Letter from Carnegie Pertaining to Establishing and Maintaining C.I.T.

"Pittsburgh, Pa.,
November 15, 1900

"Hon. Wm. J. Diehl,
Mayor, City of Pittsburgh,
"Honored Sir: —

I learn with deep interest that the Central Board of Education has asked the City of Pittsburgh for $100,000 to begin a Technical School, no doubt to obtain for the bright youth of the High School the essential advantages which technical education in our day affords.

"For many years I have nursed the pleasing thought that I might be the fortunate giver of a Technical Institute to our City fashioned upon the best models, for I know of no institution which Pittsburgh, as an industrial center, so much needs. I postponed moving in the matter because I wished the Carnegie Institute to be fairly launched upon its new development before drawing the attention of Pittsburgh to the Technical Institute. The action of the Educational Board, however, impels me to step forward now and ask that I may be allowed to do what I have long wished to do for Pittsburgh.

"I have given much attention to Technical Schools both in the United States and Great Britain during the past few years. The work now being done by the Technical Institute in Boston and Worcester, the Drexel Institute in Philadelphia, the Pratt Institute in Brooklyn, the Armour Institute in Chicago, is most encouraging.

"In Great Britain the Keithley Institute and the Halifax Institute, which I visited in September last to distribute the prizes to the students, gave me quite a surprise, nearly one-half of the 1,100 students in the former, and fully one-half of the 1,400 in the latter were young men and women, workers during the day, improving themselves in various studies pertaining to their crafts in the evening classes of these institutions. I told these students that this impressed me more than any other. I recalled an essay written by my grandfather to Cobbett's Register, which that great man pronounced the most valuable communication ever published in the Register. It was entitled 'Handicraft versus instruction'; in that article my grandfather thanked God that in his youth he had learned to make and mend shoes.

"It is really astonishing how many of the world's foremost men have begun as manual laborers. The greatest of all, Shakespeