack with 500 sq. ft. of expanded metal shelving; hand screws; clamps; shellac pots; and all necessary complementary equipment.

A tool room with drawing cabinets, check board, and tool racks, well equipped with saws, chisels, gouges, squares, auger bits, dividers, calipers, rabbet and core box planes, and other small tools too numerous to mention, which are at the students' disposal by presenting a check to the attendant.

Foundry

The Foundry is a spacious, well-lighted and well-ventilated room occupying an entire wing of the School for Apprentices and Journeymen's building. As in all the other mechanical departments, the equipment and operation of the foundry follow closely the lines of the best commercial practice.

The equipment comprises eight benches for bench moulding with all necessary tools, such as shovels, sieves, flasks, rammers, trowels, slicks of different shapes, lifters, vent-wires, brushes, bellows, rapping-bars, gate-sticks, draw-spikes, wet-brushes, parting-sand shakers, dust-bags and gate-cutters.

There are also sixteen flasks for floor moulding, with all necessary tools for this work; iron flasks for dry sand moulding; bench for core making; core-boxes, rods, clamps, core-plates, etc.; 5'x5' pit; two core-ovens—one for large and the other for small cores; one oven for dry sand and loam moulds.

There is one 42" cupola for general shop work, the blast for which is furnished by an electrically-driven fan, the charging platform equipped with an automatic-stop elevator, motor driven; one 24" tilting cupola for general cupola practice; one 20" cupola for experimental practice; one Swartz melting furnace for copper, brass and other alloys. The furnace is equipped for gas and oil, and the blast is furnished by a direct-connected No. ½ Garden City positive blower; eighteen hand ladles, four shank ladles and one 800 lb. crane ladle; also two pattern racks.

The Foundry Foremen use the equipment of the general foundry, plus the testing machines of the Materials Testing Laboratory. The laboratory of the Foundry is equipped with a Riehlé Transverse testing machine, drop testing machine, and machines for determining the tensile strength, compression strength, resistance to crushing, etc.

Forge Shop

The equipment in this department is proportionate to the present installation of ten fires. It consists of ten Sturtevant forges with hoods and down draft exhaust of the following sizes, one 48", three 36" and six 30". Air for blowing is supplied from one No. 6 Sturtevant blower with direct-connected motor, while the exhaust is provided by one 72" Sturtevant centrifugal exhaust fan, direct-connected.

To complete the equipment there are ten anvils, two mandrel cones, annealing bins, and oil pans for tempering and case hardening, besides a suitable number of the tools required in hand forging, such as top and bottom fullers, swages, hot and cold chisels, flat and set hammers.

Plumbing Shop

In the Plumbing Shop is erected a model building wherein a complete working outfit will be installed in bath room, kitchens and lavatories; cast iron soil pipes, lead pipes, range boiler heated from kitchen range, etc.

In this shop there are also twelve work benches with forty-eight gas-heated soldering pots. These benches are used for lead-work, joint-wiping, etc. There are four vise benches equipped with vises and necessary clamps for holding pipe in place for pipe-fitting.

There is also an adequate supply of small tools, such as dividers, files, rasps, ladles, bending-irons, wrenches, saws, tap borers, shave hooks, plugs, turn pins, calking irons, hammers, plumb-bobs, testing-plugs, copper cups, chain-tongs, die stocks, spiders, plumber's furnace, pliers, etc.

The store room contains a carefully selected line of standard supplies such as lead and brass pipe, soil pipe, vent pipe, and fittings; traps, syphons, P. & S. lead traps, valve-regulators and sanitary fixtures.

Bricklaying Shop

This is a lofty, well-lighted room on the ground floor, especially designed for the purpose, and is conveniently situated with reference to the handling of the large quantities of materials required. Supplies of brick, sand, lime, etc., are kept in the adjoining store room, and the following equipment is provided:

Tools—Trowels, standard and pointing; hammers; broad, cold and jointing chisels; jointing tools; try-squares; lines and line-pins; plumb-bobs and rules; levels and leveling boards; measuring-rules; hatchets; saws; dust-brushes; mortar-hoes; holds, sieves, boards and boxes; water-hose; slack-boxes; brick-hods; water-buckets; brooms.

Scaffolding—Boards; planks; trestles; uprights; ledger-boards; ladders.

Wood Centers—Elliptic; segment; half-circle; Gothic.

Electric Wiring Shop

Arrangement of Shop—The instruction in the Electric Wiring shop being of a practical nature, the arrangement of the shop and its equipment is such as to approximate conditions which a wireman would encounter, if actually wiring buildings. To achieve this end, part of the main room is partitioned into small rooms or booths providing vertical and horizontal surfaces. In these, and on the walls and ceilings of the room itself, the students install apparatus, running all the wires and making the connections to put different systems into operation.

Power Plant—The main power plant and general wiring system of the School buildings are made use of as subjects for study and analysis from the view point of the wireman.

Materials and Tools—In the store room connected with the wiring shop is a well assorted supply of standard materials and fittings for electric wiring such as wires and cables of various kinds, lamps, switches, sockets, cut-outs, insulators, conduits, bells, batteries, etc.; also a full line of tools needed by the wireman.

Instruments and Experimental Apparatus—The Electric Wiring department also has a supply of standard testing instruments, portable voltmeters, ammeters, galvanometers, etc., and the usual laboratory apparatus for experiments in elementary electricity and magnetism.

Wiring—Model buildings will be erected from time to time, in which the students of Electric Wiring will install complete systems of electric light wiring with the necessary switches, cut-outs, etc.; also bells and annunciators in working order.

(These buildings will also be fitted with systems of plumbing and drainage, and with roofing, spouting and cornice work, by the students in the Plumbing and Sheet Metal departments respectively.)

Sheet Metal and Cornice Work

The equipment in the Sheet Metal and Cornice shop consists of standard machines, hand tools, bench-stakes, etc. The machines are three-foot

and six-foot cornice-brakes; 30" roll and folder; 36" rolling-machines; one each of turning, wiring, swedging, burring, and grooving-machines; a scroll-cutter; punching and bending machine; four soldering-benches, sixteen feet long; two fire-pots; two cutting-benches; sixteen drawing-tables with the usual equipment, etc.

This department is also equipped with the necessary hand tools, comprising mallets, hammers, shears, scrapers and pliers, files, squares and punches; also with a suitable number of bench-stakes, blowhorn, needle, round-head and seaming stakes.

House Painting Shop

The equipment of the House Painting Shop consists of ladders, brushes and such tools as are required for the execution of general painting and are found in the up-to-date shop.

The shop possesses all required features for practical work; booths for exercises in the application of paint; sash for glazing; tools for graining in all of its branches; doors and panels for proper exercises.

Sign Painting Shop

The Sign Painting department is equipped as follows: Twenty-four hinged easels; twenty-four drawing boards; twenty-four easel-stools; locked cabinet of shelves for colors; locked cabinet for brush-trays; combined water color cabinet and blue print case for alphabets; blue prints of standard alphabets; show-card writer's work table; sign boards of various sizes; brush-trays; rinsing-cups; color-cups and paint-cans; palette knives; black-red sable lettering-pencils; show-card pencils; blackboard; paint and varnish brushes. Standard colors in oil; standard colors in japan; standard show-card colors in water, gold, silver, aluminum and composition leaf, bronzes, etc.; sign frames; glass, show-card board, etc.

NIGHT TRADE COURSES

The School for Apprentices and Journeymen offers courses at night which are intended primarily for men who are working at a trade. In the formation of classes, preference is given to men already at work as it is recognized that they are in a position to make the best use of the instruction given.

Two distinct groups of courses are offered, depending upon the degree of proficiency which the student has acquired in his trade.

The courses for Apprentices are for beginners and for those who have made but little progress in their trades, while the courses for Journeymen presuppose a shop training equivalent to the completion of an apprenticeship. In every course attendance is required on three evenings of each week of the session.

Upon the completion of a course a certificate is awarded by the school. The time required for a given course is indeterminate, and depends simply upon the length of time taken by the individual student in obtaining the necessary credit units. The methods of instruction aim to permit the student to advance as rapidly as he can master the subjects of the course, but in general three years' attendance is necessary to make the required credits. A student obtaining the certificate in an Apprentice course may complete the corresponding course for Journeymen in a single year.

NIGHT TRADE COURSES FOR APPRENTICES

Only very brief previous practical experience is necessary to enable the student to profit by the instruction offered in the courses for Apprentices. The courses include instruction in Mathematics, English, Principles of Mechanisms, Properties of Materials and Shop Practice.

Applicants for certificates from the Apprentice Courses are required to present 78 credit units, a credit unit being defined as the amount of credit allowed for the satisfactory completion of the assigned work of a term in a course of one hour a week of recitation or lecture, or of two hours a week of drawing, laboratory or shop practice.

The student who has completed the Apprentice Courses may obtain the required credits for the corresponding Journeymen Courses by completing the work in which he is deficient. This will usually require only a single additional year of attendance.

COURSES OFFERED

For the year 1908-1909 night Trade courses are offered to Apprentices in the following trades:

Machinery Trades

- Machine Work
- Pattern Making
- Blacksmithing and Forging
- Moulding and Foundry Work

Building Trades

- Plumbing
- Bricklaying
- Electric Wiring
- Sheet Metal and Cornice Work
- House Painting, Hardwood Finishing and Graining.
- Sign Painting.

Courses for Apprentices working at other trades will be added with the increase in the number of school buildings. Announcement of these additional courses will be made from time to time, as the space and equipment necessary for instruction are provided.

The following statements outline the subjects taught in each of the separate courses, and show the required number of credit units which must be obtained in order to secure certificates uniform with the Day Industrial Courses.

OUTLINES OF COURSES

Machinery Trades

- Properties of Materials
- Mathematics
- English
- Drawing
- Principles of Mechanisms
- Shop Practice (according to trade selected)
- Practical experience obtained outside of Schools

Total number of Credit Units required, 78.

Building Trades

- Properties of Materials
- Mathematics
- English
- Drawing
- Principles of Mechanisms
- Shop Practice (according to trade selected)
- Practical experience obtained outside of Schools

Total number of Credit Units required, 78.

NIGHT TRADE COURSES FOR APPRENTICES.

In order to suggest more clearly to the students in House and Sign Painting and Sheet Metal and Cornice Work the slightly different arrangement of work necessary to meet their specific requirements, we have furnished the following table for these courses:

SHEET METAL AND CORNICE WORK

Properties of Materials
Mathematics
English
Drawing
Shop Practice
Practical experience obtained outside of Schools
Total number of Credit Units required, 78.

HOUSE PAINTING, HARDWOOD FINISHING AND GRAINING

Mathematics
English
Chemistry
Shop Practice
Practical experience obtained outside of Schools
Total number of Credit Units required, 78.

SIGN PAINTING

Mathematics
English
Chemistry
Drawing
Shop Practice
Practical experience obtained outside of Schools
Total number of Credit Units required, 78.

To secure the credit units required for a certificate from the School for Apprentices and Journeymen, examinations in prescribed studies and satisfactory evidence of work done outside of the Schools are necessary.

ENTRANCE REQUIREMENTS

Applicants must be at least sixteen years of age, and must present themselves at the School for personal interview. Preference will be given in every instance to those already apprenticed at the trade which they wish to study.

TUITION FEE

For residents of the city of Pittsburgh.....$5.00 per year.
For all others..... 7.00 per year.

The entire tuition fee for the year must be paid in advance.

A deposit of $3.00 must be made by each student at the beginning of the school year to cover breakage, locker rental and incidental fees. The unused portion will be returned, upon request, at the end of the year.

Each student is expected to buy his drawing instruments and supplies, which may be secured from the School at cost price.

ATHLETIC FIELD DUES

Payable upon registration as per statement on page 19.

NIGHT TRADE COURSES FOR JOURNEYMEN

Courses for Journeymen are offered to those who have already served their apprenticeship and have had some experience as Journeymen, and who desire to increase their efficiency and fit themselves for positions as foremen. Less time is given to practical work than in the courses for Apprentices, and more time to the study of mathematics, drawing, and the theory underlying the trades.

Applicants for certificates from the Journeymen Courses are required to present 78 credit units, a credit unit being defined as the amount of credit allowed for the satisfactory completion of the assigned work of a term in a course of one hour a week of recitation or lecture, or of two hours a week of drawing, laboratory or shop practice.

A student who obtains the above required credits and presents satisfactory evidence of the completion of an apprenticeship at a building or machinery trade will be awarded the same certificate as is given from the Day Industrial Course.

COURSES OFFERED

For the year 1908-1909 night trade courses are offered to Journeymen in the following trades:

MACHINERY TRADES

Machine Work,
Pattern Making,
Blacksmithing and Forging,
Moulding and Foundry Work,
Course for Foundry Foremen. (No credits are arranged for this course.)

BUILDING TRADES

Plumbing,
Bricklaying,
Sheet Metal and Cornice Work,
Electric Wiring.

Courses for Journeymen working at other trades will be added with the increase in the number of school buildings. Announcement of these additional courses will be made from time to time, as available teaching space and the equipment necessary for suitable instruction are provided.

The following statements outline the subjects taught in each of the separate courses, and show the required number of credit units which must be obtained in order to secure a certificate:

OUTLINES OF COURSES

Machinery Trades

Properties of Materials
Mathematics
English
Drawing
Principles of Mechanisms
Shop or Laboratory Practice (according to trade selected)
Practical experience obtained outside of Schools
Total number of Credit Units required, 78.

Building Trades

Properties of Materials
Mathematics
English
Drawing
Principles of Mechanisms
Shop or Laboratory Practice (according to trade selected)
Practical experience obtained outside of Schools
Total number of Credit Units required, 78.

Sheet Metal and Cornice Work

Properties of Materials
Mathematics
English
Drawing
Shop Practice
Practical experience obtained outside of Schools
Total number of Credit Units required, 78.

Stationary Engineering (Special Course)

Chemistry
Mathematics
English
Drawing
Principles of Mechanisms
Stationary Engineering
Practical experience obtained outside of Schools
Total number of Credit Units required, 78.

To secure the credit units required for a certificate from the School for Apprentices and Journeymen, examinations in prescribed studies and satisfactory evidence of work done outside of the Schools are necessary.

ENTRANCE REQUIREMENTS

Applicants must be at least twenty years of age, and must present themselves at the School for a personal interview. They must have served an apprenticeship at the trade they wish to study, and preference will be given in every instance to those employed at the trade.

TUITION FEE

For residents of the city of Pittsburgh.....$5.00 per year.
For all others..... 7.00 per year.

The entire tuition fee for the year must be paid in advance.

A deposit of $3.00 must be made by each student at the beginning of the school year to cover breakage, locker rental, and incidental fees. The unused portion will be returned, upon request, at the end of the year.

Each student is expected to buy his drawing instruments and supplies, which may be secured from the School at cost price.

ATHLETIC FIELD DUES

Payable upon registration as per statement on page 19.

List of Students
1907-1908
Day Students
Industrial Trade Course

Ainsley, William L.	Drafting.	Scottdale.	610 Dallas Ave., Pgh.
Barton, Harry C.	Wiring.	Pittsburgh.	2224 Jane St.
Baur, John.	Special.	Pittsburgh.	232 N. Fairmount Ave.
Bearinger, Uriah C.	Machine.	Pittsburgh.	109 Allen Ave.
Blanchard, Benton W.	Special.	Pittsburgh.	5139 Carnegie Ave.
Borgmann, Erich J.	Machine.	Carnegie.	714 Dick St.
Brady, Hugh S.	Special.	Howardsville, Va.	3349 Forbes St., Pgh.
Bragg, Percy W.	Plumbing.	Providence, R. I.	5821 Rural Ave., Pgh.
Brennan, William E.	Drafting.	Pittsburgh.	1227 Wightman St.
Brown, David B.	Special.	Edgewood Park.	415 Locust St.
Brown, Nathaniel E.	Special.	Youngstown, O.	
Buente, Willard H.	Special.	Pittsburgh.	856 Washington, N. S.
Burg, Raymond C.	Plumbing.	Pittsburgh.	3549 Butler St.
Burnworth, James W.	Drafting.	West Bridgewater.	
Calhoun, Earl W.	Drafting.	Beaver Falls.	Patterson Heights.
Carnill, Anson E.	Special.	Pittsburgh.	233 Dithridge St.
Carter, Charles A.	Machine.	Pittsburgh.	Reynolds & Dallas Aves.
Chambers, Harry D.	Machine.	Ingram.	51 Dallas Ave.
Crisman, Daniel E.	Bricklay'g.	Pittsburgh.	583 Bellefield Ave.
Dailey, Alfred S.	Wiring.	Pittsburgh.	308 Jackson St., N. S.
Dalas, Frank L.	Special.	Pittsburgh.	617 Ivy St.
Davis, George C.	Special.	Pittsburgh.	2425 Jane St.
Davis, William S.	Machine.	Pittsburgh.	1654 Denniston Ave.
Dill, Charles M.	Special.	Pittsburgh.	2411 Osgood St., N. S.
Drachbar, William B.	Pattern.	Lancaster.	1426 Denniston Ave., Pgh.
Ecker, Walter H.	Special.	Pittsburgh.	838 Farragut St.
Eigenbrod, Edward C.	Plumbing.	Pittsburgh.	126 Climax St.
Einstein, Oliver B.	Special.	Pittsburgh.	33 Maple Ave., N. S.
Eisner, Morris.	Drafting.	Pittsburgh.	140 Crawford St.
Elliott, Eugene B.	Machine.	Fayette City.	5816 Rural St., Pgh.
Emerson, Ralph W.	Pattern.	Hoboken.	
Feigley, David A.	Wiring.	Pittsburgh.	122 Graham St.
FitzHugh, Mayo McG.	Special.	McKeesport.	1515 Bluff St., Pgh.
Flynn, Paul E.	Drafting.	Pittsburgh.	1514 Cliff St.
Frampton, Guy E.	Special.	Pittsburgh.	7203 Hermitage St.
French, John C., Jr.	Drafting.	Pittsburgh.	5803 Hays St.
Gailey, Samuel D.	Machine.	Pittsburgh.	702 N. St. Clair St.
Garman, Royal G.	Special.	Denver.	340 Meyran Ave., Pgh.
Gibbs, John H.	Build. Tr.	Philadelphia.	7427 Race St., Pgh.
Goucher, Hoyt B.	Drafting.	Pittsburgh.	502 Lowell St.
Gregg, Francis E.	Special.	Monessen.	209 McKee Ave.
Griffin, Hupp.	Build. Tr.	Parkersburg, W. Va.	20 DeSota St., Pgh.
Hahn, Harry A.	Drafting.	Pittsburgh.	260 Spring Garden, N. S.
Hanley, Russell S.	Special.	McKeesport.	2404 Jenny Lind St.
Harrington, Stuart.	Special.	Edgewood.	3 Dewey Ave.

Day Students.

Harter, Jacob. . . .	Machine.	Pittsburgh.	224 Erin St.
Hay, Paul R.	Special. . .	Pittsburgh.	937 Beech Ave., N. S.
Heck, Oliver S. . . .	Bricklay'g.	Carnegie.	206 Modern Ave.
Heckart, Frederick W.	Drafting.	Brackenridge.	
Henderson, David. . .	Special. . .	Pittsburgh.	1407 Wightman St.
Herron, Eugene O'N.	Special. . .	Pittsburgh.	5201 Liberty Ave.
Heuler, Charles. . . .	Wiring. . .	Sewickley.	414 Beaver St.
Hines, Paul E. . . .	Wiring. . .	Cambridge, Md. . .	700 Collins Ave., Pgh.
Hipwell, Harry T. . . .	Machine.	Pittsburgh.	1520 Garfield Ave., N. S.
Hittner, William J., Jr.	Special. . .	Pittsburgh.	922 Chislett St.
Hook, Howard H. . . .	Drafting.	Pittsburgh.	7222 Monticello St.
Hosey, Hanford L. . .	Machine.	Pittsburgh.	305 Lawn St.
Hyle, Frederick W. . .	Machine.	Butler.	809 Holland Ave., Wkbg.
Johnston, Charles H.	Drafting.	Pittsburgh.	1455 Wightman St.
Johnston, Harvey H.	Special. . .	Edgewood Park. . .	112 Swissvale Ave.
Kemp, Alexander H. . .	Special. . .	Ingram.	198 Dewey Ave.
Kennedy, Sam M. . . .	Wiring. . .	Kirksville, Mo. . . .	
Kindl, Fred H., Jr. . .	Special. . .	Pittsburgh.	511 Sheridan Ave.
Koerbel, Frederic H. . .	Special. . .	Zanesville, O. . . .	Jeannette, Pa.
Lamker, Harry G. . . .	Special. . .	Pittsburgh.	639 College Ave.
Lenchner, Louis L. . .	Special. . .	Pittsburgh.	3332 Fifth Ave.
Leopold, Fred O. . . .	Drafting.	Sewickley.	718 Maple Lane.
Lohman, Francis A. . .	Drafting.	Monessen.	Donner Ave.
Lowman, Thomas E. . .	Special. . .	Pittsburgh.	315 N. St. Clair St.
McCance, George A. . .	Machine.	Pittsburgh.	326 Aiken Ave.
McCaslin, Robert C., Jr.	Special. . .	Homestead.	1011 Ann St.
McDermott, Clare B.	Special. . .	McKees Rocks. . . .	505 Manwood Ave.
McFarland, Thomas G.	Wiring. . .	Wilkinsburg. . . .	1115 South Ave.
McHugh, Joseph W. . .	Machine.	Pittsburgh.	5613 Hays St.
McKinney, Robert G.	Drafting.	Pittsburgh.	316 Aiken Ave.
McRae, Harry.	Machine.	Franklin.	1523 Howard Ave., N. S., Pgh.
McTighe, Bernard C.	Bricklay'g.	Pittsburgh.	6533 Dalzell Place.
Martin, Nicholas. . . .	Machine.	Pittsburgh.	1518 Forbes St.
Mench, George W. . .	Drafting.	Braddock.	420 Corey Ave.
Mercer, Charles C. . .	Special. . .	Pittsburgh.	5425 Howe St.
Miller, Robert F. . . .	Machine.	Butler.	58 Wyoming St., Pgh.
Morse, Flobert H. . . .	Plumbing.	Coldbrook, Mass. . .	5821 Rural Ave., Pgh.
Mould, Edward M. . .	Machine.	Pittsburgh.	7144 Monticello St.
Mullen, Robert L. . . .	Special. . .	Pittsburgh.	409 Alpine Ave., N. S.
Neely, William H. . .	Drafting.	Pittsburgh.	1116 Sherman Av., N. S.
Newhouse, Stephen O.	Pattern. . .	Washington.	
Newlin, Henry S. . . .	Special. . .	McKeesport.	401 Ninth Ave.
O'Callaghan, John A.	Special. . .	Pittsburgh.	3916 Penn Ave.
O'Donnell, Charley. . .	Pattern. . .	Pittsburgh.	5114 Dearborn St.
Osborn, Ray W.	Special. . .	Mt. Vernon, O. . . .	710 Swissvale Av., Wkbg.
Otterman, Harvey B.	Special. . .	Pittsburgh.	1519 Garfield Ave., N. S.
Otting, Harry J. . . .	Special. . .	Newport, Ky. . . .	Cliff St., Bellevue.
Paulsen, Walter H. . .	Special. . .	Pittsburgh.	110 Graham St.
Peloubet, Frank G. . .	Special. . .	Knoxville.	3924 Fifth Ave., Pgh.
Post, David C.	Wiring. . .	Dunn Station. . . .	R. D. 3.
Powers, Bert M.	Drafting.	Canfield, O. . . .	Techmont Club, Pgh.
Priddy, Robert M. . .	Plumbing.	Pittsburgh.	1139 Caughey St.
Rabenstein, William S.	Foundry.	Indiana.	Beaver St., Sewickley

Ralph, Frederick H.	Special.	Bellevue.	251 Rogers Ave.
Reiter, Rutherford.	Drafting.	Pittsburgh.	320 Hemlock St., N. S.
Renner, Carl F.	Plumbing.	Pittsburgh.	44 S. Twenty-seventh St.
Reynolds, William L.	Machine.	Pittsburgh.	54 Bigelow St.
Rieger, Christie O.	Wiring.	Pittsburgh.	201 Stratford Ave.
Robinson, Orlie W.	Special.	Clarksburg, W. Va.	5171 Cypress St., Pgh.
Robinson, Robert B.	Special.	Pittsburgh.	5801 Hays St.
Rogers, George P.	Bricklay'g.	Detroit, Mich.	3608 Bouquet St., Pgh.
Rogers, Joseph J.	Wiring.	Pittsburgh.	1022 Grandview Ave.
Rugh, William R.	Special.	Pittsburgh.	164 Luna St.
Rutledge, James J.	Wiring.	Pittsburgh.	1214 Boyle St., N. S.
Rutledge, Robert J.	Drafting.	Pittsburgh.	1214 Boyle St., N. S.
Scheafnocker, C A.	Special.	Wilkinsburg.	311 Penn Ave.
Schmitt, Thomas M. T.	Special.	Oakmont.	10th & E Sts.
Seidener, Leslie H.	Drafting.	Pittsburgh.	462 Atlantic Ave.
Shapiro, Michael N.	Drafting.	Pittsburgh.	1331 Penn Ave.
Shickler, George O.	Plumbing.	Pittsburgh.	339 Rebecca St.
Silverman, Irvin W.	Special.	Pittsburgh.	1316 Locust St., N. S.
Silverman, William L.	Wiring.	Avalon.	721 Florence Ave.
Skewis, William H.	Special.	McKeesport.	812 Park St.
Slocum, Donald.	Special.	Pittsburgh.	5460 Penn Ave.
Smith, Clarence K.	Pattern.	Butler.	4704 Fifth Ave., Pgh.
Smythe, Samuel B.	Build. Tr.	Oakmont.	C St.
Snee, John A.	Special.	West Elizabeth.	
Sossong, Reymond A.	Drafting.	Carnegie.	510 Chestnut St.
Steinmetz, Edwin W.	Drafting.	Pittsburgh.	6224 Station St.
Stine, Samuel H.	Special.	Osceola Mills.	238 Emerson St., Pgh.
Straub, Archie J.	Wiring.	Pittsburgh.	703 N. St. Clair St.
Sullivan, Henry P.	Drafting.	Pittsburgh.	7315 Idlewild St.
Tyler, Ralph M.	Build. Tr.	Washington, D. C.	4631 Winthrop St., Pgh.
Wallace, Fred.	Drafting.	Pittsburgh.	215 E. Montgomery Ave., N. S.
Walsh, Leo R.	Pattern.	Pittsburgh.	327 Charles St., Knoxville
Walton, Charles E.	Pattern.	West Homestead.	402 Eighth Ave.
Watts, Hall W., Jr.	Foundry.	Glenshaw.	
Wehs, Joseph G.	Drafting.	Pittsburgh.	311 Hemlock St., N. S.
Weldon, Richard C.	Special.	Pittsburgh.	Bellefield Apartments.
Werner, Philip.	Drafting.	Pittsburgh.	7244 Hermitage St.
White, Donald R.	Bricklay'g.	Pittsburgh.	906 Chislett St.
White, George L.	Special.	Pittsburgh.	234 Orchard St.
White, Myron P.	Wiring.	Pittsburgh.	Homewood & Reynolds St.
Whitehead, Cortlandt K.	Special.	Bellevue.	140 Lincoln Ave.
Wilkinson, William E.	Plumbing.	Pittsburgh.	326 Robinson St.
Woodruff, Allen.	Foundry.	Woodruff.	
Young, Harry T.	Drafting.	Munhall.	706 Fourteenth St.

Night Students

Journeymen

Middle Class

Appenrodt, Walter C.	Mach. Tr.	Pittsburgh.	162 S. Seventeenth St.
Baird, Warren W.	Sheet Metal.	Pittsburgh.	917 Mellon St.

Night Students.

Blanchard, Herbert J.	Mach. Tr.	Pittsburgh	1842 Morningside Ave.
Borres, Frank J.	Build. Tr.	Pittsburgh	4808 Kincaid St.
Bowers, Ira E.	Build. Tr.	Pittsburgh	1019 Murtland Ave.
Bowes, Thomas.	Plumbing.	Pittsburgh	267 Fisk St.
Bown, James E.	Build. Tr.	Pittsburgh	326 Ward St.
Brennan, James A.	Build. Tr.	Pittsburgh	120 N. Millvale Ave.
Buel, Fred A.	Plumbing.	Pittsburgh	6 Stratton Lane
Carr, Harry J.	Build. Tr.	Pittsburgh	261 Dunlap St.
Crismyre, Logan C.	Wiring.	Pittsburgh	317 Fremont St.
Croft, Edmund S.	Mach. Tr.	Canonsburg	139 Millvale Ave., Pgh.
Dawson, John A.	Build. Tr.	Pittsburgh	69 Kingsborough St.
Dettis, Gustave.	Mach. Tr.	Pittsburgh	2313 Jane St.
Dolan, James P.	Mach. Tr.	Homestead	Box 874.
Donaldson, Alfred L.	Sheet Metal.	Pittsburgh	423 Arch St., N. S.
Emrich, Ernest C.	Mach. Tr.	Pittsburgh	6349 Meadow St.
Fisher, Thomas.	Build. Tr.	Pittsburgh	2722 Oakley St.
Good, Albert C.	Plumbing.	Smicksburg	1110 Mill St., Wkbg.
Grant, Howard A.	Wiring.	Pittsburgh	1371 Montezuma St.
Grant, William D.	Wiring.	Pittsburgh	1371 Montezuma St.
Gutierrez, Savino J.	Mach. Tr.	Altoona	6228 Station St., Pgh.
Haas, Michael L.	Sheet Metal.	Pittsburgh	1914 Sarah St.
Hauck, Joseph W.	Sheet Metal.	Pittsburgh	407 Larimer Ave.
Herlehy, Thomas W.	Mach. Tr.	Pittsburgh	5407 Second Ave.
Hoffeldt, William A.	Build. Tr.	Buffalo, N. Y.	45 DeSota St., Pgh.
Hoffman, Charles.	Mach. Tr.	Pittsburgh	416 School St.
Howat, Andrew.	Mach. Tr.	Pittsburgh	5348 Kincaid St.
Huemmrich, Fred C.	Wiring.	Pittsburgh	610 McCandless Ave.
Illig, Adolph G.	Mach. Tr.	Pittsburgh	Rear 318 Pearl St.
Jamison, Robert G.	Mach. Tr.	Pittsburgh	7541 Bennett St.
Kalberer, Gust.	Mach. Tr.	Pittsburgh	104 Wabash, Mt. Oliver.
Katzenmeyer, William	Mach. Tr.	Pittsburgh	7026 Idlewild St.
Keller, Charles F.	Mach. Tr.	Pittsburgh	3020 Smallman St.
Keller, Charles H.	Mach. Tr.	Pittsburgh	3020 Smallman St.
Keller, Herbert T.	Mach. Tr.	Pittsburgh	612½ Murtland Ave.
Keough, James F.	Build. Tr.	Braddock	421 Fourth St.
Kirsch, Harry J.	Sheet Metal.	Pittsburgh	4275 S. Atlantic Ave.
Knipschild, Joseph A.	Mach. Tr.	Ben Avon	120 Watt Ave.
Koerner, Emil F.	Mach. Tr.	Pittsburgh	3932 Howley Ave.
Lawler, Lawrence J.	Plumbing.	Pittsburgh	14 Shipton St.
Lynch, William.	Sheet Metal.	Carrick	135 Woodlawn Ave.
McDonough, John V.	Mach. Tr.	Pittsburgh	228 Woods Run Av., N. S.
McGlumphy, William.	Wiring.	Pittsburgh	4027 Howley St.
McLure, Walter W.	Mach. Tr.	Braeburn.	
McPoland, Edward.	Plumbing.	Pittsburgh	711 Sterrett St.
Marcus, Charles F.	Plumbing.	Pittsburgh	9 Shiloh St.
Meyer, Frank P.	Mach. Tr.	Knoxville	121 Jucunda St.
Mielcke, Charles H.	Build. Tr.	Pittsburgh	6570 Rowan Ave.
Miller, Frank.	Mach. Tr.	Pittsburgh	1820 Tustin St.
Miller, William.	Mach. Tr.	Pittsburgh	5301 McCandless Ave.
Morris, Robert L.	Plumbing.	Pittsburgh	7616 Mulford Ave.
Murray, John MacD.	Build. Tr.	Glassport	504 Oakwood Ave., Pgh.
Otte, John F.	Plumbing.	Pittsburgh	8411 Frankstown Ave.
Paton, John D.	Sheet Metal.	Crafton	14 Ridenour Ave.

Phillips, Edgar L.	Mach. Tr.	Glenfield	Beaver St.
Price, Charles W.	Plumbing.	Pittsburgh	6442 Marchand St.
Rendleman, Homer C.	Mach. Tr.	Hollyburg, Cal.	218 Erny Ave., Pgh.
Riddle, William R.	Sheet Metal.	Pittsburgh	101 Fortieth St.
Rieder, Frank J.	Sheet Metal.	McKees Rocks	1022 Chartiers Ave.
Roe, Howard B.	Wiring.	Pittsburgh	419 Arch St., N. S.
Rogerson, Charles L.	Plumbing.	Knoxville	144 Jucunda St.
Schauer, Walter M.	Wiring.	Pittsburgh	114 N. Atlantic Ave.
Schade, Adam	Sheet Metal.	Carnegie	Bank St.
Schoeller, Harry F. V.	Sheet Metal.	Pittsburgh	6437 Marchand St.
Schreibeis, George D.	Build. Tr.	Pittsburgh	344 Mathilda St.
Schwartz, Edward C.	Mach. Tr.	Pittsburgh	16 Rose St.
Shoning, Edward C.	Mach. Tr.	Pittsburgh	1220 Park Ave.
Skeehan, James J.	Mach. Tr.	Pittsburgh	5126 Carnegie Ave.
Smoker, Harry M.	Mach. Tr.	Lewistown	826 Concord St., N. S., Pgh.
Stear, Luther W.	Build. Tr.	Smicksburg	711 Homewood Av., Pgh.
Stratemeier, Joseph W.	Sheet Metal.	Pittsburgh	329 Cedar St.
Thomas, Benjamin.	Mach. Tr.	Wilkinsburg	710 Peebles St.
Tummon, William B.	Mach. Tr.	Pittsburgh	7051 Hermitage St.
Ullrich, John W., Jr.	Mach. Tr.	Pittsburgh	2217 East St., N. S.
Wagner, Frank P.	Plumbing.	Pittsburgh	24 Allen Ave.
Zellmann, Henry.	Mach. Tr.	Pittsburgh	2615 Hamilton St.

Lower Class

Aber, Charles L.	Build. Tr.	Pittsburgh	6725 Reynolds St.
Albert, Karl E.	Mach. Tr.	Pittsburgh	5817 Harvard St.
Anderson, William J.	Plumbing.	Pittsburgh	509 Wilmot St.
Auer, George J.	Sheet Metal.	Pittsburgh	4783 Scioto St.
Austin, James.	Mach. Tr.	Pittsburgh	114 Blackadore Ave.
Bach, Augustine.	Mach. Tr.	Wilkinsburg	311 West St.
Bachman, John.	Plumbing.	Pittsburgh	310 Collins Ave.
Boerstler, Ursa L.	Build. Tr.	Sharpsburg	216 Sixth St.
Bollenbacher, Herman A.	Mach. Tr.	Pittsburgh	630 Thompson St.
Borres, John.	Build. Tr.	Pittsburgh	4808 Kincaid St.
Brain, Lawrence.	Plumbing.	Sheridanville.	
Buck, Frederick W.	Sheet Metal.	Pittsburgh	711 Madison Ave., N. S.
Caldwell, John T.	Sheet Metal.	Pittsburgh	145½ Frankstown Ave.
Caplan, Harry.	Build. Tr.	Pittsburgh	5427 Kentucky Ave.
Carroll, Thomas.	Build. Tr.	Limerick, Ireland.	231 Lehigh Ave., Pgh.
Clark, James H.	Build. Tr.	Pittsburgh	8408 Frankstown Ave.
Clement, George F.	Wiring.	Pittsburgh	424 Beatty St.
Cox, James A.	Plumbing.	Pittsburgh	323 Fisk St.
Crocker, Thomas W.	Mach. Tr.	Pittsburgh	2907 Carson St.
Daryman, Thomas A.	Wiring.	Pittsburgh	246 Dunlap St.
Devine, Francis J.	Build. Tr.	Pittsburgh	4423 Geneva St.
Dick, Walter.	Build. Tr.	Pittsburgh	711 Homewood Ave.
Doherty, Harry.	Wiring.	Pittsburgh	95 Parkview Ave.
Dowling, Raymond D.	Mach. Tr.	Pittsburgh	205 Lothrop St.
Dunlap, Howard G.	Build. Tr.	Pittsburgh	303 Dunlap Ave., N. S.
Ebersberger, Charles F.	Sheet Metal.	Pittsburgh	247 Atwood St.
Ebert, Harry A.	Sheet Metal.	Pittsburgh	67 Mahon Ave.

Eder, John	Build. Tr.	Colby, Wis.	908 Vickroy St., Pgh.
Elliott, Samuel F.	Mach. Tr.	Swillingate, Newf'd.	514 Jeannette St., Wkbg.
Fahey, Edward J.	Build. Tr.	Pittsburgh	527 Martin St., N. S.
Fitzgerald, Michael P.	Wiring.	Pittsburgh	5951 Alder St.
Gollings, Richard E.	Plumbing.	Oak Station	721 N. Grant St., Pgh.
Gosnell, Willard F.	Sheet Metal.	West Homestead	219 Ninth Ave.
Granberg, Oscar	Mach. Tr.	Swissvale	2439 Woodstock Ave.
Grimm, Carl	Mach. Tr.	Pittsburgh	415 W. Jefferson St., N. S.
Huff, Oscar F.	Mach. Tr.	Pittsburgh	143 Washington Ave.
Husband, Ralph	Build. Tr.	Pittsburgh	7944 Susquehanna St.
Irwin, Alexander	Mach. Tr.	Pittsburgh	309 Haldane St.
Jamison, Frank	Mach. Tr.	Pittsburgh	1716 Chartiers St., N. S.
Jamison, John A.	Mach. Tr.	Pittsburgh	320 Brushton Ave.
Johnston, John R.	Plumbing.	Crafton	34 Underhill St.
Johnston, Robert	Mach. Tr.	Wilkinsburg	1146 South Ave.
Kegel, John P.	Mach. Tr.	Mt. Washington	213 Southern Ave.
Kerestes, George	Mach. Tr.	Pittsburgh	3209 Wampum St.
Knight, George	Sheet Metal.	Pittsburgh	4062 Woolsleyer Alley.
Lacknet, George S.	Mach. Tr.	Pittsburgh	5115 Liberty Ave.
Laury, Harry P.	Sheet Metal.	Pittsburgh	2218 Center Ave.
Lewis, Howard J.	Plumbing.	Pittsburgh	1025 Windsor St., N. S.
Loan, Thomas R.	Mach. Tr.	Pittsburgh	7712 Tuscarora St.
Lyons, William T.	Build. Tr.	Pittsburgh	419 Gettysburg St.
McCloskey, John D.	Build. Tr.	Pittsburgh	5750 Ellsworth Ave.
McCombs, William P.	Sheet Metal.	Pittsburgh	S. 21st & Carson St.
McDonough, James J.	Plumbing.	Pittsburgh	437 Lincoln Ave.
McQuade, Henry L.	Mach. Tr.	Pittsburgh	1830 Forbes St.
McShane, Phelan	Build. Tr.	Crafton	Creighton Road.
Menking, Howard W.	Mach. Tr.	Pittsburgh	2402 Arlington Ave.
Morris, Frank J.	Build. Tr.	Pittsburgh	Olive & Wandless Sts.
Murphy, Michael P.	Build. Tr.	Buffalo, N. Y.	2334 Sarah St., Pgh.
Naismith, Samuel	Build. Tr.	Pittsburgh	6312 Butler St.
Neff, Aloysius A.	Sheet Metal.	Pittsburgh	20 Carver St.
Pfarr, Jacob	Mach. Tr.	Pomeroy, O.	5010 Penn Ave., Pgh.
Pierce, Edmond L.	Plumbing.	Pittsburgh	92 Climax St.
Poster, William E.	Mach. Tr.	Pittsburgh	413 Oregon St.
Reed, Joseph A.	Plumbing.	Homestead	248 Third Ave.
Rippel, Martin R.	Plumbing.	Pittsburgh	92 Gloucester St.
Russell, James C.	Mach. Tr.	Pittsburgh	4515 Plummer St.
Ruttkowski, Paul	Build. Tr.	Tarentum.	
Sellers, Nelson M.	Build. Tr.	Somerset	R. F. D. No. 2.
Simons, Homer	Build. Tr.	Pittsburgh	1918 Sedgwick St., N. S.
Small, Edgar B.	Build. Tr.	Pittsburgh	319 Thirty-eighth St.
Storer, John	Plumbing.	Sheridanville.	
Struble, John I.	Sheet Metal.	Wilkinsburg	1119 Ross Ave.
Swaney, James A.	Wiring.	Pittsburgh	7545 Hamilton Ave.
Tepel, Herman	Wiring.	Pittsburgh	109 Ruth St.
Vernam John W.	Mach. Tr.	Washington	8008 Westmoreland Ave., Swissvale.
Wascoe, Herman F.	Mach. Tr.	Pittsburgh	4068 Howley Ave.
Weisberg, Frank	Sheet Metal.	Pittsburgh	32 Davis St.
Wochley, Frank E.	Plumbing.	Pittsburgh	Rear 310 Brushton Ave.
Wochley, George E.	Build. Tr.	Pittsburgh	Rear 308 Brushton Ave.

Young, Emil O.	Sheet Metal.	Pittsburgh.	2411 McCook St., N. S.
Zeiher, Clarence P. W.	Mach. Tr.	Pittsburgh.	248 Bouquet St.

Apprentices

Middle Class

Adams, Stewart G.	Pattern.	Pittsburgh.	353 Oakland Ave.
Albert, John C.	Foundry.	Wilkinsburg.	810 Peebles St.
Aumick, Grover C.	Plumbing.	Pittsburgh.	191 Woodland Ave., N. S.
Barnes, Robert.	Plumbing.	Pittsburgh.	4627 Chatsworth Ave.
Becker, Fred A.	Wiring.	Pittsburgh.	1705 Fifth Ave.
Behr, Henry J.	Sheet Metal.	Pittsburgh.	147 Locust St., N. S.
Bennett, Joe.	Sign Paint.	Pittsburgh.	43 Blaine St.
Berger, Herbert.	Pattern.	Pittsburgh.	South End Ave., N. S.
Bernarding, Mathias J.	Forging.	Mt. Oliver.	115 Burr St.
Blanchard, Ben H.	Forging.	Pittsburgh.	1842 Morningside Ave.
Boerner, Albert C.	Plumbing.	Pittsburgh.	1111 Sarah St.
Bradley, Connery.	Machine.	Pittsburgh.	5823 Rural Ave.
Bradley, William P.	Foundry.	Ben Avon.	14 Monitor Ave.
Butler, John J.	Machine.	Hastings, Ont.	51 S. Tenth St., Pgh.
Butler, James M.	Pattern.	Pittsburgh.	Stanton & Hawthorne St.
Calhoun, Charles.	Sign Paint.	Pittsburgh.	225 Shetland Ave.
Cameron, Aber M.	Machine.	Pittsburgh.	320 Edmond St.
Cameron, William B.	Sheet Metal.	Pittsburgh.	3223 Bouquet St.
Carson, Harry F.	Wiring.	Pittsburgh.	7713 Hamilton Ave.
Chisholm, Marquis, Jr.	Foundry.	Homestead.	122 Seventh Ave.
Clark, Leo.	House Paint.	Carnegie.	534 Washington Ave.
Clark, William B.	Plumbing.	Wilkinsburg.	1207 Mill St.
Clarke, Arthur T.	Plumbing.	Pittsburgh.	3310 Ward St.
Condon, John T.	Machine.	Pittsburgh.	Northumberland Ave.
Conley, Martin J.	Wiring.	Ewingville.	
Cooper, Peter P.	Machine.	Homestead.	133 E. Fifth Ave.
Coulter, Christopher A.	Plumbing.	Pittsburgh.	1315 Webster Ave.
Dadoski, Paul.	Foundry.	Pittsburgh.	3041 Brereton Ave.
Damms, William J.	Sheet Metal.	Pittsburgh.	166 Lodi Alley.
Dickson, Dezeal J.	Machine.	McKees Rocks.	1157 Dohrman St.
Dimperfeld, William.	Pattern.	Pittsburgh.	64 Raymond St., N. S.
Dischner, Eduard.	Plumbing.	Pittsburgh.	371 Main St.
Emerick, Jesse C.	Machine.	Pittsburgh.	7003 Idlewild St.
Erheardt, Frank J.	Plumbing.	Pittsburgh.	401 Lorenze Ave.
Evans, E. M.	Machine.	Pittsburgh.	3226 Bouquet St.
Fath, John M.	Sheet Metal.	McKees Rocks.	768 Bouquet St.
French, Frank A.	Machine.	Pittsburgh.	5600 Kentucky Ave.
Freund, Elmer.	Plumbing.	Pittsburgh.	2413 Jane St.
Fuhs, Harry C.	Plumbing.	Pittsburgh.	36 Boggs Ave.
Gallagher, Charles B.	Machine.	Pittsburgh.	7319 Hermitage St.
Garvey, Charles P.	Plumbing.	Pittsburgh.	6040 Butler St.
Gebhart, Otto.	Pattern.	Pittsburgh.	2410 Cobden St.
Goerg, August.	Plumbing.	Pittsburgh.	11 St. Martin St.
George, John B.	Machine.	Wilkinsburg.	935 James St.
Grosskopf, Adolph W.	Sheet Metal.	Pittsburgh.	19 Sigel St., N. S.
Haas, Albert E.	Bricklay'g.	Braddock.	215 Camp Ave.

Hager, Raymond. . . .	Machine.	Wilkinsburg.	749 Franklin Ave.
Hartner, Adam E. . . .	Plumbing.	Pittsburgh.	88 Walter Ave.
Hatch, Ceylon J. . . .	Sheet Metal.	Corry.	256 S. St. Clair St., Pgh.
Hergenroeder, C W. . .	Wiring. . .	Pittsburgh.	1925 Lombard St., N. S.
Heuber, Edgar F. . . .	Sign Paint. .	Pittsburgh.	260 Atwood St.
Hilkert, Frederick. . . .	Machine.	Pittsburgh.	5522 Walnut St.
Hogenmiller, Leo F. . .	Sheet Metal.	Pittsburgh.	170 Climax St.
Hoffman, Earl G. . . .	Wiring. . .	Carrick.	1624 Concord Ave.
Hrabko, Frank.	Machine.	Youngstown, O. . . .	141 4th Av., Homestead
Johnson, Albert W. . .	Plumbing.	Pittsburgh.	810 Trenton Ave.
Johnston, Roger O'M. .	Wiring. . .	Pittsburgh.	1629 Forbes St.
Keller, Adam H. . . .	Machine.	Pittsburgh.	94 Excelsior St.
Kinder, Don.	Pattern. . .	Braddock.	505 Corey Ave.
Klug, Herbert J. . . .	Pattern. . .	Aspinwall.	Eighth & Center Aves.
Knendel, Joseph. . . .	Bricklay'g.	Pittsburgh.	Atlantic & Breeds Hill St.
Krause, Harry A. . . .	Machine.	Edgewood Park. . .	Walnut & Beech Sts.
Kunz, William A. . . .	Plumbing.	Pittsburgh.	129 S. Highland Ave.
Kurland, John.	Foundry.	Pittsburgh.	932 Flemington St.
Laber, George.	Wiring. . .	Millvale.	2 Park St.
Langdon, Elis N. . . .	Pattern. . .	Pittsburgh.	943 Mellon St.
Leibold, George.	Sheet Metal.	Pittsburgh.	320 Manor St.
Lepant, Alfred H. . . .	Machine.	Pittsburgh.	26 Overhill St.
Lettie, Elmer L.	House Paint.	Braddock.	430 Sixth St.
Lewis, Joshua.	Sign Paint.	Pittsburgh.	1 Augustine St.
Ley, Clarence R. . . .	Plumbing.	Pittsburgh.	18 Drum St., N. S.
Liggett, James.	Machine.	Pittsburgh.	1112 Laketon Ave.
Linz, George.	Pattern. . .	Pittsburgh.	31 Raymond St., N. S.
Lynch, Raymond E. . . .	Plumbing.	Braddock.	441 Fourth St.
McAulay, Kenneth. . .	Machine.	Homestead.	Carnegie Hotel.
McCabe, James J. . . .	Machine.	Swissvale.	1915 Wayne St.
McClatchey, Samuel. . .	Forging. . .	Homestead.	214 Fourteenth Ave.
McConnell, Robert G. .	Foundry.	Pittsburgh.	2244 Hawthorne Ave.
McCormick, Charles H.	Plumbing.	Pittsburgh.	7633 Bennett St.
McDonald, Edwin R. .	Pattern. . .	Pittsburgh.	3425 Denny St.
McDonough, James A. .	Plumbing.	Pittsburgh.	327 McClure Ave., N. S.
McGinley, James F. . .	Forging. . .	Pittsburgh.	616 Kendall St.
Mack, Harry F.	Forging. . .	Pittsburgh.	27 Allen Ave.
Magel, Walter F. . . .	Foundry.	Pittsburgh.	233 Wick St.
Maidment, Francis H. .	Bricklay'g.	St. Johns, Newf'd.	25 Somers St., Pgh.
Marshell, Emil F. . . .	Plumbing.	Pittsburgh.	3934 Mifflin St.
Masters, Cyrus P. . . .	Plumbing.	Parnassus.	
Mathay, John F. . . .	Forging. . .	Beaver Falls. . . .	21 Arlington Ave., Pgh.
Mautz, George E. . . .	Plumbing.	Pittsburgh.	1223 Grandview Ave.
Miller, Walter H. . . .	Bricklay'g.	Pittsburgh.	443 Norfolk St.
Milton, John L.	Sign Paint.	Baxter.	426 Fourth Ave., Pgh.
Moesta, Frank.	Plumbing.	Pittsburgh.	7328 Hermitage St.
Mohler, Richard H. . .	Forging. . .	Pittsburgh.	231 Collins Ave.
Moody, William T. . . .	Machine.	Pittsburgh.	175 Edmond St.
Moyer, Oscar G. A., Jr.	Machine.	Pittsburgh.	2828 Sarah St.
Muller, August.	Sign Paint.	Pittsburgh.	2723 Waterman St.
Muller, Peter A.	Sign Paint.	Pittsburgh.	2512 Carson St.
Murphy, Peter W. . . .	Machine.	Pittsburgh.	164 Hazelwood Ave.
Naismith, Walker F. .	Machine.	Pittsburgh.	6312 Butler St.

Obermeier, Frank H.	Pattern.	Pittsburgh.	192 Spring Alley.
O'Brien, Louis J.	Wiring.	Pittsburgh.	2829 Center Ave.
Ossman, George A.	Plumbing.	Pittsburgh.	1610 Chartiers St.
Painter, Albert R.	House Paint.	Braddock.	564 Hawkins Ave.
Paisley, William G.	Forging.	Pittsburgh.	4639 Friendship Ave.
Petzold, Charles.	Machine.	Pittsburgh.	19 Watt St.
Pfischner, Theodore E.	Wiring.	Millvale.	801 North Ave.
Pierce, Edward E.	Wiring.	Pittsburgh.	709 Collier St.
Priddy, Harry.	Plumbing.	McKees Rocks.	337 Broadway.
Rawlings, John.	Bricklay'g.	Swissvale.	8200 St. Lawrence Ave.
Reynolds, John P.	Foundry.	Pittsburgh.	3121 Mary St.
Rippl, John H.	Sheet Metal.	Pittsburgh.	2333 Webster Ave.
Robinson, William C.	Wiring.	Wilkinsburg.	715 Wallace Ave.
Sabad, Mark.	Pattern.	Pittsburgh.	1217½ Grandview Ave.
Savage, Joe J.	Plumbing.	Pittsburgh.	4223 Calvin St.
Schade, Ralph C.	Foundry.	Canonsburg.	
Schaffer, Alexander F.	Sheet Metal.	Pittsburgh.	809 River St.
Schwartz, Benjamin D.	Machine.	Pittsburgh.	16 Rose St.
Schwartz, Richard C.	Pattern.	Pittsburgh.	16 Rose St.
Scott, Edward F.	Bricklay'g.	Sheridanville.	Box 481.
Seebacher, Paul M., Jr.	Machine.	Pittsburgh.	3437 Carson St.
Sheridan, Thomas S.	Pattern.	Pittsburgh.	1024 Crucible St.
Smith, John E.	Machine.	Pittsburgh.	7800 Hamilton Ave.
Sorg, Elmer W.	Pattern.	Pittsburgh.	1437 Nixon St., N. S.
Sproal, William J.	Pattern.	McKees Rocks.	Shingles St.
Sullivan, James J.	Forging.	Pittsburgh.	41 Browns Road.
Thompson, John W.	Plumbing.	Pittsburgh.	2124 Tustin St.
Till, Anthony G.	Plumbing.	Finleyville.	21 Griffin St., Pgh.
Tillman, Charles P.	Plumbing.	Jeannette.	7512 Kelly St., Pgh.
Toomey, Timothy N.	Machine.	Pittsburgh.	24 Wick St.
Tracy, Charles A.	Bricklay'g.	Springfield, Mass.	14 Stockton Ave., Pgh.
Trakofler, Gregory.	Foundry.	Pittsburgh.	325 Thirty-eighth St.
Trakofler, Joseph G.	Machine.	Pittsburgh.	325 Thirty-eighth St.
Turner, George E.	Plumbing.	McKeesport.	1216 Walnut St.
Wallace, Lew F.	Pattern.	Pittsburgh.	272 Fisk St.
Wallisch, Lawrence A.	Pattern.	Pittsburgh.	519 Grant Boulevard.
Walter, Charles A.	Plumbing.	Pittsburgh.	2116 Rose St.
White, John T.	Sign Paint.	S. Cumberland, Md.	1 Robinson St., Pgh.
Whitehouse, William F.	Bricklay'g.	Pittsburgh.	514 Lloyd St.
Wilharm, Louis F.	Machine.	Pittsburgh.	6554 Rowan Ave.
Wilker, Harry B.	Pattern.	Pittsburgh.	42 Raymond St., N. S.
Williams, Joseph T.	Wiring.	Pittsburgh.	609 Morgan St.
Woolensack, Frank J.	Sign Paint.	Pittsburgh.	171 S. Eighteenth St. Ex.
Wootton, John.	Bricklay'g.	Pittsburgh.	4906 Schenley Ave.
Wootton, William J.	Forging.	Pittsburgh.	924 Gerritt St.

Lower Class

Abram, Ruben.	Sign Paint.	Pittsburgh.	1527 Center Ave.
Albrecht, August.	Foundry.	Pittsburgh.	610 River Ave.
Aldinger, Oscar R.	Sign Paint.	Pittsburgh.	818 Sandusky St., N. S.
Armstrong, Henry C.	Machine.	Pittsburgh.	6029 Stanton Ave.
Bahr, Henry A.	Sign Paint.	Pittsburgh.	7 Katherine St.

Night Students.

Bauer, George J.	Pattern.	Pittsburgh.	Stanton Ave.
Becker, Carl P.	Bricklay'g.	Pittsburgh.	624 Smithfield St.
Bergstrom, Elmer.	House Paint.	McKeesport.	1111 Maple St.
Bertram, Carl P.	Machine.	Pittsburgh.	3712 Mifflin St.
Blackham, Robert G.	Plumbing.	Pittsburgh.	Alger & Winterburn Sts.
Blackmore, Charles S.	Machine.	Wilkinsburg.	1113 Wallace Ave.
Bowes, John J.	Plumbing.	Pittsburgh.	267 Fisk St.
Brindle, Edward H.	Plumbing.	Pittsburgh.	84 Frankstown Ave.
Brittle, Richard G.	Bricklay'g.	Pittsburgh.	49 Paul Ave.
Brose, Robert J.	Foundry.	Pittsburgh.	22 Norton Ave.
Brown, Alexander.	Pattern.	Munhall.	1912 Nineteenth St.
Buncke, Joseph.	Sign Paint.	Pittsburgh.	1912 Gang Ave., N. S.
Burrows, John T.	Sign Paint.	Pittsburgh.	808 Fallowfield Ave.
Cairns, William H., Jr.	Plumbing.	Avalon.	20 Marie Ave.
Callaghan, John B., Jr.	Plumbing.	Pittsburgh.	5231 Rosetta St.
Campbell, William A.	House Paint.	Pittsburgh.	1418 Home St., N. S.
Casey, Joseph H.	Sign Paint.	Pittsburgh.	321 Larimer Ave.
Collins, Martin J.	Machine.	Pittsburgh.	5112 Dresden St.
Colwell, William J., Jr.	Machine.	Pittsburgh.	4078 Cabinet St.
Connor, Arthur V.	Bricklay'g.	Pittsburgh.	Melwood Ave.
Conway, Harry F.	Wiring.	Pittsburgh.	1526 River Ave.
Conway, Thomas E.	Plumbing.	Pittsburgh.	176 Washington Ave.
Crawford, Stewart M.	Machine.	Broughshane, Ireland.	2343 Manor, Swissvale.
Cupps, Albert J.	Wiring.	Pittsburgh.	156 Meadow St.
Currier, Herbert E.	Sign Paint.	McKeesport.	717 May St.
Davage, Thomas S.	Wiring.	Pittsburgh.	1357 Montezuma St.
Degelman, Frank.	Pattern.	Pittsburgh.	4780 Cypress St.
Devlin, John J.	Plumbing.	Pittsburgh.	2032 Bedford Ave.
Dixon, Charles E.	Bricklay'g.	Pittsburgh.	34 Ulysses St.
Donohue, John H.	Forging.	Pittsburgh.	412 Atwood St.
Dumont, Frank.	Sheet Metal.	Pittsburgh.	51 Boggs Ave.
Durham, Christopher C.	Foundry.	Pittsburgh.	Loretto St.
Elkin, Harry.	Plumbing.	Wilkinsburg.	1802 Montier St.
Elliott, Robert M.	House Paint.	Pitcairn.	Box 328.
Emmel, George W.	Pattern.	Pittsburgh.	506 Bingham St.
Falk, Franz O.	Machine.	Wilkinsburg.	442 Swissvale Ave.
Fischer, George F.	Bricklay'g.	Pittsburgh.	151 Uvilla St.
Fisher, Simon J.	Wiring.	Cresson.	4624 Henry St., Pgh.
Frank, John M.	Pattern.	Pittsburgh.	3646 Mifflin St.
Gallagher, Daniel.	Plumbing.	Pittsburgh.	1320 River Ave.
Germandt, Herbert L.	Pattern.	McKees Rocks.	745 Chartiers Ave.
Gillespie, Joseph A.	Bricklay'g.	Pittsburgh.	Murray & Loretto St.
Goldman, Jacob E.	Sign Paint.	Pittsburgh.	23 Townsend St.
Griffiths, Godfrey R.	Machine.	Pittsburgh.	90 Beltzhoover Ave.
Grindle, Raymond C.	Plumbing.	Pittsburgh.	7623 Susquehanna St.
Guerin, William A.	Foundry.	Pittsburgh.	7329 Hermitage St.
Hamilton, George V.	Wiring.	Pittsburgh.	Dilworth St.
Hatch, Willis DeV.	House Paint.	Pittsburgh.	410 W. North Av., N. S.
Haus, George David.	Sign Paint.	Pittsburgh.	7042 Mt. Vernon St.
Henderson, Thomas G.	Sign Paint.	Pittsburgh.	5021 Dearborn St.
Hill, Jabez H.	Foundry.	Wilkinsburg.	1404 Hunter St.
Hoffman, Christie W.	Forging.	Pittsburgh.	3313 Ward St.
Hoffman, Raymond.	Machine.	Pittsburgh.	135 Dithridge St.

Howie, Gilbert J.	Pattern.	Brooklyn, N. Y.	Technont Club, Pgh.
Hussing, Edward L.	Plumbing.	Pittsburgh	7150 Kedron Ave.
Janssen, William.	Machine.	Pittsburgh	6310 Bond St.
Johnston, William.	Pattern.	Wilkinsburg	1146 South Ave.
Kartlick, Fred J.	Foundry.	Pittsburgh	404 Tabor St.
Keating, Felix M.	Machine.	Pittsburgh	Ward & Whitney Sts.
Keelan, James D.	Machine.	Pittsburgh	230 Winterburn Ave.
Keller, Joseph S.	Machine.	Pittsburgh	3020 Smallman St.
Keller, William H.	Forging.	Ingram	8 Dallas Ave.
Kevey, Victor.	Sign Paint.	Pittsburgh	1337 Fifth Ave.
Kiedaisch, George F.	Wiring.	Pittsburgh	2316 East St.
King, Charles D.	Pattern.	Pittsburgh	842 Inwood St.
Koehler, Jacob P., Jr.	Foundry.	Etna	212 Washington St.
Koshkin, Simeon J.	Machine.	Rostow-on-Don, Rus.	366 Meyron Ave., Pgh.
Krupp, Theodore.	Plumbing.	Pittsburgh	4536 Carroll St.
Lamont, James G.	Machine.	Pittsburgh	523 Morningside Ave.
Lee, Allen Payne.	Sign Paint.	Pittsburgh	2103 Wylie Ave.
Lewis, Martin L.	Pattern.	Pittsburgh	291 Forty-fourth St.
Lippert, Harry.	Plumbing.	Pittsburgh	1827 Beaver Ave.
Lovejoy, Henderson W.	House Paint.	N. Braddock	30 Corey St.
Lucas, LeClare E.	Wiring.	Pittsburgh	5713 Rural Ave.
McCausland, Clarence M.	Forging.	Pittsburgh	1511 Federal St., N. S.
McClain, Otto A.	Machine.	Pittsburgh	2906 Penn Ave.
McConaghy, John L.	Forging.	Pittsburgh	55th & McCandless Ave.
McFarland, Charles T.	Pattern.	Pittsburgh	137 Forty-fourth St.
McGinley, John F.	Plumbing.	Pittsburgh	2512 Alliquippa St.
McGinley, John L.	Plumbing.	Millvale	315 Sample St.
McKee, Thomas W.	House Paint.	Pittsburgh	800 Greenfield Ave.
McKinley, James.	Wiring.	Pittsburgh	392 Forty-fourth St.
MacMurray, Harry B.	Pattern.	Pittsburgh	54 Woodville Ave.
McNally, Bliss A.	Sign Paint.	Pittsburgh	900 Greenfield Ave.
McNiff, Joseph R.	Plumbing.	Pittsburgh	Minnesota St.
McRoberts, Samuel L.	Pattern.	Fair Haven.	
Manns, Fred A.	Foundry.	Pittsburgh	186 Forty-second St.
Martin, James A.	Plumbing.	Pittsburgh	5509 Sunnyside St.
Melcher, Walter A.	Plumbing.	Swissvale	7426 Park Ave.
Metzger, Charles L.	Machine.	Pittsburgh	2 Hoosac St.
Meyer, Charles E.	Foundry.	Pittsburgh	1009 Manhattan, N. S.
Meyers, George.	Pattern.	Pittsburgh	1490 Lowry St.
Mifflin, Allen G.	Machine.	Pittsburgh	2118 Reed St.
Miller, John G.	Sign Paint.	Pittsburgh	62 Clifton St., N. S.
Moldenhauer, Gustave A.	Foundry.	Pittsburgh	704 Southern Ave.
Moore, Frank B.	House Paint.	E. Liverpool, O.	1932 Fifth Ave., Pgh.
Morgan, William E.	Wiring.	Pittsburgh	32 Wakefield St.
Morrow, William P.	Sheet Metal.	Wilkinsburg	1151 South Ave.
Mosenson, Nathan.	Plumbing.	Pittsburgh	2027 Wylie Ave.
Mulcare, John R.	Sign Paint.	Avalon	Norwood Ave.
Muller, Joseph.	Machine.	Pittsburgh	2509 Jane St.
Muskulus, Oscar.	Machine.	Pittsburgh	3929 Liberty Ave.
Novotny, Frank.	Forging.	Pittsburgh	450 California Ave., N. S.
Ober, Albert J.	Sign Paint.	Pittsburgh	21 Summit Ave.
O'Connor, Charles C.	Plumbing.	Beechview.	
O'Donnell, Anthony J.	Foundry.	Pittsburgh	218 Robinson St.
O'Donnell, John.	Plumbing.	Pittsburgh	2332 Forbes St.

O'Leary, Bernard J.	Sheet Metal.	Pittsburgh.	1326 Lincoln Ave.
Pahler, Jacob A.	Sheet Metal.	Pittsburgh.	136 S. Twenty-second St.
Parkinson, Charles W.	Pattern.	Pittsburgh.	Rear 357 Spahr St.
Patterson, Earl J.	Sign Paint.	Pittsburgh.	2 Forest Place.
Pohl, Otto A.	Bricklay'g.	Mt. Oliver.	186 Arlington Ave.
Poster, Samuel H.	Machine.	Pittsburgh.	314 Oregon St.
Rafter, James.	House Paint.	Pittsburgh.	3423 Penn Ave.
Ralston, John A.	Forging.	Pittsburgh.	167 Grant Ave., N. S.
Rankin, Earl C.	Foundry.	Wilkinsburg.	814 Wallace Ave.
Rankin, Thomas W.	Foundry.	Wilkinsburg.	814 Wallace Ave.
Rapp, William E.	Wiring.	Pittsburgh.	1812 Market St., N. S.
Rawlings, Edward.	Bricklay'g.	Swissvale.	8200 St. Lawrence Ave.
Reilly, Richard P.	Forging.	Pittsburgh.	331 Ward St.
Rihn, Edward J.	Bricklay'g.	Ford City.	
Roberts, Joseph.	Pattern.	Morganza.	
Rogers, David C.	Forging.	Bellevue.	26 E. Forest Ave.
Ruttkamp, Otto H.	Pattern.	Pittsburgh.	3938 Fifth Ave.
Schafer, William.	Plumbing.	Pittsburgh.	135 Forty-second St.
Schalek, John H.	Pattern.	Pittsburgh.	92 Clarence St.
Schoeller, Albert L.	Sign Paint.	Pittsburgh.	6437 Marchand St.
Schoeneman, Charles E.	Foundry.	Pittsburgh.	313 Gross St.
Scholl, Joseph L.	Machine.	Pittsburgh.	1717 Greenleaf St.
Schwartzmeier, Frank G.	Pattern.	Pittsburgh.	200 Loreda St., N. S.
Scocca, Christ J.	Pattern.	Pittsburgh.	626 Whittier St.
Scott, Walter.	Pattern.	Braddock.	
Seippel, William.	Machine.	Pittsburgh.	1419 Arch St.
Shaffer, William A.	Sign Paint.	Wilkinsburg.	1313 Clark St.
Shourek, Theodore L.	Machine.	Pittsburgh.	811 E. View St.
Shuck, Edgar A.	Foundry.	McKees Rocks.	Woodward Av., West Pk.
Silverman, Morris.	Pattern.	Pittsburgh.	69 Congress St.
Simmers, Orrion.	Foundry.	Mannington, W. Va.	
Smalley, Henry L.	Pattern.	Pittsburgh.	7935 Tacoma St.
Smith, Harry.	Forging.	Pittsburgh.	48 Fourteenth St.
Smith, Samuel P.	Bricklay'g.	Pittsburgh.	7632 Baxter St.
Smith, Thomas H.	Foundry.	Pittsburgh.	3107 Hamlet St.
Soss, Thomas M.	Pattern.	Pittsburgh.	127 Larimer Ave.
Stafford, Frank S.	Machine.	Pittsburgh.	2703 Liberty Ave.
*Stanier, Henry B.	Wiring.	Pittsburgh.	5222 Holmes St.
Steup, Ernest.	Sign Paint.	Bellevue.	46 Division St.
Stickle, Frederick J.	Machine.	Rankin.	242 Third St.
Stock, Joseph.	Plumbing.	Pittsburgh.	121 Industry St.
Stoker, Oscar E.	Sign Paint.	Pittsburgh.	219 Auburn St.
Strasser, George B.	Plumbing.	Pittsburgh.	404 W. Carson St.
Sugden, Ray S.	Wiring.	Pittsburgh.	221 Fortieth St.
Svenson, Valfred M.	Sheet Metal.	McKeesport.	721 Packer St.
Swift, James P.	Wiring.	Pittsburgh.	5207 Carnegie Ave.
Taylor, Robert J.	Forging.	Pittsburgh.	1723 Allegheny Ave., N. S.
Theiss, James R.	Wiring.	Sardis, O.	1304 Arch St., N. S., Pgh.
Thomas, John C.	Pattern.	Pittsburgh.	3116 McClurg St.
Thompson, Fred G.	Sheet Metal.	Wilmerding.	
Thornton, Aaron G.	Plumbing.	Pittsburgh.	5200 Center Ave.
Turocy, John A.	Foundry.	Pittsburgh.	2326 Fifth Ave.
Tyler, Charles M.	Plumbing.	Pittsburgh.	2507 Webster Ave.
*Ulrich, John E.	Machine.	Pittsburgh.	30 Washington Ave.

*Deceased.

Varley, Albert E.	Pattern.	Homestead.	814 Amity St.
Velte, Lawrence H.	Wiring.	Pittsburgh.	4807 S. Atlantic Ave.
Vetter, George F.	Sheet Metal.	Pittsburgh.	137 Hawkins Ave.
Walker, Frank C.	Sign Paint.	Pittsburgh.	3907 Liberty Ave.
Walter, George K.	Foundry.	Pittsburgh.	Buckingham Apts.
Wardle, William L.	Forging.	Pittsburgh.	5263 Wickliffe St.
Watkins, Richard H.	Pattern.	Braddock.	111 Ninth St.
Wiegand, Frank P.	Bricklay'g.	Mt. Oliver.	408 Carbon St.
Wills, John E.	Pattern.	Lock Haven.	East Pittsburgh.
Wilson, Joseph G.	Wiring.	Pittsburgh.	34 Bigelow St.
Woolensack, Alfred.	Plumbing.	Pittsburgh.	171 Eighteenth St. Ex.
Young, Albert J.	Sheet Metal.	Pittsburgh.	602 Rosedale St.
Young, George W.	Machine.	Pittsburgh.	Syracuse St.
Zeigler, Rodney L.	Wiring.	Eidenau.	705 N. Dallas Ave., Pgh.
Zierenberg, George.	Plumbing.	Pittsburgh.	550 California Av., N. S.

Stationary Engineers

Brown, Cleveland Worth.	Pittsburgh.	424 Bessemer Bldg.
Brownhill, George.	Knoxville.	219 Mathew St.
BuMiller, George Adam.	Pittsburgh.	1712 Fulton St., N. S.
Dempsey, Thomas John.	Pittsburgh.	17 Bouquet St.
Glynn, Patrick Joseph.	Pittsburgh.	309 Dithridge St.
Gray, Julius French.	Warrenton, Va.	5653 Second Ave., Pgh.
Inks, Newton Alexander.	Pittsburgh.	254 Addison St.
Kenney, Leo Ellsworth.	Pittsburgh.	49 DeSota St.
Livingston, William James.	Homestead.	248 Fourth Ave.
McCullough, John Patrick.	Pittsburgh.	508 Bingham St.
Mixer, Charles Ball.	Knoxville.	221 Mathews Ave.
Murray, William.	Pittsburgh.	Maurice St.
Noble, William Scott.	Pittsburgh.	23 Gibson St.
Noel, Oscar.	Aspinwall.	121 Fourth St.
O'Keefe, Jerome.	Pittsburgh.	25 Emerald St.
Pearlman, Joseph.	Homestead.	
Pendergast, Michael Francis.	Pittsburgh.	2017 Webster Ave.
Ritts, William Henry.	Etna.	Maplewood St.
Schmidt, William Jacob.	Pittsburgh.	273 Washington Ave.
Vaughn, Patrick Joseph.	Pittsburgh.	2017 Market St., N. S.
Wilson, John L.	McKees Rocks.	320 Russell Wood Ave.
Young, Walter Marshall.	Mt. Oliver.	141 Zara St.

Foundry Foremen

Connolly, Richard Dennis.	Pittsburgh.	4545 Carroll St., N. S.
Flynn, Timothy Aloysius.	Pittsburgh.	350 Forty-fifth St.
Fulton, Alfred Miller.	Coraopolis.	908 State St.
Goodin, Brooks J.	Pittsburgh.	227 S. Negley Ave.
Hollowell, John William.	Swissvale.	7435 Park Ave.
Kerins, James Dominick.	Pittsburgh.	100 S. Thirteenth St.
Nesbitt, Charles Bennett.	Zelienople.	
Padgett, George Lones.	Pittsburgh.	40 Exeter St.
Ryan, John M.	Pittsburgh.	40 Exeter St.
Smith, David.	Braddock.	610 Corey Ave.

Carnegie Technical Schools

Pittsburgh, Pa.

School of Applied Design

Courses in

Architecture and Interior Decoration

Day School

Night School

Announcement

1908-1909

This School offers

1 DAY COURSES

In Architecture.

In Interior Decoration.

2 NIGHT COURSES

In Architectural Design, adapted particularly to Draftsmen in offices of Architects.

In Interior Decoration.

Calendar

1908

	DAY	NIGHT
Closing Dates	Wednesday, June 17	Friday, May 15
Commencement Day	Wednesday, June 17	
Spring Entrance Examinations	Thursday, June 18, 10 A.M. Friday, June 19, 10 A.M.	
Spring Examinations for the Removal of Conditions	Thursday, June 18, 10 A.M. Friday, June 19, 10 A.M.	
Fall Entrance Examinations	Tuesday, Sept. 15, 10 A.M. Wednesday, Sept. 16, 10 A.M.	
Fall Examinations for the Removal of Conditions	Tuesday, Sept. 15, 10 A.M. Wednesday, Sept. 16, 10 A.M.	
Interviews for Admission		Thursday, Sept. 17, 7 P.M. Friday, Sept. 18, 7 P.M.
Registration and Payment of Tuition Fees	Monday, Sept. 21, 9 A.M. to 12	Monday, Sept. 21, 7 P.M.
School Year Begins	Monday, Sept. 21, 1 P.M.	Monday, Sept. 21, 7:30 P.M.

1909

Closing Dates	Wednesday, June 16	Friday, May 14
Commencement Day	Wednesday, June 16	
Spring Entrance Examinations	Thursday, June 17, 10 A.M. Friday, June 18, 10 A.M.	
Fall Entrance Examinations	Monday, Sept. 14, 10 A.M. Tuesday, Sept. 15, 10 A.M.	
Interviews for Admission		Thursday, Sept. 16, 7 P.M. Friday, Sept. 17, 7 P.M.
Registration and Payment of Tuition Fees	Monday, Sept. 20, 9 A.M. to 12	Monday, Sept. 20, 7 P.M.
School Year Begins	Monday, Sept. 21, 1 P.M.	Monday, Sept. 20, 7.30 P.M.

Day sessions will be held every week-day except Saturday, beginning at 9 o'clock.
Night sessions will be held every week-day except Saturday, beginning at 7:30 o'clock.

Vacations and Holidays

There will be no sessions on Thanksgiving day or the Friday following.
Christmas recess begins Friday, December 18, at 10:30 P.M., and ends Monday, January 4, 1909, 9 A.M.
A week's recess will be given at the end of the winter term.
Holidays are Lincoln's Birthday, February 12; Washington's Birthday, February 22; Founder's Day, last Thursday in April; Decoration Day, May 30, and Election Day, November 3, 1908.

Faculty

ARTHUR A. HAMERSCHLAG, Sc.D. - Director
HENRY HORNBOSTEL, Ph.B. - - Professor of Architectural Practice.
JEAN P. ALAUX, A.D.G. - - - Associate Professor of Architectural Design.
HENRY K. McGOODWIN, B.S. - - Assistant Professor of Architecture.
EDWARD B. LEE, B.S. - - - - Instructor in Architectural Practice.
EDMUND S. CAMPBELL, S.M. - - Assistant Instructor in Architecture.
AUGUST ZELLER - - - - - - Assistant Instructor in Modelling.
ALEXANDER S. KESZTHELYI - - - Assistant Instructor in Freehand Drawing.
EDWARD J. WEBER - - - - - - Assistant Instructor in Architecture.
BENNO JANNSEN - - - - - - Visiting Instructor in Architecture.

WALTER F KNOX, Ph.D. - - - Assistant Professor of Mathematics.
MARTIN HOKANSON, C.E. - - - Assistant Professor of Materials of Construction.
HORACE R. THAYER, M.S. - - - Instructor in Applied Mechanics.
A. LEROY LIGHTNER, A.B. - - Instructor in English.
JOHN J. JEFFREY, B.S. - - - - Assistant Instructor in Physics.
THOMAS F. PAYNE - - - - - Instructor in Plumbing.
JOHN H. NOLEN - - - - - - Instructor in Bricklaying.
HUGH A. CALDERWOOD - - - - Instructor in Electric Wiring.

Officers of administration are members, ex-officio, of the faculty.

Standing Committees

Committee on Faculty Organization

PROFESSOR HORNBOSTEL — MR. FIELD
MR. LEETE

Committee on Entrance Examinations

MR. CAMPBELL — MR. LEE
MR. ZELLER

Committee on Student Organizations and Publications

MR. FIELD — PROFESSOR ALAUX
MR. LEE

Committee on Inter-Schools Relations

PROFESSOR MCGOODWIN — PROFESSOR CRABTREE
MR. LEEDS — MISS BALDWIN

Committee on Education, Curriculum and Standing

MR. LEETE — PROFESSOR MCGOODWIN
PROFESSOR HORNBOSTEL — MR. CAMPBELL
PROFESSOR ALAUX — MR. LEE
MR. KESZTHELYI

The Director is a member, ex-officio, of all committees.

School of Applied Design

GENERAL STATEMENT

With the future development of the School of Applied Design, courses of instruction will be organized in various branches of the arts. At the present time only two courses are offered,—those in Architecture and Interior Decoration. Detailed information concerning the work in these departments is given below.

The advancement of the student from stage to stage of work in these courses is based on a system of acquirement of values which allows the greatest possible flexibility of adjustment of the work to the individual.

The Departments of Architecture and Interior Decoration will finally be housed in a group of buildings designed to receive the School of Applied Design. The quarters in which they are temporarily accommodated at present include draughting rooms which are large, admirably lighted and thoroughly equipped, excellent studios for freehand drawing and modeling, a very complete working library, and a lecture room with stereopticon. The equipment includes a large and rapidly increasing collection of lantern slides.

The splendid collections of books, architectural models, and paintings in the Carnegie Library and Institute, which are adjacent to the Schools, form an invaluable extension of the resources of these Departments.

The international exhibitions of architectural drawings held at the Institute under the auspices of the Pittsburgh Architectural Club offer to the student excellent opportunities for seeing and comparing the best current work in architecture and decoration.

THE DEPARTMENT OF ARCHITECTURE

The work in architecture is projected to give the student a thorough training in those fundamental principles of design and construction which are most necessary to the practicing architect. Parts of the work lead toward that liberal mental training which is as necessary to the successful practitioner as is his purely technical equipment. A detailed description of the required courses of study is given below.

A number of important architectural competitions for students are open to students of this Department. Of these the principal ones are:

The Patron's Prize. This prize, offered through the generosity of Mr. Henry Hornbostel, provides for foreign travel and study by the holder during the summer vacation.

The Paris Prize of $2500 provides for two and a half years of foreign travel and study: *The Pupin Prizes* of $50 and $25: *The Warren Prizes* of $50 and $25. These prizes are offered annually under the supervision of the Society of Beaux Arts Architects.

The Stewardson Travelling Scholarship of $1000, offered annually to any student of one year's residence in Pennsylvania.

A Domestic Travelling Scholarship of $250, offered anonymously each year through the Pittsburgh Chapter of the American Institute of Architects.

CURRICULUM

Candidates for the diploma in Architecture are required to gain the "credit units" or "values" specified in the following schedule of subjects of study.

A "credit unit" or "value" is defined as the amount of credit allowed for the satisfactory completion of the assigned work of one term in a course of one hour a week of recitations or lectures or of two hours a week of laboratory or drawing room work.

Advanced Algebra	3
Solid Geometry	2
Trigonometry	5
Analytic Geometry	6
Calculus	6
Descriptive Geometry	4
Shadows	3
Perspective	3
Physics	7
Electricity	3
Materials	1
Applied Mechanics, Elementary	3
Applied Mechanics, Advanced	6
Graphic Statics	9
Plumbing, Electric Equipment, Masonry	5
Heating and Ventilating	2

Sanitary Science	1
General Lectures and Non-Technical Subjects	9
English	7
French	12
Economics	6
Law of Contracts	3
History of Architecture	6
History of Ornament	6
Free Hand Drawing	18
Modelling	5
Planning and Composition	9
Architectural Design	75
	225

Candidates for the diploma in Architecture may obtain 25 of the credit units in Architectural Design by non-resident study. See description, page 141.

The above schedule of values or credit units will be subject to such slight changes as may be required for practicable arrangements of schedules of classes.

After a student has acquired all values except those in Class A Design according to the programs of the New York Society of Beaux Arts Architects, these Class A values may then be acquired in either day or night classes of this Department, or in any other school or atelier submitting its work to the above Society for judgment, the judgments of this Society being the basis of the values or credit units required in Architectural Design for the diploma in Architecture.

The work of the Department in Architectural Design is that projected by the New York Society of Beaux Arts. The work in Free Hand Drawing and Modelling is also submitted to this Society for judgment. As the subjoined list of values includes all those required by the Society for the award of its certificate, the graduate of this Department may receive the certificate of the Society in addition to the diploma in Architecture of the Schools.

DESCRIPTION OF COURSES

MATHEMATICS. The courses in mathematics are projected to assist in the mental equipment of the student and to fit him to attack the ordinary problems of construction occurring in architectural practice. The course in descriptive geometry deals especially with the problems occurring in architectural shadows, perspective construction, etc.

SHADES AND SHADOWS. A course in the determination of shades and shadows as they occur on architectural rendered drawings.

PERSPECTIVE. A course in the theory of perspective and in the practical construction and rendering of architectural perspective drawings.

PHYSICS. Courses in mechanics, sound, heat, light, etc., intended especially to fit the student for the attack of problems in construction.

ELECTRICITY. A general course in the fundamental principles of electricity, preparatory to the study of the electric equipment of buildings.

MATERIALS. Courses in the general properties of the common building materials.

APPLIED MECHANICS. Courses designed to prepare the student for problems in architectural construction.

GRAPHIC STATICS. Courses in the analysis by graphical methods of the common problems concerning beam, column, arch, truss, etc., as they occur in architectural practice.

HEATING AND VENTILATING. Courses in the theory and practice of the heating and ventilating of buildings.

SANITARY SCIENCE. A course in the general principles of sanitation especially as applied to buildings.

GENERAL LECTURES. Lectures on various subjects of science and art, intended to give members of the entering classes some insight into the nature of the various professional courses taught at the schools, and to enable them to elect their courses with intelligence; also instruction in certain subjects of general culture.

PLUMBING, ELECTRIC EQUIPMENTS, MASONRY. Courses to familiarize the student in a general way with the apparatus and the technical methods employed in these building trades.

ENGLISH. Training in the clear and correct use of language and in forms of contracts and specifications.

FRENCH. Courses designed especially to enable the student to read fluently modern French texts.

ECONOMICS. A course in the history of economics, especially as related to American industrial development.

LAW OF CONTRACTS. A course in the underlying principles of business law, especially as relating to contracts and specifications.

HISTORY OF ORNAMENT. This course is intended to familiarize the student with the historic styles of ornament and to teach the elemental principles of composition in decoration and ornament. The course consists of lectures with the stereopticon and exercises in drawing ornament.

HISTORY OF ARCHITECTURE. Courses developing the progress of architectural art through the historic styles, and of the civilizations which produced them.

FREEHAND DRAWING. Includes thorough training in drawing from cast and from life, and in water-color drawing. Work in these classes is submitted for judgment in the competitions held by the society of Beaux Arts Architects in New York.

MODELLING. Course in modelling in clay architectural details and ornaments. Work in this course is submitted for judgment in the competitions held by the society of Beaux Arts Architects in New York.

ARCHITECTURAL DESIGN. The study and rendering of original designs by the student. This work constitutes the most important courses of the Department. Designs are submitted for judgment in the competitions held by the Society of Beaux Arts Architects in New York.

The completion of the course in design requires the student to obtain all the values in Class B Plan, Class A Plan and Archæology required by this Society for its certificate, and three values in the orders instead of the two values required by the Society.

NIGHT CLASSES

Of the subjects of instruction described above, the following are now offered to night classes:

Shadows and Rendering.
History of Architecture.
Freehand Drawing.
Architectural Design.

Every encouragement is given to night students to enter the day classes when they can find it possible to do so, and to acquire in night classes as many credit units as possible, with a view to graduation. In addition to the four architectural subjects offered above, night students may take in the night classes of the School of Applied Science other subjects in which credit units are required for graduation.

DEPARTMENT OF INTERIOR DECORATION

The courses of study required in this Department are projected to give the student a thorough fundamental training in the elementary principles of the arts of design; and to furnish a general equipment in the technical understanding and skill necessary for successful development in the practice of the decorative arts. A detailed description of these courses is given below.

CURRICULUM

Candidates for the diploma in Decoration are required to gain the "credit units" or values specified in the following schedule of subjects of study.

A "credit unit" or value is defined as the amount of credit allowed for the satisfactory completion of the assigned work of one term in a course of one hour a week of recitations or lectures, or of two hours a week of laboratory or drawing room work.

Solid Geometry	2
Descriptive Geometry	6
Shadows	3
Perspective	3
Sanitary Science	1
General Lectures and Non-Technical Subjects	9
English	7
French	12
Economics	6
Law of Contracts	3
History of Architecture	6
History of Ornament	6
Composition	6.
Theory of Color	6
Modelling	18
Freehand Drawing	30
Drawing and Painting in Oils, Water Color, Pen-and-Ink, etc	21
Design	80
	225

The above schedule of credit units will be subject to slight variations such as may be required for practicable arrangement of schedules of classes.

DESCRIPTION OF COURSES

Geometry. Courses in geometry are projected to render the student familiar with the mathematical problems concerned in shadows and perspective, and with the intersections and surfaces common in buildings and other subjects of decoration.

Shadows. A course in the determination of shadows as they ordinarily occur on architectural and other rendered drawings.

Perspective. A course in the theory of perspective and in the practical construction and rendering of perspective drawings.

Sanitary Science. A course in the general principles of sanitation, especially as applied to buildings.

General Lectures and Non-Technical Subjects. Lectures on various subjects of science and art intended to broaden the student's general culture.

English. Training in the clear and correct use of language.

French. Courses designed especially to enable the student to read fluently modern French prose.

Economics. A course in the history of economics especially as related to American industrial development.

Law of Contracts. A course in the underlying principles of business law, especially as relating to contracts and specifications.

History of Ornament. This course is intended to familiarize the student with the historic styles of ornament, and to give elementary practice in ornamental composition.

History of Architecture. Courses developing the progress of architectural art through the historic styles, and of the civilizations which produced them.

Composition. A course in the elementary principles of pure design and in the application of these principles to various materials and subjects of design.

Theory of Color. A course in the principles of color harmony and composition.

Modelling. A course in modelling ornament and figure from cast, and in modelling original decorative compositions.

Freehand Drawing. Thorough training in drawing from cast and from life in various media.

Drawing and Painting in Water Color, Oils, Pen-and-Ink, Etc.—Courses of training in the rendering of decorative compositions in the common pictorial media.

Design. Elementary training in the practical application of principles of design to the ordinary subjects of decorative art, including interior and exterior color schemes, furniture, wall coverings, textiles, colored glass, metal, jewelry, etc.; the elements of architecture intended to furnish the student with a knowledge of architectural forms and styles to which decorative schemes must generally conform; and archaeology or practical problems in decoration in given historic styles.

NIGHT CLASSES

Of the subjects of instruction described above, the following are now offered to night classes:

Decorative Design.
Archaeology.
Freehand Drawing.
History of Architecture.
Shadows and Rendering.

Every encouragement is given to night students to acquire in night classes as many credit units as possible, and to enter the day classes with a view to graduation whenever they can find it possible to do so.

DAY COURSES

ENTRANCE REQUIREMENTS

Students of three classifications are received into day courses of the Departments of Architecture and Interior Decoration, as follows:

Classification I—Students who pass the examinations for admission to the School of Applied Science with the intention of electing the course in Architecture or that in Interior Decoration after the completion of the preliminary work common to all courses. Such candidates must be at least 16 years of age and must satisfy the entrance requirements as stated on pages 59 and 60 of the general catalogue.

Classification II—Those students who elect the course in Architecture or that in Decoration at the time of their admission and who are regularly admitted by examination. Such students must be not less than 18 years of age at the time of admission and must fulfill the entrance requirements given below.

Entrance Requirements for Students of Classification II—For admission there is required of the candidate:

1. A personal interview intended to disclose something of the personality of the candidate, and of his general fitness for work in the course elected.

2. A certificate or other evidence of the completion of a high school course or other preparatory work of an approved type, or of its equivalent in technical training and experience.

3. Examinations in subjects fundamental to courses of study to be pursued in the department of work elected.

Personal Interview—All candidates under this classification should present themselves for personal interview, at which they will be rated as approved or not approved.

Approved candidates who fail to pass the entrance examinations may be allowed to enter with a limited number of entrance conditions.

No student who has not removed all such entrance conditions within the year following his admission will be allowed to continue his classes.

No student not approved on personal interview will be admitted unless he passes satisfactorily all other entrance tests.

Candidates should present themselves at Room 120A, on

Monday, Sept. 21, 1908.
Tuesday, Sept. 22, 1908.

Examinations—Candidates under this classification are required to pass satisfactory examinations in four of the subjects named below. Candidates electing Architecture must present Algebra, Plane Geometry and three other subjects only; those electing Decoration must present Freehand Drawing and Modelling and three other subjects only.

1. *Algebra*—Through quadratics, or, *Freehand Drawing,* consisting of pencil rendering of simple objects.

2. *Plane Geometry,* or *Modelling*—Modelling of simple objects in clay.

3. *Physics,* or *Chemistry*—Of High School grade.

4. *English*—Test of ability to express thought in clear and correct written language.

5. *French*—Test of ability to read modern French prose; or *History*—Test of knowledge of histories of ancient Egypt, Greece and Rome.

6. *Mechanical Drawing*—Test of skill in using instruments and in making geometrical constructions.

CLASSIFICATION III—Those candidates who are not prepared to satisfy the above entrance requirements, but who, on account of maturity, practical experience or for other pertinent reasons, may be expected to do the same work as the other classifications of students.

Such candidates may be admitted provisionally to the work of the department elected on the recommendation of the Faculty of that department. If they have not given evidence by their first term's work of capability to continue it, they will be required to withdraw upon recommendation of the Faculty.

They should present themselves for interview at Room 120A, on

Monday, Sept. 21, 1908.
Tuesday, Sept. 22, 1908.

Examinations for entrance will be held in accordance with the calendar on page 135, in June and September of each year. Examinations may be divided between these two periods at the option of the student.

For detailed information concerning hours, rooms, etc., for examinations, bulletin boards in the entrance corridor of the School Buildings should be consulted on the days set in the calendar for those examinations.

High schools and other preparatory schools of approved standing may make arrangements for holding examinations in their own localities for applicants who live at a distance from Pittsburgh. Application for the arrangement of such examinations must be received by the Secretary or the Registrar of the Schools before June 1 or September 1. Papers containing the results of such examinations must be delivered at the office of the Schools not later than June 20 or September 16. Failure to comply with these conditions will render the examinations void.

A fee of two dollars will be charged for admission to entrance examinations in Pittsburgh, which will be credited toward the tuition fee of students who enter the Schools. A candidate for re-examination will be required to pay a second fee, and this fee only will be credited toward his tuition fee in case of his admission. A candidate dividing his examinations will pay a fee only for his first examinations.

Fees must be paid to the Cashier of the Schools at the time of the examinations or in advance.

ADVANCED STANDING—Applicants for admission with advanced standing may enter the course at whatever point they can show, by examination or otherwise, their fitness for the work.

LENGTH OF COURSE—No specific time is set for graduation. It is intended that the certificate or diploma of the Schools should stand for a certain standard of professional attainments, as represented by the schedule

of "values" or "credit units" given below, and that the length of time required to reach this standard in individual cases be not taken into account in awarding the diploma. Students are permitted and encouraged to advance in their work as rapidly as their various talents and capabilities make possible.

It is possible for the architectural student of Classifications I and II above described to acquire all values or credit units required for the diploma in Architecture, excepting part of those in Architectural Design, in three years. The students of Classification III may do the same in four years. The time required for the completion of the work in Decoration would be approximately the same.

TUITION FEE

For residents of the City of Pittsburgh.....$20.00 per year
For all others..... 30.00 per year

The tuition fee must be paid in advance.

A deposit of $5.00 must be made by each student at the beginning of the school year to cover locker rental, breakage and incidental fees. The unused portion will be returned on application at the end of the year.

ATHLETIC FIELD DUES

Payable upon registration as per statement on page 19.

NIGHT COURSES

The night classes in architecture are intended primarily for the instruction of draughtsmen who are employed during the day in architects' and decorators' offices. But others who wish to take up the study of architecture and decoration will be received up to the limit of the capacity of the School to accommodate them.

ENTRANCE REQUIREMENTS—No examinations are required for entrance to these classes—students being admitted on the recommendation of the Faculties in Applied Design.

Applicants for entrance should present themselves at room 120A, at the following times:

September 17—7:00-8:30 p. m.
September 18—7:00-8:30 p. m.

TUITION FEE

For residents of the City of Pittsburgh.....$5.00 per year
For all others..... 7.00 per year

The tuition fee must be paid in advance.

A deposit of $3.00 must be made by each student at the beginning of the school year to cover locker rental, breakage, and incidental fees. The unused portion will be returned on application at the end of the year.

ATHLETIC FIELD DUES

Payable upon registration as per statement on page 19.

List of Students
1907-1908

Day Students

Senior Class

Peebles, Henry Wyche. . . .	Jackson, Miss. . . .	5143 Woodlawn Ave., Pgh.
Spence, David Juan, Jr. . . .	San Jose, Cal. . . .	306 Craig St., Pgh.
Steen, M. Markle.	Pittsburgh.	126 Dithridge St.
Stoner, George Milligan. . . .	White Ash.	

Junior Class

Cohen, Julius Aaron.	Pittsburgh.	Craft Apts.
Ihsen, Oscar Herman.	Pittsburgh.	1011 Vinial St., N. S.
Israeli, Esaias.	Hartford, Conn. . .	350 Oakland Ave., Pgh.
Lyman, Earl Lytton.	Bellevue.	Kendall & Cedar Aves.
Smart, Frank Harris.	Pittsburgh.	35 Riverview Ave., N. S.

Irregular Course

Allison, Donald Mahaney. . .	Pittsburgh.	68 Clifton Ave., N. S.
Bernardi, Raymond Charles. .	Carrick.	1001 Brownsville Road
Brierley, Cornelius.	Homestead.	
Clyde, Roy Leslie.	Pittsburgh.	6432 Dean St.
Critchlow, Thomas Roscoe. . .	Prospect.	
Dunham, Howard Horatio. . .	Galena, Kan. . . .	718 Grandview Ave., Pgh.
Elliott, Daniel J.	Leechburg.	Parnassus.
Gerrard, Herbert Stockford. .	Wilkinsburg.	454 Biddle Ave.
Gilkison, Arthur Henry. . . .	Toronto, Can. . . .	3608 Bouquet St., Pgh.
Gloekler, Karl Joseph.	Pittsburgh.	5132 Friendship Ave.
Grine, Paul Garland.	Elizabeth.	
Hazlewood, Richard Nelson. .	Pittsburgh.	5823 Holden St.
Hinckley, Wallace Raymond. .	Blue Hill, Me. . . .	319 Craig St., Pgh.
Hudson, Welby Hatcher. . . .	Pittsburgh.	5174 Woodworth St.
Lamont, Archibold Garfield. .	Pittsburgh.	1246 Lincoln Ave.
Mitchell, George Evans. . . .	Delhi, O.	550 Neville St., Pgh.
Muhr, Paul John.	Pittsburgh.	2026 Wylie Ave.
Sauers, Chester Burrell. . . .	Williamsport. . . .	3211 Elsinore Sq., Pgh.
Schaefer, William Frederick. .	Pittsburgh.	506 Liberty St., N. S.
Shaffer, Wilbert Harrison. . .	Prospect.	
Smith, Harry Everet.	Pittsburgh.	5137 Woodlawn Ave.
Sterling, Percy Howard. . . .	Pittsburgh.	66 Maple Terrace
Stonerod, Earl DeForest. . .	Ben Avon.	Perrysville Ave.
Street, Reginald Dawson. . .	Braddock.	Second & Hawkins Ave.
Weaver, Adam Lincoln, Jr. . .	Pittsburgh.	68 Wabash Ave.
Wentworth, Samuel Clinton. .	Pittsburgh.	5820 Baum St.

Night Students

Alexander, Alfred Dwight. . .	Pittsburgh.	3306 Terrace Ave.
Bailey, James Ruskin.	Pittsburgh.	

Banks, William Albert. . . .	Pittsburgh. . . .	.33 Boggs Ave.
Berkson, Morris.	Pittsburgh. . . .	.714 Manilla St.
Bruton, F. Guy.	Pittsburgh. . . .	.729 Liberty St., N. S.
Buxton, Henry Alfred. . . .	Pittsburgh. . . .	.310 Denniston Ave.
Byrne, John Francis.	Pittsburgh. . . .	.209 Elysian Ave.
Campbell, Ray Brant.	Fairmont, W. Va.	.25 Mason St., Pgh.
Clark, Glen Clifford.	Hubbard, O.	
Clark, Richard Robb.	Pittsburgh. . . .	.1010 Cabinet St., N. S.
Clements, Herman Harry. . .	Pittsburgh. . . .	.2721 Quincy St.
Cocken, William York.	Pittsburgh. . . .	.317 Pitt St.
Conwell, Sylvester Ralph. . .	Pittsburgh. . . .	.2533 Center Ave.
Danner, Linval LeGrand. . .	Swissvale.	.2228 Hampton Ave.
Diethrick, Albert Michael. . .	Braddock.	.918 Talbot Ave.
Durnall, William W.	Pittsburgh. . . .	.229 Halket St.
England, John Jr.	Wilkinsburg. . . .	.429 Biddle Ave.
Falvey, Walter Lee.	Pittsburgh. . . .	.929 Bedford Ave.
French, James Emerson. . . .	Wilkinsburg. . . .	.403 Pitt St.
Glenn, James R.	Bellevue.	.20 East Forest Ave.
Goldsten, Issy Jack.	Pittsburgh. . . .	.5146 Friendship Ave.
Gundlach, Hellmuth.	Pittsburgh.	
Hannen, Ivan H.	Pittsburgh.	
Harrison, William Henry. . .	Pittsburgh. . . .	.631 Ivy St.
Haupt, Max.	Homestead. . . .	.525 Dixon St.
Hergenroeder, Edward Joseph.	Pittsburgh. . . .	.1925 Lombard St., N. S.
Hess, Florence Clarence. . . .	Pittsburgh. . . .	.803 St. James St.
Hill, Floyd B.	Ambridge.	
Hoffman, Leroy Lawrence. . .	Wilkinsburg. . . .	.615 Hampton Ave.
Hopkins, Frank Louks. . . .	Edgewood.	.173 Gordon St.
Jones, Walter, Jr.	Pittsburgh. . . .	.164 McClure Ave., N. S.
Kelsall, William Thomas. . . .	Pittsburgh. . . .	.547 Cora St.
King, William H., Jr.	Pittsburgh. . . .	.6 Irving Place
Kuhn, John L.	Oakmont.	
Luty, John Merle.	Sewickley.	
McCarty, Walter Andrew. . .	Pittsburgh. . . .	.2 Refuge St., N. S.
McCook, Roderick Sheldon. . .	Pittsburgh. . . .	.263 Emerson St.
McCormick, William.	Pittsburgh. . . .	.5635 Howard St.
Macdonald, Charles A.	Pittsburgh. . . .	.1108 Fayette St., N. S.
McGrew, Louis Robert. . . .	Pittsburgh. . . .	.2002 Wylie Ave.
McMullen, L. A.	Bellevue.	.26 Crawford St.
McNaughton, Adam.	Pittsburgh. . . .	.1409 Sheffield St., N. S.
Markhart, Clark Orromell. . .	Pittsburgh. . . .	.354 Lehigh Ave.
Markley, Harry Elmer. . . .	Bellevue.	.Preston Ave.
Meals, Floyd Julian.	Pittsburgh. . . .	.2910 Shady Ave., N. S.
Moss, Charles Edwin.	Pittsburgh. . . .	.502 Larimer Ave.
O'Brien, Clyde William. . . .	Williamsport. . . .	.Matilda Apts., Pgh.
Philipp, William.	Pittsburgh. . . .	.Grand Ave.
Powelson, Frank Wible. . . .	Pittsburgh. . . .	.129 Crucible St.
Pringle, Thomas.	Pittsburgh. . . .	.373 N. Craig St.
Raguere, Thomas J.	Pittsburgh. . . .	.219 Carron St.
Render, Arthur R.	Pittsburgh. . . .	.641 Maryland Ave.
Rigaumont, Victor A.	Pittsburgh. . . .	.Coltart Square
Robling, Oliver J.	Pittsburgh. . . .	.3213 Elsinore Square
Rodgers, James.	Pittsburgh. . . .	.546 Park Ave.
Rodgers, Raymond Joseph. . .	Pittsburgh. . . .	.308 Orchard Place

Scanlon, John Maurice	Homestead	115 Third Ave.
Schott, Charles George	Waterford, O.	1210 Camp Ave., Braddock
Slater, Thomas L.	Pittsburgh	213 Weymore St.
Slovinec, John	Pittsburgh	1424 Boyle St., N. S.
Smith, Brandon	Pittsburgh	6741 McPherson Boulevard
Smith, Thomas E.	Pittsburgh	7400 Hermitage St.
Stevens, Harry	Carrick	2611 Church Ave.
Stevens, Louis	Carrick	2611 Church Ave.
Stevens, Percy	Surgeons Hall.	
Szabo, Alexius	Pittsburgh	3222 Bouquet St.
Thoma, Walter Landlin	Pittsburgh	211 Mt. Troy Road, N. S.
Tyler, Dave	Pittsburgh	2507 Webster Ave.
VanHausen, Harry J., Jr.	Pittsburgh	221 Meadow St.
Vincent, James Reed	Otto.	
Walter, Otis William	Pittsburgh	5625 Broad St.
Weishaupt, Charles A.	Columbus, O.	424 Beatty St., Pgh.
Weld, Fred L.	Sugar Grove	1034 Fulton Bldg., Pgh.
White, Clarence	Pittsburgh	4740 Friendship Ave.
Wilkins, Arthur H.	Pittsburgh	306 Oakland Ave.
Winner, Benjamin L.	Pittsburgh	200 McIntire Ave.
Withers, Loris Alvin	Swissvale	1917 Wayne St.
Wood, Cecil Charlie	Swissvale	7344 Schley Ave.
Yagle, Emil Joseph	Aspinwall	804 Penn Ave., Pgh.
Yellig, John Albert	Pittsburgh	47 S. 31st St.

Carnegie Technical Schools

Pittsburgh, Pa.

Margaret Morrison Carnegie School for Women

Day School
Technical Courses

Night School
Trade Courses

Announcement

1908-1909

This School offers two distinct groups of courses:

1 DAY TECHNICAL COURSES

2 NIGHT TRADE COURSES

3 SPECIAL COURSES

Calendar

1908

	DAY	NIGHT
Closing Dates	Wednesday, June 17	Friday, May 8, 9.30 P.M.
Spring Entrance Examinations	Thursday, June 18, 10 A.M.	
Spring Examinations for the Removal of Conditions	Thursday June 18, 10 A.M. Friday, June 19, 10 A.M.	
Fall Entrance Examinations	Wednesday, Sept. 16, 10 A.M.	
Fall Examinations for the Removal of Conditions	Tuesday, Sept. 15, 10 A.M. Wednesday, Sept. 16, 10 A.M.	
Interviews for Admission	Dates of interviews for admission to special classes will be announced later	Thursday, Oct. 1, 7 P.M. Friday, Oct. 2, 7 P.M.
Registration and Payment of Tuition Fees	Monday, Sept. 21, 9 A.M. to 12	Thursday, Oct. 8, 7 P.M. Friday, Oct. 9, 7 P.M.
School Year Begins	Monday, Sept. 21, 1 P.M.	Monday, Oct. 12, 7.30 P.M.

1909

	DAY	NIGHT
Closing Dates	Wednesday, June 16	Friday, May 7, 9.30 P.M.
Commencement Day	Wednesday, June 16	
Spring Entrance Examinations	Thursday, June 17, 10 A.M.	
Fall Entrance Examinations	Wednesday, Sept. 15, 10 A.M.	
Interviews for Admission	Dates of interviews for admission to special classes will be announced later	Thursday, Sept. 30, 7 P.M. Friday, Oct. 1, 7 P.M.
Registration and Payment of Tuition Fees	Monday, Sept. 20, 9 A.M. to 12	Thursday, Oct. 7, 7 P.M. Friday, Oct. 8, 7 P.M.
School Year Begins	Monday, Sept. 20, 1 P.M.	Monday, Oct, 11, 7.30 P.M.

Day sessions will be held every week-day except Saturday, beginning at 9 o'clock.

Night sessions will be held on Monday, Wednesday and Friday evenings, beginning at 7:30 P.M

Vacations and Holidays

There will be no sessions on Thanksgiving day or the Friday following.

Christmas recess begins Friday, December 18, at 9.30 P.M., and ends Monday, January 4, 1909, 9 A.M.

A week's recess will be given at the end of the winter term.

Holidays are Lincoln's Birthday, February 12; Washington's Birthday, February 22; Founder's Day, last Thursday in April; Decoration Day, May 30, and Election Day, November 3, 1908.

Faculty

ARTHUR A. HAMERSCHLAG, Sc.D.	Director
ANNA B. SMITH	Assistant to the Director. In charge of the Margaret Morrison Carnegie School for Women.
CLARA L. WEST	Professor of Home Making Arts and Social Ethics.
IDA C. STUTZ	Assistant Professor of English.
JULIA M. HARDING	Instructor in History and English.
FLORENCE BALDWIN	Instructor in Drawing.
HARRIETTE P. MUNSON	Instructor in Sewing.
MAY N. ARROWSMITH, B.A.	Instructor in Mathematics and English.
EDMOND ESQUERRÉ, A.B.	Instructor in Chemistry.
CECELIA K. BRADT	Instructor in Household Arts and Institutional Management.
ELIZABETH R. STONER	Instructor in Physiology and Physical Training.
JESSIE M. ADAIR	Instructor in Costume Design.
WILLIAM A. WOOD	Instructor in Secretarial Work and Bookkeeping.
VIRGILIA PURMORT	Assistant Instructor in Household Arts and Institutional Management.
ANNE E. MORAN	Assistant Instructor in Practical Dressmaking.
IRENE E. DIESCHER	Assistant Instructor in Secretarial Work and Stenography.
PERCIVAL J. EATON, M.D.	Lecturer on Hygiene.
ALLAN H. WILLETT, Ph.D.	Lecturer on Economics.
ANNA F. PHILPUT	Assistant Secretary-Registrar.

Part Time Instructors

KATHERINE E. JOHNSTON	Instructor in Millinery.
CLARENCE E. BARNET	Instructor in Commercial Law, Stenography and Mathematics.
BERTHA MORROW	Assistant Instructor in Sewing.
EMMA HOSBAUGH	Assistant Instructor in Millinery.

Officers of administration are members, ex-officio, of the faculty.

Standing Committees

Committee on Faculty Organization

MISS SMITH — MR. LEETE
MR. FIELD

Committee on Entrance Examinations

MISS PURMORT — MISS STONER
MISS ARROWSMITH

Committee on Student Organizations and Publications

MR. FIELD — PROFESSOR WEST
PROFESSOR STUTZ

Committee on Inter-Schools Relations

MISS BALDWIN — PROFESSOR MCGOODWIN
PROFESSOR CRABTREE — MR. LEEDS

Committee on Education, Curriculum and Standing

MR. LEETE — PROFESSOR STUTZ
PROFESSOR WEST — MR. WOOD
MR. ESQUERRÉ — MISS ADAIR
MRS. PHILPUT

The Director and Miss Smith are members, ex-officio, of all committees.

Margaret Morrison Carnegie School for Women

The Margaret Morrison Carnegie School for Women offers courses designed for the training of women in specialized vocations.

In this School there are three distinct groups of courses:

1. Technical Courses (Day).
2. Trade Courses (Night).
3. Special Courses (Day and Night).

DAY TECHNICAL COURSES

The instruction offered in this group of courses is planned to develop womanly attributes and to lay a foundation, both practical and theoretical, in the economy of the arts and occupations that make up the fabric of woman's life under normal conditions; and on this foundation to build the technical or professional framework of a career in those lines of work that should best and most logically be controlled by women. Therefore the curriculum contains two distinct types of subjects: (*a*) Those subjects that make for the breadth of womanly development; the primary aim of the School. These are grouped under the general title of Home Making Arts and form an integral part of the work of all of the Day Courses. (*b*) Those bearing directly upon actual technical training or serving as preparation therefor.

REQUIREMENTS FOR GRADUATION—Candidates for a diploma from the School must complete a regular course of study which approximates 2500 lesson hours and secure the full number of credit units given for that course. A credit unit is defined as the amount of credit allowed for the satisfactory completion of the assigned work of a term in a course of one hour a week of recitation or lecture; or of two hours a week of laboratory or shop practice. No credit units will be given in any subject unless the entire work of the term in that subject has been satisfactorily completed.

The number of years necessary to fulfill these requirements is not determinate as it largely depends upon the student, her preparation, her progress in the School and her ability to utilize in the advanced work the training afforded by fundamental studies. But no diploma will be awarded to a student who has not been in attendance at least three years in the Day School unless she shall have entered with advanced standing.

A statement of the values of the various subjects and courses in terms of credit units will be found under the detailed description of each course.

The work of the Technical Courses has for efficiency been subdivided as follows:

1. First Year General Course
2. Specialized Courses.

FIRST YEAR GENERAL COURSE

In order to lay a foundation that will be basic for any field of specialization that the student may choose, a first year general course is given and is required of all regular students unless they can give evidence of having covered equivalent ground.

This course is complete in itself and has a three-fold aim:

1. To develop within the student those powers of observation, reasoning, concentration and thought indispensable to the successful technician or the intelligent housekeeper or professional woman.

2. To lay a sound foundation on which any of the specialized courses offered by the School can safely be built.

3. To disclose to the teaching corps the special aptitude of the individual student and thus make possible the directing of the student's capabilities towards the work for which she is best fitted.

CURRICULUM

English—The aim of this course is to enable the student to express herself logically and fluently both in speaking and in writing. The work includes sentence structure; composition, both oral and written; grammar and rhetoric; note taking; letter writing. CREDIT UNITS, 10.

Social Ethics—The aim of the first year work is to develop in the student a sense of individual moral responsibility and to establish a right attitude in regard to the duties of woman in the home and in the community.

Right and wrong in human conduct, freedom and responsibility, self-control, the formation of habits, work and character, how knowledge becomes power, and the power of personal influence are some of the things treated in this course. CREDIT UNITS, 3.

Economics—A brief course in Industrial History followed by the study of a number of practical topics, such as immigration, taxation, money and banking and the labor question. CREDIT UNITS, 2.

History—The purpose of this course is to give the student an idea of the progress of the world from prehistoric times to the beginning of the dark ages and to parallel this survey with a study of the evolution of society and government. CREDIT UNITS, 4.

Physiology, Hygiene and Physical Training—These subjects are directly correlated with one another. The physiology includes such work as will lead to a practical understanding on the part of the student of the structure, functions and needs of the human body. The principles of Public and Personal Hygiene are also given.

In the gymnasium the knowledge gained in the class room is put into

practical use. Besides the corrective and developing exercises, work is also given in aesthetic dancing, and in carefully supervised games.

Each student is given a thorough physical examination at the beginning and end of each year, defects are noted and special exercises prescribed. CREDIT UNITS, 7.

CHEMISTRY—The instruction given during the first half of the first year is limited to the study of the elementary principles of physics and to an inquiry into the nature of the elements entering into the composition of the human body, as well as of foods; two hours of laboratory practice being given for every lecture hour.

The second half of the first year is devoted to a general course conceived to touch lightly upon the applications of chemistry to the household and intended to give the students a practical knowledge that will be of value in the management of the home. CREDIT UNITS, 7.

MATHEMATICS (ACCOUNTS)—The aim of this course is to give the student a direct practical mathematical training that she can apply in her every day experience.

The course includes an explanation of the fundamental laws of banking, investments, etc.; a system of simple bookkeeping that can be applied to personal and household accounts; a practical application of the metric system and of interest, equations, mental arithmetic and rapid computation. CREDIT UNITS, 7.

COOKING—A course in home cooking and simple serving of foods to give the student such knowledge of these subjects as will prove valuable in home life. CREDIT UNITS, 3.

HOUSEKEEPING—This course includes: The principles of plumbing, drainage, ventilation, heating, lighting. The care of the various rooms in the house. Instruction in home laundry. Arrangement and care of the sick room. CREDIT UNIT, 1.

SEWING AND MENDING—A course in hand and machine home sewing is given which consists of simple stitches, button holes, etc., as applied to a complete set of underwear and a shirt waist suit.

Mending and the preparation of household linen is included in this course. CREDIT UNITS, 3.

DRAWING—This first year course includes training in form, color, proportion and space relations, composition and simple designs. The work is elementary yet aims to develop understanding, appreciation and imagination and to give a wider range of thought. While it does not endeavor to give finish of execution, it does secure for the student modes of expression attainable in no other way. CREDIT UNITS, 3.

SPECIALIZED COURSES

The fields of specialization offered by the Day Technical School are those in which a woman's experience and a womanly point of view may be considered as very positive aids to success.

These courses are offered to students who have satisfactorily completed the work of the first general year or who have secured the full number of credit units required for entrance to advanced standing.

The curriculum of each of the courses offered contains in a carefully adjusted proportion such subjects under the three heads, Technical, Academic and Home Making, as will make for the best breadth of development along both vocational and womanly lines.

Specialization is offered in the following departments:

A. Department of Household Arts
B. Department of Dressmaking
C. Department of Costume Design
D. Department of Secretarial Work

INTERIOR DECORATION AND ARCHITECTURE—These courses are subdivisions of the regular courses offered by the School of Applied Design; but women students in these departments will be enrolled in the Margaret Morrison Carnegie School.

GENERAL SUBJECTS COMMON TO ALL SPECIALIZED COURSES

The following subjects are a continuation of the general work of the first year course and enter into the curriculum of each of the specialized courses:

SOCIAL ETHICS—This work is a continuation of the first year work and embraces during

Junior Year—

(*a*) Lectures on the History of Ethics and the Origin and Development of the modern codes of morals.

(*b*) Ethical study from Ancient, Mediæval and Modern Literature.

Senior Year—

(*a*) Study of Child Life in the Home and School.

(*b*) Child Labor.

(*c*) The Duty of Woman in regard to Public Health.

(*d*) The Influence of Woman in raising the moral tone of society.

PHYSIOLOGY, HYGIENE AND PHYSICAL TRAINING—The structure and functions of the various parts and organs of the human body are studied and the laws of hygiene affecting each. The pathological conditions and common accidents which may occur are considered as each part of the body is studied, in order that the administering of simple household remedies, the work of home nursing and the measures taken in applying first aid may all be done with an intelligent understanding of conditions, and results to be obtained from the treatment. To this specific work is added a course of training in general emergencies and a special course of practical lessons in home nursing given under the charge of a trained nurse.

The physical development of each student is watched and thorough physical examinations are given at the beginning and end of each school year, the results of which are carefully compared and brought to the attention of the faculty. Ample opportunity is given for systematic exercise under supervision, and corrective gymnastics are prescribed wherever their need is manifest.

ENGLISH—The aim of the English course is to give the student greater ease of expression in writing and speaking and to develop her critical power. The course consists of constructive English from the standpoint of grammar and rhetoric, theme writing, the study of current events through the medium of periodic literature, and studies in dramatic literature.

HISTORY—A study of the forces contributing to the building up of modern Europe.

HOUSEKEEPING—A one term course of lectures supplementing and amplifying the instruction in housekeeping given in the first or general year.

A. DEPARTMENT OF HOUSEHOLD ARTS

The aim of the course in this department is:

(*a*) To train women to administer a house with economy and with a knowledge of its proper organization, and to give them experience in directing and performing all kinds of household work.

(*b*) To fit them for positions as housekeepers; dietitians for homes or institutions; matrons and managers of children's homes, women's clubs, schools, etc.

TECHNICAL WORK OF THE COURSE

HOUSEKEEPING—Development of the house; sanitation, plumbing, drainage, heating, lighting, ventilation, disposal of waste, the arrangement, furnishing and care of each room, cellar, kitchen, pantries, dining room, living and bed rooms, baths, halls, stairs and store rooms; household management, domestic service, duties of mistress and maid, division of labor, household pests; advanced laundry work; marketing; dietetics and home nursing; principles of house decoration; practical housekeeping in the furnished apartment, each student in turn acting as hostess, maid, cook and laundress in order to gain the experience of sewing in each capacity; institutional management, including practical instruction in the use of institutional laundry apparatus, buying at wholesale, and the principles of catering; individual responsibility in the lunch room; visits of inspection to hospitals, hotels, children's homes, schools, etc.; practice teaching for dietitians.

COOKING—An advanced course in cooking with instruction in serving luncheons, dinners, etc.; dietetics; feeding of children; preparation of food for the sick and convalescent. Instruction and practice will be given in the lunch room in the preparing and serving of food in large quantities from 25 to 500 persons; this work will continue throughout the year. Planning of dietaries for the home and institutions; actual cooking and serving in the apartment; a course in chafing dish cookery; estimated quantities of foods for institutions, together with problems of waste.

CHEMISTRY APPLIED TO HOUSEHOLD PROBLEMS—(*a*) Chemistry of foods; carbohydrates; fats; proteids; the work to be conducted in such a way that the student will receive in the lecture room instruction in the practical work done in the kitchen at different periods. The theory of the lecture room being proven by the student in laboratory practice.

(*b*) Chemistry of the laundry, soaps, bluing.

(*c*) Bacteriology of the household; examination of dust from sweepings and dusting, with special emphasis upon possible causes of infection directly traceable to pathogenic bacteria; isolation; cultivation of said bacteria; inquiry into food stuff and values—dietetics; biological chemistry; importance of role played by bacteria in household economics.

(*d*) Industrial chemistry of the household; cleansing; dyeing.

(*e*) Physiological chemistry for nurses; an alternate of *d*.

SEWING—Preparation and marking of table and bed linen; embroidery and stitched ornamentation for household purposes; the making of one

simple muslin house gown with embroidery or stitch work trimming; children's clothes; ornamental needle work; a short course in textiles used as foundation for needle work and for domestic purposes.

DRAWING AND DESIGN—General training in space and color relations and form, leading up to instruction in designs relating to needle work, house furnishing and decorations. Especial attention will be given to the artistic value in household stuffs, furniture and utensils.

ACCOUNTS—Ratio and percentage; application of percentage; household and institutional bookkeeping; distribution of income.

Total of Credit Units for this course, 100.

B. DEPARTMENT OF DRESSMAKING

The course in this department is designed to afford an opportunity for the study of Dressmaking as a profession. In order that the students may become familiar with the best and most efficient methods in use in the trade, the teaching corps in this department is partially composed of professionally experienced women who are able to give the students the highest trade standards. The practical work room training is supplemented by the theoretical, artistic and non-technical education necessary to a broad foundation on which many branches and subdivisions of the profession may be developed.

Students who have satisfactorily completed the full course should be qualified in accordance with their varying degrees of talent and individual aptitude to take up one or more of the following lines:

(*a*) To plan and execute special order work in original costumes.

(*b*) To design occasion or period costumes.

(*c*) To copy importations.

(*d*) To develop lines of specialization such as layettes, children's clothes, negligees, etc.

(*e*) To receive private order work along general dressmaking lines.

TECHNICAL WORK OF THE COURSE

DRESSMAKING—The principles of practical dressmaking, including drafting, cutting, fitting and modelling; making and finishing of linings, slips and drop skirts; all types of lined and unlined waists; plaited, gored, circular and fancy skirts; combining of materials, designing and trimming of gowns. Special instruction is given in corrective line work and scientific padding. The students are also taught to renovate, freshen and clean the many kinds of materials used in dressmaking.

FINE HAND SEWING AND EMBROIDERY—This work will include fine lingerie and French embroidery; the marking of linens; embroidering emblems and insignia; braid work; hand made trimmings; fancy buttons and a variety of fancy stitches that can be used in the decoration of gowns.

MENDING—This course is a continuation of the work in mending

given in the first or general year and is treated with special reference to the problems in patching, darning and reinforcing that are met in the remodelling of garments of any sort.

TAILORING—A short course in Tailoring is given to teach the students the methods used for foundations, interlining, reveres and collars, finishing, etc.

ALTERATION—A brief course in Alteration follows the work in tailoring. Ready-made garments will be altered to fit different figures without destroying the style or finish of the garment.

TEXTILES—A study of the sources of supply of the materials used in costuming work; processes of manufacture; the loom, dyeing and shrinking. The students are taught to detect the difference in quality of materials and to buy with discrimination.

FINISHING—A course of lessons covering the various methods of finishing used by dressmakers. The students are taught the reason for the use of the different methods so that they may be able to apply them discriminatingly. Absolute accuracy of workmanship and finish are required in this course.

HISTORY OF COSTUME—The course in History of Costume includes the study of costumes of all periods from the earliest historic ages down to the present time. Special attention is given to political and economic conditions as reflected in costumes, manners and customs. The evolution of dress, in accordance with changing needs, is traced and this development is considered from the standpoints of beauty and convenience.

COSTUME DESIGN—Work in figure study from the standpoints of proportion and anatomy; the study of lines and their effects on normal and abnormal figures; type study; color work; designing of waists, skirts, gowns and costumes of all types, to be executed in the dressmaking department.

ESTIMATES AND ACCOUNTS—The students are taught to keep the books of the department and to make careful estimates of costs of finished garments. These estimates include not only cost of materials, findings, trimmings, etc., but also the value of hours given to the making of the garments. Speed test work is given constantly throughout the course and time cards are used for all work that is to be carried to completion.

MILLINERY—A one term course in practical millinery including both making and trimming, with special emphasis on the handling of materials.

Total of Credit Units for this course, 100.

C. DEPARTMENT OF COSTUME DESIGN

The course in this department is designed to prepare students for service as—

(*a*) Designers of original costumes for manufacturers, wholesale houses and dressmaking establishments.

(*b*) Adapters and copiers of designs for houses where original work is not required.

(*c*) Illustrators of costumes for fashion magazines, millinery plates, etc.

(*d*) Cataloguers of costumes in large importing and dressmaking establishments.

TECHNICAL WORK OF THE COURSE

DRAWING AND COMPOSITION—Embracing the study of form, tone, color, proportion and arrangement; drawing from still life and flowers; the study of composition; the theory of design and application, with methods covering varying methods of production; analysis and application of color schemes, etc.

COSTUME DESIGN—This includes work in figure study from the standpoint of proportion and anatomy. The study of lines and their effects on normal and abnormal figures; type study; color work; designing of waists, skirts, gowns and costumes.

POSE DRAWING, SKETCHING AND TYPE STUDY—The Costume Design class is supplemented by a class in pose drawing from living costumed models for the study of costume illustration, anatomy and type study. It includes the handling of various mediums, both for illustration and reproduction, such as charcoal, pen and ink, wash and color.

ILLUSTRATION—Toward the end of the course finished sketches are to be required of all students, these sketches to be their conception of the fitting handling of the illustration of the problems, given out by the department. They will represent the knowledge and ability gained in many of the departments, i. e., drawing, designing, anatomy, history of costume, color combination, composition, a wise selection of accessories avoiding anachronism, etc.

TECHNICAL DRESSMAKING AND COMBINATION OF FABRICS—In order to design costumes intelligently it is imperative that the designer should have a practical knowledge of the work of the dressmaking department, an understanding of the methods to be used and a knowledge of materials to be handled. For this reason, the schedule for the Costume Design students has been so arranged as to include as much work as possible in the Dressmaking department during the first year of the specialized course. The course in dressmaking which they receive includes drafting, cutting, fitting and modelling; adaptation of lines in conjunction with types in the Costume Design class; making and finishing linings, slips and drop skirts; lined and unlined waists; plaited, gored, circular and fancy skirts; combining of materials, designing and trimming of gowns.

HISTORY OF COSTUME—This course covers the study of costume of all periods from the earliest historic age down to the present time. Special attention is given to political and economic conditions as reflected in costumes, manners and customs. The evolution of dress in accordance with changing needs is traced, and this development is considered from the standpoints of beauty and convenience.

TEXTILES, FABRICS AND MATERIALS—This course includes the study of the sources of supply of materials used in costuming work; processes of handling and of manufacture; a study of the loom and of weaving; dyeing and a careful study of quality of materials.

FINE HAND-SEWING AND EMBROIDERY—This work will include fine lingerie and French embroidery; the marking of linens; embroidering emblems and insignia; braid work; hand-made trimmings; fancy buttons and a variety of fancy stitches that can be used in the decoration of gowns.

MILLINERY—A one term course in practical millinery is given, which includes work in making wire and buckram frames and bandeaux; covering; binding; bows; work with feathers and flowers; trimming in general, and renovation.

ESTIMATES—Students are to be taught to make careful estimates of the cost of finished garments. In this department the element of time is not as important a factor as it is in the Dressmaking department, but it is necessary for a custume designer to be able to give an accurate estimate of the cost of gowns carried out in accordance with her designs.

DESCRIPTION OF COSTUME—Under the direction of the English department the students are to write paragraphs descriptive of their costume plates.

Total of Credit Units for this course, 100.

D. DEPARTMENT OF SECRETARIAL WORK

The course in this department aims to furnish the general training necessary to develop educated women and at the same time offers instruction in the special subjects required to equip them for the duties of private secretaries, registrars, record and filing clerks, and similar positions.

TECHNICAL WORK OF THE COURSE

ENGLISH—The aim of the English course is to perfect the students in English composition including spelling and punctuation, vocabulary building, grammar and rhetoric; to give ease of expression in speaking; to develop critical and analytical powers; to teach the right use of books of reference; to create an intelligent interest in current events; to awaken a sense of literary values through the study of English classics; to teach social and business correspondence, typography and advertising.

CONSTITUTIONAL UNITED STATES HISTORY—The study of American History from the Colonies to the present day. Development of colonial and local forms of government organization of the national government and its legislative, executive and judicial development; state and municipal governments.

BANKING AND FINANCE—This course includes history of banking; organization and management of national, state and savings banks, trust companies, etc. A fully equipped banking department makes it possible for the students to gain practical experience in banking methods.

GEOGRAPHICAL AND HISTORICAL ECONOMICS—This course treats of the origin and early development of commerce and its influence on civilization; of trade, water routes and transportation; values of exports and imports; discoveries and inventions; industries and manufactures; public works; legislative enactments and their effects on commercial growth.

COMMERCIAL LAW—A course of lectures including elementary principles of contracts and negotiable papers; laws regulating the sale and conveying of real estate; agencies; insurance; common carriers; partnerships and corporations. The student is made familiar with the statute of limitations and statute of frauds, particularly Pennsylvania legislation thereon.

BOOKKEEPING—This course includes single and double entry with the preparation of all necessary business forms; importing and jobbing; wholesale and retail; a manufacturing set of books introducing the voucher system; corporation bookkeeping and cost accounting.

FILING, CARD INDEXING AND SHELVING—Instruction is given in alphabetical, numerical and subject filing by the vertical methods; flat, document and catalogue filing; cross indexing; card ledger and other systems. Students are given practical instruction in the office of the record department of the Schools.

CLASSIFICATION AND REFERENCE WORK—Instruction is given in the principles of reference work and in the decimal system of cataloguing.

PHONOGRAPHY AND TYPEWRITING—The Graham system of Phonography, as modified by Pitman, is taught.

The students are taught the proper use of the typewriter and its mechanism. Instruction is also given in letter press work and duplicating processes.

COMMERCIAL ARITHMETIC—Instruction is given in the application of percentage, including discounts, interest, partial payments, exchanges, stocks, bonds, partnership settlements, equations of payments, annuities and averaging accounts.

PENMANSHIP AND LETTERING—Emphasis is laid upon the development of character and legibility in writing. A simple system of lettering is taught and practical use is made of it throughout the course.

Total of Credit Units for this course, 100.

ENTRANCE REQUIREMENTS

AGE—The minimum age of entrance is sixteen, but students will not be encouraged to seek admission at that age, unless their preparation is equivalent to two years in a high or preparatory school of approved rank.

For the guidance of the applicant it is well to state that the average age at which the students derive the greatest benefit from the work given in the first year is about eighteen.

SCHOLARSHIP FOR ADMISSION—(*a*) Applicants of eighteen years of age or over will be admitted on a personal interview, supplemented when advisable with such tests as may, in the opinion of the Entrance Examina-

tion Committee, be required to establish proof of the applicant's fitness to pursue the work of the School.

(*b*) Applicants under eighteen years of age must, in addition to the personal interview, furnish a statement showing a training equivalent to two years in high or preparatory schools and pass a satisfactory examination in the following subjects which are necessary as preparation for the work of the first year:

ENTRANCE EXAMINATIONS—1. *English*—English Grammar, Spelling, Punctuation, Composition and the elementary laws of Rhetoric.

2. *History of the United States.*

3. *Mathematics*—The four simple arithmetical processes, Common and Decimal Fractions, Percentage, Simple Interest.

4. *Geography of the United States*—Commercial centres, products and general geographic conditions.

PERSONAL INTERVIEW—All candidates should present themselves for personal interview, at which they are rated as approved or not approved. Approved candidates who fail to pass the necessary entrance examinations may be allowed admission for a limited period under special conditions. These conditions must be removed during the first year of attendance, and no student having an unremoved entrance condition at the beginning of the second year of residence is allowed to enter her classes until such condition is removed.

A student not approved in the personal interview will not be granted admission unless she shall satisfactorily meet the requirements of all the other entrance tests.

Students examined at a distance from Pittsburgh, who present satisfactory certificates, but who are not able to present themselves for a personal interview, are required to maintain credit rank in scholarship during the first term.

ADVANCED STANDING—Applicants may be admitted to the specialized courses, if they can give satisfactory proof of having covered, in colleges or similar institutions of approved rank, ground equivalent to that given in the curriculum of the first year, in which case each department represented will allow the applicant the number of credit units awarded for the satisfactory completion of the course.

No applicant will be admitted to advanced standing unless she can secure 75 per cent of the credit units, and the subjects in which units are not secured will be considered as conditions and must be removed by the end of the first year of specialized work.

TUITION FEE, SCHOOL AND LIVING EXPENSES

For residents of Greater Pittsburgh.....$20.00 per year
For all others..... 30.00 per year

The entire tuition fee for the year must be paid in advance.

A deposit of five dollars ($5.00) to cover locker, gymnasium and

breakage fees must be made by every student at the beginning of each school year, any unused portion of which will be returned on request at the end of the year.

A kitchen fee of three dollars ($3.00) for Juniors and five dollars ($5.00) for Seniors must be paid by students registering for the Household Arts course.

Each student will be expected to furnish such text books and supplies as are required during the course.

Each student is required to come provided with a gymnasium suit, two cooking aprons, two caps, two pairs of sleeves, a sewing apron and a chemistry apron. Information concerning patterns and material will be furnished upon application.

The School will gladly furnish on request information regarding boarding places, cost of living, etc.

SPECIAL DAY COURSES

The following classes are open to students who desire a short specialized course not leading to the regular school certificate.

GENERAL REQUIREMENTS FOR ADMISSION

Applicants are eligible to the Special Courses who in addition to the special requirements of the course can, in a personal interview, give evidence of their capacity to follow to advantage the work offered.

Application should be made to the Assistant Secretary, Margaret Morrison Carnegie School, Carnegie Technical Schools, and applicants will be notified of the dates on which the special classes will start.

DESCRIPTION OF COURSES OFFERED

DIETETICS

COURSE A

A one year course in Dietetics for graduate nurses given under the management of the Household Arts Department. This is designed to fit women as Purveyors, Dietitians and Superintendents of nurses. It includes lecture work in chemistry, physiology, bacteriology, dietetics and ethics. A selected course of housekeeping will be given in connection with instruction and practice in institutional management and serving principles of catering and practice teaching for Dietitians are included in the plan of teaching.

A course of lectures on special subjects arranged for this class will be given by practicing physicians.

Special requirements for admission: In addition to the general requirements for admission, applicants for this course must present their training school diploma.

The tuition fee for the course is twenty dollars ($20.00) payable on the date of registration, which will be announced later.

Kitchen fee five dollars ($5.00).

COURSE B

A four months' course for those intending to become trained nurses or for graduate nurses who feel the need of additional training. This course includes some of the lecture work of the above one year course and practice in sewing, invalid cookery and housekeeping. The tuition fee for this course is ten dollars ($10.00) payable on the date of registration which will be announced later.

Kitchen fee three dollars ($3.00).

HOME DRESSMAKING

This course presupposes a knowledge of plain hand and machine sewing and the ability to apply such simple dressmaking principles as are required in the making of underclothing.

The work includes drafting, cutting, fitting and designing of waists and skirts and finally of a complete dress; methods of finishing, type study and costume planning, with special reference to occasions, expenditures, materials, color and lines as adapted to individual figures.

This class meets once each week for a period of about 20 lessons.

Materials for this course are to be furnished by the student.

The tuition fee for the course is ten dollars ($10.00) payable on date of registration.

HOME MILLINERY

This course in Home Millinery is designed with special reference to its adaptation to the needs of women who desire to make and trim their own hats and is in no sense a course that will fit them for trade positions.

The course includes work in buckram and wire frames, in bandeaux, covering, binding, lining, etc.; in bows, rosettes, flowers, feathers and various other kinds of trimming.

This class meets once each week for a period of about 20 lessons.

Materials, with the exception of common thread and the trial materials used in the first lesson, are to be furnished by the student.

The tuition for this course is ten dollars ($10.00) payable on the date of registration.

DRAWING

The special class in Drawing meets one afternoon each week during the school year. It includes general work in representation and composition; still life and landscape composition; also simple work in the elements of design. In addition to this the course has been specially arranged to meet the needs of teachers desiring assistance in specific work, as well as general instruction.

All materials must be furnished by the student.

The tuition fee for this course is ten dollars ($10.00) payable on the date of registration.

COOKING

It is hoped that a short term class in Cooking can be offered during the next School year. Details concerning this will be announced later.

NIGHT TRADE COURSES

The Night Trade Courses are primarily for students who are employed during the day and necessarily differ from the courses offered by the Day School because of the brief period of time that the students can give to school work or to outside study.

In these courses specialization begins at once, but the training cannot be either as broad or as full as in the Day Technical Courses.

The School does not attempt to develop experts, but offers, to those who are gaining their livelihood by daily employment, courses of instruction which will supplement the usual apprenticeship, strengthen the reasoning faculties, and teach both the theory and practice of the trades.

Modern conditions require that schools of this character shall so train women apprentices that they may acquire a permanent and effective place in those social and industrial spheres to which they are best adapted. For this reason, while the work given is of a distinctively practical nature and accords with the best trade methods, the School endeavors to give to its students in addition to actual practice a grasp of the future possibilities in each of the subjects and to lay the foundation for individual development along the lines of these possibilities.

This system of instruction is especially helpful to those who have not had an opportunity to acquire the theoretical foundation and breadth of training necessary for intelligent practical operation. When this broader training is combined with actual practice in all branches of the subjects taught it should enable the students to advance along their chosen lines more rapidly and efficiently and finally qualify them to fill higher positions than would otherwise be open to them.

ENTRANCE REQUIREMENTS

The minimum age at which students will be admitted to the night schools is 17, but any applicant of this age must submit references from previous teachers or present employers.

Preference will be given applicants who are employed during the day time and who are dependent upon their earnings for their livelihood. There are no written tests for entrance but each applicant must, in a personal interview, satisfy the Interviewing Officer of her fitness to profitably pursue the work of the School. Specific requirements for admission to the different departments will be found stated under the description of the courses offered. Capacity, earnestness and regularity in attendance are essentials to the retention of a place in the classes.

TUITION FEE AND SCHOOL EXPENSES

For residents of Greater Pittsburgh.....$5.00 per year
For all others..... 7.00 per year

The entire tuition fee for the year must be paid in advance.

A deposit of three dollars ($3.00) must be made by each student at the beginning of the School year to cover breakage, locker rental and incidental fees. The unused portion of this fee will be returned on application at the end of the year.

Each student is expected to purchase such text books and material as are required for her course.

REGULAR NIGHT COURSES

The Night Trade School certificate which involves the obtaining of 50 credit units will be awarded to students completing the full Regular Night Courses.

Applicants for admission to these courses should have had at least a common school education and must, in addition to the general requirements for admission to the Night Trade School, satisfy the instructors, in the courses of specialization which they select, of their ability to satisfactorily carry to completion the work of those courses.

BOOKKEEPING

This course is designed to fit young women for positions as clerks and bookkeepers in commercial houses, manufacturing concerns and the like. Accuracy, neatness of work and speed are insisted upon.

BOOKKEEPING—Double entry, including the preparation of all necessary business forms; the use of auxiliary books with special ruling, work with a set of manufacturing books, including the voucher system and bank bookkeeping as used in national banks.

COMMERCIAL LAW—A study of the laws governing commercial contracts, negotiable paper, sale and transfer of real estate, surety and guarantyship, agency, partnership and corporations.

COMMERCE—This study treats of trade routes and transportation, values of exports and imports, raw materials and commerce, methods of converting raw materials into finished products, industries and consumption of products. Physical and political geography are reviewed.

ENGLISH—Spelling and punctuation, vocabulary building, grammar, correspondence and composition.

COMMERCIAL ARITHMETIC—A course in rapid calculation, denominate numbers and the application of percentage. Special attention is given to the development of speed and accuracy.

FILING AND CARD INDEXING—The various systems of letter and document filing and card indexing are taught, and an opportunity is given for the study of the practical application of these systems in the office of the record department of the School.

PENMANSHIP AND LETTERING—The development of a legible, rapid business hand. Practice is given in a simple form of library lettering that can be used in a variety of practical ways.

STENOGRAPHY

This course is designed to give the student not only the speed and accuracy essential to successful work as stenographers but to train them also to use thought and judgment in their work, and to be self-reliant and resourceful.

Stenography—The Graham system, as modified by Pitman, is taught.

Typewriting—Instruction is given in the proper use of the typewriter and students are required to familiarize themselves with the mechanism of the various makes. Emphasis is laid on correct fingering; and accuracy, neatness and speed in transcribing are essentials to credit in this course. The students are taught the modern methods of duplicating and the use of the letter press.

Commercial Law—A study of the laws governing commercial contracts, negotiable paper, sale and transfer of real estate, surety and guarantyship, agency, partnership and corporations.

Commerce—This study treats of trade routes and transportation, values of exports and imports, raw materials and commerce, methods of converting raw materials into finished products, industries and consumption of products. Physical and political geography are reviewed.

English—Spelling and punctuation, vocabulary building, grammar, correspondence and composition.

Commercial Arithmetic—A course in rapid calculation, denominate numbers and the application of percentage. Special attention is given to the development of speed and accuracy.

Filing and Card Indexing—The various systems of letter and document filing and card indexing are taught, and an opportunity is given for the study of the practical application of these systems in the office of the record department of the School.

Penmanship and Lettering—The development of a rapid, legible business hand. Practice is given in a simple form of library lettering that can be used in a variety of practical ways.

SPECIAL NIGHT COURSES

A certificate is not awarded to students completing these Special courses, but the credit units earned therein will be counted toward the obtaining of the Night Trade School certificate for which 50 credit units are required.

SEWING

COURSE A

A course for beginners. Students are taught the use of the needle and of the stitches and principles needed for plain sewing. They are instructed also in the use and mechanism of sewing machines and are made familiar with the most commonly used attachments. No garment work is given in this beginning course as the work is entirely in practice of methods and execution and as soon as students become sufficiently proficient they are advanced to Course B.

COURSE B

This course presupposes a certain proficiency in the use of the needle and ability to operate the sewing machine. Instruction is given in simple drafting of underclothes, shirt waists and gored skirts, in the use of patterns, designing, economical cutting and the fitting, making and finishing of underclothes, shirt waists, and simple skirts. Work in designing is a necessary part of this course and is taken by all students, lessons are also given in the simple types of fancy stitches and embroidery that are in use in connection with hand made garments.

Candidates for admission to this course must have either completed Course A or submit satisfactory evidence of having arrived at an equivalent stage of proficiency.

COURSE C

This course consists of work in drafting, pattern modeling, cutting, fitting and finishing applied to linings, lined and unlined waists, gored and plaited skirts. Emphasis is laid upon the development of good taste, accuracy of work and speed in execution. Time cards are kept to show the actual length of time taken by a student for the completion of each piece of work.

Instruction is given in the Costume Design Department in the study of lines and their relation to the human figure giving the students the foundation for practical work in dress design and adaptation of models. Designs are made for all the waists and dresses that are to be executed in the sewing room. Combinations of materials are studied and estimates of costs made.

Candidates for admission to this course must either have completed Course B or submit satisfactory evidence of having attained equivalent proficiency.

DESIGNING AND EMBROIDERY

This course is a continuation of the work given under the direction of the Costume Design Department to the students in the Night Sewing and Millinery classes and is planned to meet the needs of those students who desire further instruction in designing. The course embraces work in dress and millinery design, in original and adapted designs for embroidery and braiding and in the perforating and stamping of patterns. Instruction is also given in embroidery, braiding and fancy trimmings.

Applicants for admission to this course must have completed either the Night Millinery Course or Sewing Course C, or submit satisfactory evidence of having attained equivalent proficiency in designing and the use of the needle.

MILLINERY

This course is designed to train women to be practical milliners and emphasis is laid upon accuracy and neatness of execution and upon taste and conservative individual style in trimming. The course comprises work

in making buckram and wire frames to measurement; covering; binding, linings, bandeaux and the handling of all the various materials used in trimming, such as ribbons, velvets, maline, chiffon, flowers, feathers, lace, etc.

This work is supplemented by a course of instruction given in the Costume Design Department and taken by all millinery students. The purpose of this course is to train the student's eye and taste that she may be able quickly to detect errors in measurement, poor design, bad color combinations and lack of balance and proportion in trimming. As the student advances in proficiency she is assisted in the making of practical designs to be carried out in the work room.

Applicants for admission to this course must fulfill the general requirements for admission to the Night School and must, during the first term, show by their work that they have the aptitude and taste necessary to success in this trade.

COOKING

COURSE A

This is a course in simple home cooking for beginners and is supplemented by practical talks on housekeeping and food values.

Course A covers a period of one year and applicants for admission must fulfill merely the general entrance requirements for admission to the Night School.

COURSE B

A course in advanced cooking and housekeeping presupposing a knowledge of the principles and practice of simple home cooking.

Applicants for admission to this course must either have completed Course A or give satisfactory evidence of equivalent proficiency.

FACILITIES FOR INSTRUCTION

The building occupied by the Margaret Morrison Carnegie School is the first of a proposed group to be devoted to the education and training of women along specific technical and industrial lines.

Externally, its appearance differentiates it at once from the buildings designed for the Engineering and Trade Departments of the Technical Schools; and the ideals of the Woman's School are beautifully expressed in the motto on the cornice of the entrance court:

"TO MAKE AND INSPIRE THE HOME;
TO LESSEN SUFFERING AND INCREASE HAPPINESS;
TO AID MANKIND IN ITS UPWARD STRUGGLES;
TO ENNOBLE AND ADORN LIFE'S WORK, HOWEVER HUMBLE—
THESE ARE WOMAN'S HIGH PREROGATIVES."

The interior of the building was designed and built with reference to the needs and equipment of the various departments of instruction and special attention was given by the architects to the problems of hygiene and sanitation. A brief description of the class rooms, work rooms and laboratories is here given.

CLASS ROOMS—The class rooms are large and light, affording ample floor and desk space for the accommodation of the classes. These rooms are equipped to meet the special needs of the subjects taught in each.

LECTURE ROOM—The lecture room has a seating capacity of 150 and is equipped with a stereopticon lantern and screen and a large platform desk containing a laboratory sink with water, gas and electricity attachments. The windows are fitted with adjustable opaque screens that exclude all rays of light.

STUDY HALL—A large, well lighted room, 50 feet by 40 feet, equipped with library tables and chairs, and cases for reference books has been set apart as a study hall for the use of the students.

LOCKER ROOMS AND LAVATORIES—The student locker rooms are furnished with good-sized sheet metal ventilated lockers, with combination locks.

The lavatories are thoroughly sanitary and are finished in white tile and glass slabs with nickeled hardware and fixtures.

REST ROOM—A rest room for the use of the girls is equipped with cots and emergency case and is under the supervision of the Physiology and Physical Training Department.

LUNCH ROOM—The lunch room is on the top floor of the school building and has a seating capacity of about 150. A well equipped lunch kitchen enables the School to furnish a light hot luncheon in the middle of the day to those students who desire it.

CHEMICAL LABORATORY—The chemical laboratory is fully equipped for qualitative and quantitative work in General Chemistry. Special care has been given to the selection of apparatus necessary for the study of the chemistry of foods and the experimenting on problems interesting to the housekeeper from a practical point of view.

BIOLOGICAL LABORATORY—The biological laboratory is most modern in its equipment, containing microscopes, incubators, sterilizers, microphotography apparatus and other accessories indispensable to the demonstration of the principles of household sanitation.

STUDIO—The studio affords ample room for both special students and those taking the general first year course. It is well lighted, conveniently arranged for all kinds of work in drawing, painting and design, with a varied supply of attractive still life, Japanese prints and photographs and a file of good examples of composition, design, brush work and ornament, reference books on design and composition, specific works on flower study, ornament, etc. The Library, Museum and Art Gallery of the Institute make it easily possible for students to have valuable assistance from reference books and to study painting and sculpture from both permanent and loan collections.

GYMNASIUM—The gymnasium is a light, airy room on the fourth floor. It is 54 feet long by 37 feet wide. The floor is of hard wood and is not marred by any pillars for building support. The equipment is the best of modern apparatus, after the Swedish models, including climbing ropes, serpentine ladder, boms, vaulting box and horse, balance beams and bar stalls. Apparatus has been provided for such games as basket ball and volley ball with wands and dumb-bells to vary the exercise.

Twelve dressing rooms provided with one hundred and fifty lockers for the gymnasium students occupy a room back of the gymnasium stage. Six shower baths and two tub baths communicate with the dressing rooms and afford ample opportunity for warm and cold baths after exercise.

Lectures on Physiology and Hygiene are given in the gymnasium. A manikin, physiological charts and stereoscopic views of dissections enable the student to study the human body, and in order to make a practical application of the study of physiology the work is correlated with the work in physical training in both lectures and gymnastics.

The equipment for physical examination includes apparatus for testing the lungs, back, legs and chest, and for taking all necessary measurements of the body. The results are filed for reference by all departments.

LAUNDRY—The laundry and ironing rooms are equipped with the most modern facilities for hand or power machine washing and ironing.

The washing equipment includes six double units of porcelain wash tubs with running hot and cold water; a motor driven cylindrical steam washing machine; an under-driven centrifugal extractor for wringing clothes; a steam-heated hurricane dry room; frames and lines for fresh air drying; a heat retaining starch cooker; soap tanks; wash room trucks, etc.

The facilities for ironing include a motor driven steam mangle with a 75-inch ironing surface; individual self-contained ironing boards for hand work; large ironing tables; gas iron heaters; assorted sizes and shapes of flat irons, electric irons; trucks for airing clothes and shelves for finished and sorted work.

COOKING AND HOUSEKEEPING—(*a*) Two class kitchens, each fully

equipped for 24 students. The gas, electric, coal and wood stoves and fireless cooker being of the most practical and latest construction, some of them specially manufactured for this School. The vitrified tile working tables, convenient supply and dish cabinets and specially constructed supply tables add greatly to the facilities for doing good work.

(*b*) A demonstration dining room.

(*c*) A complete apartment for practical housekeeping, consisting of living room, dining room, three bed rooms, halls, pantry and kitchen.

(*d*) The School lunch room and kitchen are used for institutional cooking practice.

BOOKKEEPING, FILING AND TYPEWRITING—The bookkeeping room is equipped with such furniture as is to be found in business offices. A special feature of the equipment of this room is a banking department, offering facility for instruction in practical banking. Modern office devices and conveniences are now in use and new ones are constantly being added.

The filing equipment is composed of the various types of cases employed for letter, document and catalogue filing, card indexing and card accounting. The Record and Registrar Departments of the School offer other facilities for practical instruction in this work.

The typewriting room is equipped with 12 individual drop desks and adjustable typewriter chairs. Each desk is furnished with a new, modern typewriter of standard make. In order that the student may be familiar with the mechanism of the different makes of machines, six different kinds of typewriters are in use in this room.

SEWING, DRESSMAKING AND MILLINERY—These work rooms are furnished with the best and most practical working equipment that it has been possible to secure. This includes long work tables; drafting tables; a table ruled in standard lengths and widths of materials, for use in making estimates of amounts, cost, etc.; all the representative makes of sewing machines, both chain and lock; dress forms; wax figures with adjustable hair for use in the millinery classes; electric irons; skirt and sleeve press boards; plaiters, pinkers and such other equipment as is called for by the peculiar needs of the different subjects.

A power machine room adjoins the sewing rooms. This is equipped with six Singer machines set in a trough table and driven by a direct connected motor. Four of these machines are of the high speed type used for light work and dressmaking and two are for heavy work and tailoring.

List of Students
1907-1908

Day Students

Junior Class

Alcorn, Henrietta K.	House Arts.	Pittsburgh.	5524 Hays St.
Armstrong, Grace V.	Costume Des.	Avalon.	106 Harrison Ave.
Barnum, Agnes L.	Secretarial.	Pittsburgh.	233 N. Craig St.
Benner, Margaret C.	House Arts.	Pittsburgh.	Center Ave. & Neville St.
Beymer, Alta D.	House Arts.	Tacoma, Wash.	11 Dundee Apt., McKee Place, Pgh.
Bovard, Martha H.	Secretarial.	Pittsburgh.	915 Jancey St.
Bunting, Irene E.	Secretarial.	Pittsburgh.	312 Frankstown Ave.
Carlin, E. Maud.	House Arts.	Pittsburgh.	406 S. Craig St.
Connell, Lucy P.	Dressmaking.	Pittsburgh.	918 St. James St.
Conwell, M. Lillian.	Dressmaking.	Pittsburgh.	2533 Center Ave.
Corbould, Mabel K. M.	House Arts.	Pittsburgh.	4509 Filmore St.
Crow, Nelle.	Arch.	Pittsburgh.	202 Buckingham Apt., Craft Ave.
Daugherty, Mary E.	House Arts.	Kittanning.	531 Neville St., Pgh.
Dickson, Janet.	Costume Des.	Pittsburgh.	5818 Kentucky Ave.
Donehoo, Anna M.	Secretarial.	Pittsburgh.	821 Farragut St.
Ellis, Harriet H.	House Arts.	Cincinnati, O.	415 Morewood Ave., Pgh.
Emmert, Mrs. Mary W.	Design.	Pittsburgh.	3421 Bates St.
Evans, Sarah A.	Dressmaking.	Pittsburgh.	235 Kaercher St.
Gibbs, Margaret.	House Arts.	Pittsburgh.	554 Neville St.
Griffin, R. Grace.	House Arts.	Pittsburgh.	333 N. Craig St.
Gwynn, Florence.	Dressmaking.	Pittsburgh.	30 Bigham St.
Harman, Frances B.	Dressmaking.	Pittsburgh.	1126 Heberton St.
Herron, Jean M.	Dressmaking.	Pittsburgh.	454 Atlantic Ave.
Herron, Nancy G.	House Arts.	Pittsburgh.	5201 Liberty Ave.
Ihmsen, Catherine C.	House Arts.	Pittsburgh.	5757 Parker St.
Johns, Alice.	Secretarial.	Lexington, Ky.	15 Mawhinney St., Pgh.
Kammerer, Edna O.	Secretarial.	Pittsburgh.	745 Millvale Ave.
Kramer, Besse E.	Dressmaking.	Pittsburgh.	3417 Terrace Ave.
Leatherman, Marian.	Secretarial.	Pittsburgh.	442 S. Rebecca St.
Lee, Virginia.	Secretarial.	Pittsburgh.	729 Aiken Ave.
Leschorn, Irmgarde C.	Secretarial.	Pittsburgh.	332 Mathilda St.
Looney, Frances D.	Costume Des.	Pittsburgh.	3523 California Av., N. S.
MacGilvray, Josephine.	Secretarial.	Pittsburgh.	6314 Station St.
McKee, Mary M.	House Arts.	Pittsburgh.	7941 Tioga St.
McKelvey, Alice A.	House Arts.	Pittsburgh.	401 Park Ave.
McMullen, Kitty C.	Secretarial.	Alexander City, Ala.	15 Mawhinney St., Pgh.
Marks, Sarah L.	Costume Des.	Pittsburgh.	315 Ward St.
Merrill, Hattie G.	House Arts.	Pittsburgh.	363 Lehigh Ave.
Nixon, Verne.	Secretarial.	Bellevue.	51 Forest Ave.
Pfeil, Mary L.	House Arts.	Pittsburgh.	2011 Carson St.
Powelson, Isabel M.	Secretarial.	Pittsburgh.	129 Crucible St.
Quinn, M. Irene.	Secretarial.	Etna.	321 Butler St.
Ramlack, Ada B.	House Arts.	Pittsburgh.	708 S. Negley Ave.

Ramsey, Anne McC.	Dressmaking	Bellevue	26 Orchard Ave.
Sawhill, Lucile	House Arts.	Pittsburgh	Hartford Apt., Atwood St.
Schoen, Alvina J.	Arch.	Pittsburgh	511 Sheridan Ave.
Schwartz, Charlotte D.	Dressmaking	Pittsburgh	Beechwood Blvd.
Scott, Dorothy B.	Secretarial.	Pittsburgh	241 Pacific Ave.
Selheimer, Anne M.	Secretarial.	Wilkinsburg	508 Pitt St.
Shaler, Emma L.	Design.	Pittsburgh	13 Buffalo St.
Shallenberger, M. Alice.	Secretarial.	Pittsburgh	5906 Center Ave.
Sheets, Bessie E.	House Arts.	Pittsburgh	26 Grape St., Knoxville.
Shuman, Anna M.	Design.	Pittsburgh	5090 Forbes St.
Shuman, Rebekah.	Secretarial.	Pittsburgh	5090 Forbes St.
Smith, Edna C.	Secretarial.	Homestead	705 Amity St.
Toudy, Clara L.	Dressmaking	Pittsburgh	3316 Ward St.
Van Tine, Cora M.	Secretarial.	Oakmont	405 Sixth St.
Watson, Sue E.	Design.	Pittsburgh	5622 Wilkins Ave.
Willson, Anna G.	Dressmaking	Pittsburgh	1228 Buena Vista St., N.S.
Woodside, Fannie R.	House Arts.	Pittsburgh	5636 Elgin Ave.

Plebe Class

Anderson, Helen A.	Avalon	307 Cleveland Ave.
Beal, Emma Belle	Pittsburgh	6348 Jackson St.
Bihlman, Viola	Pittsburgh	348 Meyran Ave.
Black, Florence M.	Pittsburgh	107 Bon Air Ave.
Clark, Emma M.	Pittsburgh	Termon Ave., N. S.
Clark, Garnet	Munhall	407 Twelfth Ave.
Clinton, Bessie M.	Pittsburgh	5818 Jackson St.
Coates, Marguerite E.	Pittsburgh	4222 Sherman St.
Colmery, Elsie F.	Braddock	225 Fourth St.
Connelley, Elia K.	Pittsburgh	Osgood & Maripoe Ave., N. S.
Côté, Anna J.	Pittsburgh	215 S. Euclid Ave.
Davis, Ella W.	Homestead	135 W. Fifth Ave.
Day, Helen C.	Baltimore, Md.	Buckingham Apt., Pgh.
Deyle, Leona H.	Pittsburgh	214 Lombard St.
Dice, Anna C.	Pittsburgh	266 Oakland Ave.
Dickson, Anna	Pittsburgh	5818 Kentucky Ave.
Donehoo, Mary M.	Pittsburgh	821 Farragut St.
Doran, Ruth C.	Wilkinsburg	723 Franklin Ave.
Dowdell, Anna M.	Beaver	1004 Fourth St.
Doyle, Blanche	Pittsburgh	525 Lloyd St.
Evans, Frances	Pittsburgh	235 Kaercher St.
Evans, Madeline	Pittsburgh	936 Mellon St.
Ewens, Izetta	Pittsburgh	350 Atwood St.
Farrell, Marguerite	Sharpsburg	213 Twenty-first St.
Felker, Marie H.	Pittsburgh	2322 Carson St.
Freeman, Natalie	Pittsburgh	Lexington Ave.
Freese, Olive	Pittsburgh	Alliquippa St.
Fulks, Esther E.	Charleston, W. Va.	5424 Clayborne St., Pgh.
Funk, Edith	Wilkinsburg	512 South Ave.
George, Helen E.	Pittsburgh	2810 Sarah St.
Gibson, Mary W.	Pittsburgh	7335 Idlewild St.
Glenn, Edith S.	Pittsburgh	208 Jackson St., N. S.
Grace, Amelia	Crafton	98 Steuben St.

Green, Laura B.	Pittsburgh.	3708 Bates St.
Gruber, Sophia E.	Oakmont.	
Hartman, Gertrude.	Pittsburgh.	1148 Portland St.
Hawkins, Mamie A.	Pittsburgh.	643 Summerlea St.
Heinrich, Norma.	Crafton.	17 Division St.
Henderson, Ruth B.	Pittsburgh.	7732 Hamilton Ave.
Hill, Beatrice S.	Pittsburgh.	204 N. Euclid Ave.
Hobson, Hazel E.	Pittsburgh.	5517 Black St.
Johns, Helen M.	Pittsburgh.	3511 Terrace Ave.
Johns, Mildred.	Pittsburgh.	Boquet & Semple St.
Kelly, Elizabeth G.	Pittsburgh.	5823 Walnut St.
Kempel, Frances B.	Ashtabula, O.	4267 Fifth Ave., Pgh.
Law, Marguerite F.	Pittsburgh.	305 S. Rebecca St.
Lazier, Celia.	Pittsburgh.	1531 Rose St.
Leslie, Inez B.	Pittsburgh.	243 Fisk St.
Lewis, Frances S.	Pittsburgh.	356 Meyran Ave.
Liston, Maude C.	Wilkinsburg.	403 Biddle Ave.
Long, Jennie M.	Braddock.	494 Lobinger Ave.
McCullam, Fontana.	Pittsburgh.	845 Collins Ave.
Maltby, Ethel.	Pittsburgh.	5643 Woodmont St.
Mandeville, Josephine.	Pittsburgh.	525 S. Lang Ave.
Meese, Madeleine B.	Pittsburgh.	207 Roup St.
Meighan, Mary J.	Pittsburgh.	604 Taylor Ave., N. S.
Miller, May E.	Ingram.	149 Ingram Ave.
Moore, Madeleine.	Wilkinsburg.	113 Biddle Ave.
Morrow, Mary W.	Pittsburgh.	5701 Northumberland Ave.
O'Mara, Jane F.	Pittsburgh.	1510 Shady Ave.
Ostermaier, Carrie S.	Pittsburgh.	716 S. Linden Ave.
Oursler, Helen H.	Pittsburgh.	312 Lowell St.
Pflaum, Helen T.	Pittsburgh.	307 Mayflower St.
Ramlack, Florence A.	Pittsburgh.	708 S. Negley Ave.
Ramsey, Margaret R.	Bellevue	26 Orchard Ave.
Rayburn, Frances V.	Pittsburgh.	5106 Harriet St.
Rebstock, Catherine.	Carrick.	48 Stewart Ave.
Redenbaugh, Marion D.	Pittsburgh.	4817 Lytle St.
Reinhold, Hilda.	Pittsburgh.	6643 Dalzell Place.
Schaffner, Charlotte M.	Pittsburgh.	405 Oakland Ave.
Schuster, Sophia.	Pittsburgh.	3711 Bouquet St.
Sheppard, Helen W.	Pittsburgh.	903 N. St. Clair St.
Smith, Helen.	Pittsburgh.	1410 Franklin St.
Steel, Mary L.	Pittsburgh.	2 Olivant St.
Stewart, Rhea I.	Pittsburgh.	250 S. Main St.
Tebbetts, Elizabeth P.	Pittsburgh.	1317 Sheridan Place.
White, Lillian H.	Bellevue.	10 Bayne Ave.
Wiley, Martha M.	Pittsburgh.	1 Kennett Apt., Craft Ave.
Williams, Sara G.	Houston.	
Wright, Lillian P.	Wilkinsburg.	1003 South Ave.
Wright, Margaret.	Pittsburgh.	1334 Sheridan Place.
Yohe, Jane E.	Ingram.	130 Prospect Ave.

Special Classes

Chemistry

Pflaum, Rachel Witter.	Pittsburgh.	449 Maple Ave.

Clarke, Edith Ann.	Book Kpg.	Pittsburgh.	3310 Ward St.
Clements, Elnora.	Sewing A.	Pittsburgh.	2721 Quincy St.
Cohen, Jennie A.	Cooking A.	Pittsburgh.	5741 Kentucky Ave.
Cohen, Sara.	Cooking A.	Pittsburgh.	5741 Kentucky Ave.
Collins, Jean R.	Sewing C.	Pittsburgh.	7015 Hamilton Ave.
Collins, Kathryn C.	Sewing A.	Pittsburgh.	7015 Hamilton Ave.
Crouch, Mrs. Mary.	Sewing B.	Wilkinsburg.	611 Mill St.
Cummings, Mrs. Elsie L.	Sewing B.	Pittsburgh.	1710 Ann St.
Daum, Emma T.	Sewing B.	Pittsburgh.	37 Wabash Ave., N. S.
Dauth, Emma H.	Arch.	Millvale.	134 Hiram St.
Day, Martha A. Jane.	Sewing C.	Pittsburgh.	549 Lowell St.
De Haven, Willa Louise.	Cooking A.	Munhall.	1081 Tenth Ave.
Doherty, Mary Gertrude.	Stenog'phy.	Pittsburgh.	Carolina St.
Doody, Catherine Ann.	Sewing A.	Pittsburgh.	702 Bellefonte St.
Doody, Florence Mary.	Stenog'phy.	Pittsburgh.	702 Bellefonte St.
Doyle, Ellen.	Cooking B.	Pittsburgh.	227 Dithridge St.
Dymsia, Ida.	Cooking A.	Homestead.	526 Dixon St.
Ellis, Harriet H.	Stenog'phy.	Cincinnati, O.	415 Morewood Ave., Pgh.
Evans, Ruth.	Book Kpg.	Pittsburgh.	235 Kaercher St.
Fairman, Alice Duff.	Cooking B.	Pittsburgh.	415 N. Craig St.
Floyd, Nellie.	Millinery.	Pittsburgh.	5706 Bartlett St.
Fuchs, Salome.	Cooking B.	Pittsburgh.	630 Clyde St.
Gandet, Adelaide.	Stenog'phy.	Pittsburgh.	1115 Bartlett St.
Gearing, Anne.	Sewing A.	Pittsburgh.	22 Oneida St.
Geary, Mrs. Martha.	Millinery.	Pittsburgh.	3401 Ward St.
Gebhart, Emma R.	Sewing C.	Pittsburgh.	4012 Mifflin St.
Genge, Beulah H.	Millinery.	Pittsburgh.	315 Gross St.
George, Jessie M.	Cooking A.	North Braddock.	751 Coalmont St.
Gottfried, Anna M.	Book Kpg.	Pittsburgh.	7220 Hermitage St.
Gribben, Mrs. Agnes M.	Stenog'phy.	Pittsburgh.	4805 Dearborn St.
Griffiths, Mrs. Catharine.	Millinery.	Pittsburgh.	3513 Grant Blvd.
Hammon, Anna M.	Millinery.	Carrick.	121 Linnwood Ave.
Haney, Bertha Adaleda.	Arch.	Pittsburgh.	6828 Lyric St.
Hasper, Augusta R.	Millinery.	Pittsburgh.	4638 Winthrop St.
Hasper, Sophia.	Sewing C.	Pittsburgh.	4638 Winthrop St.
Haudenshield, Mabel.	Millinery.	Pittsburgh.	4620 Filmore St.
Howells, Mrs. G. B.	Book Kpg.	Pittsburgh.	6518 Winslow St.
Jackson, Mrs. Jane.	Sewing B.	Pittsburgh.	717 Bellefonte St.
Jackson, Mamie F.	Stenog'phy.	Pittsburgh.	361 Fisk St.
James, Martha M.	Sewing B.	Pittsburgh.	2506 Frazier St.
Jamison, Bessie B.	Millinery.	Pittsburgh.	7541 Bennett St.
Jenkinson, Mary Knox.	Sewing C.	Pittsburgh.	922 Farragut St.
Jones, Elsie Mae.	Cooking B.	Pittsburgh.	205 Lexington Ave.
Kallies, Rosa E.	Book Kpg.	Pittsburgh.	Iron City Trust Co.
Keller, Mary R.	Sewing B.	Pittsburgh.	3020 Smallman St.
Kelly, Maude.	Book Kpg.	Pittsburgh.	244 Millvale Ave.
Kessler, Emma.	Millinery.	Homestead.	455 Fifth Ave.
Kintner, Ruth C.	Sewing C.	Wilkinsburg.	435 South Ave.
Kithcart, Dessa M.	Cooking A.	Pittsburgh.	5725 Walnut St.
Klingler, Mary.	Stenog'phy.	Pittsburgh.	2628 McCord St.
Knight, May Margaret.	Sewing B.	Pittsburgh.	322 S. Linden Ave.
Knox, Eileen Anna.	Arch.	Edgewood Park.	235 W. Swissvale Ave.
Kramer, Elizabeth.	Stenog'phy.	Pittsburgh.	1927 Webster Ave.

Krause, Bertha Emma.	Cooking B.	Wilkinsburg.	414 Ella St.
Lavine, Sara M.	Millinery.	Pittsburgh.	340 Ward St.
Lee, Mrs. Harriet A.	Millinery.	Pittsburgh.	2103 Wylie Ave.
Lee, Mrs. Minnie S.	Sewing C.	Pittsburgh.	4635 Winthrop St.
Leff, Sadie R.	Sewing B.	Pittsburgh.	1222 Colwell St.
Leuschner, Alma Marie.	Arch.	Pittsburgh.	355 Atwood St.
Lewis, Mary Jones.	Millinery.	Pittsburgh.	17 Wilmot Square.
Lindsey, Annie M.	Stenog'phy.	Pittsburgh.	5700 Hays St.
Lindsey, Ma Bell D.	Sewing C.	Pittsburgh.	330 Atwood St.
Lockhart, Ida Anderson.	Stenog'phy.	Pittsburgh.	7517 Bennett St.
Lonergan, Margaret.	Stenog'phy.	Pittsburgh.	363 Atwood St.
Longdon, Mrs. E. M.	Book Kpg.	Pittsburgh.	710 Taylor Ave., N. S.
Lubitz, Mamie.	Sewing C.	Pittsburgh.	2125 Forbes St.
Lynn, Annie.	Sewing C.	Pittsburgh.	165 Industry St.
McAuley, Mary Ethel.	Sewing B.	Pittsburgh.	223 Oakland Ave.
McCarthy, Kathryn M.	Millinery.	Pittsburgh.	6953 Monticello St.
MacDonald, Anna Marie.	Book Kpg.	Pittsburgh.	3431 Ward St.
McHose, Mrs. Mary W.	Sewing B.	Pittsburgh.	7434 Tioga St.
McKibben, Lottie.	Sewing A.	Pittsburgh.	244 Atwood St.
McKibben, Martha.	Sewing A.	Pittsburgh.	244 Atwood St.
McLain, Etta.	Book Kpg.	Crafton.	Creighton Road.
McMillen, Clara F.	Book Kpg.	Pittsburgh.	347 Atlantic Ave.
McSloy, Rose.	Stenog'phy.	Pittsburgh.	5164 Dearborn St.
Manchester, Elsie.	Millinery.	Pittsburgh.	818 Sheridan Ave.
Marshall, Lillian M.	Millinery.	Wilkinsburg.	514 Jeannette St.
Marshall, Margaret M.	Cooking A.	Pittsburgh.	5721 Walnut St.
Means, Jeannette Bell.	Stenog'phy.	Pittsburgh.	617 Lincoln Ave.
Mendel, Elsie J. H.	Book Kpg.	Pittsburgh.	518 Avery St., N. S.
Metcalf, Ida C.	Stenog'phy.	Carnegie.	Noblestown Ave.
Miller, Agnes A.	Sewing C.	Pittsburgh.	312 Brownsville Ave.
Miller, Clarisse Harvey.	Sewing C.	Pittsburgh.	444 Rosedale St.
Miller, Jeannette P.	Cooking B.	Pittsburgh.	505 S. Linden Ave.
Miller, Louise.	Stenog'phy.	Pittsburgh.	210 Shetland Ave.
Moffett, Mary E.	Book Kpg.	Pittsburgh.	4310 Lawrence St.
Molvie, Janet F.	Stenog'phy.	Pittsburgh.	350 Melwood St.
Moore, Adelaide C.	Millinery.	Pittsburgh.	133 Edmond St.
Moore, Mrs. Arianne.	Millinery.	Pittsburgh.	512 North Ave., N. S.
Moore, Clementine.	Sewing A.	Pittsburgh.	133 Edmond St.
Moore, Katherine R.	Sewing C.	Pittsburgh.	133 Edmond St.
Morrow, Mrs. Bertha.	Sewing B.	Pittsburgh.	705 Copeland St.
Murphy, Margaret A.	Book Kpg.	Pittsburgh.	1811 Locust St.
Napier, Agnes D.	Book Kpg	Pittsburgh.	7605 Kelly St.
O'Brien, Mary S.	Stenog'phy.	Swissvale.	2315 Woodstock Ave.
O'Brien, Mrs. Mary W.	Stenog'phy.	Pittsburgh.	114 Craft Ave.
O'Connell, Nora C.	Cooking B.	Pittsburgh.	3443 Denny St.
Owens, Helen.	Sewing B.	Pittsburgh.	1025 N. Negley Ave.
Peel, Annetta C.	Millinery.	Bellevue.	137 Brighton Road.
Perry, Florence.	Book Kpg.	Pittsburgh.	5 Colonial Place.
Pfeil, Edna May.	Cooking B.	Pittsburgh.	95 Washington Ave.
Potenza, Annie.	Sewing B.	Pittsburgh.	37 Fulton St.
Rayburn, Annie D.	Cooking B.	Pittsburgh.	5106 Harriet St.
Rayburn, Lucie W.	Cooking B.	Pittsburgh.	5106 Harriet St.
Rieland, Mary E.	Stenog'phy.	Pittsburgh.	4935 Hatfield St.

Rigney, Isabel	Stenog'phy.	Pittsburgh	261 Dunlap St.
Robena, Martha	Millinery	Pittsburgh	1025 N. Negley Ave.
Roehn, Minnie	Book Kpg.	Pittsburgh	1819 Edward Alley.
Roemhild, W. A. M.	Book Kpg.	Pittsburgh	2015 Carson St.
Roess, Signe E.	Stenog'phy.	Pittsburgh	181 Gordon St.
Roman, Elizabeth M.	Book Kpg.	Pittsburgh	34 Dithridge St.
Rowe, Mrs. Alice L.	Sewing C.	Pittsburgh	1731 Verona Blvd.
Roy, Emma F.	Millinery	Pittsburgh	551 Lowell St.
Sauerburger, Mrs. E.	Millinery	Pittsburgh	3417 Bates St.
Schiffer, Mary M.	Cooking A.	Pittsburgh	4925 Rosella St.
Schindehette, Dora.	Stenog'phy.	Pittsburgh	1607 Sedgwick St., N. S.
Schley, Mollie	Millinery	Pittsburgh	704 Clyde St.
Schreiber, Elma M.	Sewing C.	Pittsburgh	7536 Hamilton Ave.
Schroeder, Jennie	Millinery	Pittsburgh	4502 Fifth Ave.
Schubb, Minnie	Book Kpg.	Pittsburgh	42 Miller St.
Schumann, Ida	Millinery	Pittsburgh	542 Graham St.
Scott, Effie M.	Book Kpg.	Pittsburgh	6034 Rodman St.
Scott, Tamar E.	Book Kpg.	Pittsburgh	6034 Rodman St.
Sharpe, Jean S.	Book Kpg.	Pittsburgh	Meta St.
Shea, Catherine M.	Cooking B.	Pittsburgh	283 Thirty-eighth St.
Shuart, Mary C.	Stenog'phy.	Pittsburgh	7 Oakland Square.
Sigal, Etta M.	Millinery	Pittsburgh	1609 Colwell St.
Silar, Alice	Sewing A.	Pittsburgh	1237 Point View Ave.
Simon, Rosa	Sewing A.	Pittsburgh	417 Chartiers Ave.
Smith, Mary E.	Sewing C.	Pittsburgh	3225 Fifth Ave.
Snyder, Elsie A.	Book Kpg.	Pittsburgh	7825 Hamilton Ave.
Spreyer, Hilda M.	Sewing C.	Pittsburgh	107 S. Twelfth St.
Stack, Celia M.	Stenog'phy.	Pittsburgh	5417 Butler St.
Stevenson, Mary	Millinery	Pittsburgh	Dallas Ave.
Taggart, Evelyn A.	Stenog'phy.	Pittsburgh	Christian Home for Girls.
Tedrick, Flo	Book Kpg.	Pittsburgh	5865 Beacon St.
Thompson, Jeannette B.	Sewing B.	Pittsburgh	2124 Tustin St.
Tinney, Rose A.	Sewing A.	Pittsburgh	42 Westmoreland St.
Tritschler, Charlotte	Millinery	Pittsburgh	1210 Carson St.
Truley, Elizabeth E.	Sewing A.	Pittsburgh	322 Lehigh Ave.
Vogel, Jean	Book Kpg.	Wilkinsburg	334 Pitt St.
Wall, Mary L.	Sewing B.	Homestead	110 E. Fourth Ave.
Walls, Sadie H.	Sewing A.	Pittsburgh	2316 Mission St.
Walp, Edith	Stenog'phy.	Swissvale	Aurelius St.
Ward, Bertha L.	Book Kpg.	Pittsburgh	7 De Witt St.
Weaver, Nannie	Cooking B.	Pittsburgh	1224 Resaca Place, N. S.
Weightman, Harriet E.	Sewing C.	Pittsburgh	5412 Elmer St.
Wells, Margery M.	Sewing B.	Pittsburgh	524 Lowell St.
Whitehead, Gertrude E.	Stenog'phy.	Pittsburgh	6034 Rodman St.
Williams, Margaret	Sewing B.	Homestead	455 E. Fifth Ave.
Wilson, Anna C.	Cooking B.	Pittsburgh	7111 Willard St.
Wilson, Irene E.	Stenog'phy.	Pittsburgh	1021 Locust St., N. S.
Wilson, Mary G.	Book Kpg.	Pittsburgh	7111 Willard St.
Woodward, Constance	Sewing B.	Pittsburgh	5725 Walnut St.
York, Margaret E.	Sewing B.	Pittsburgh	3480 Ridge St.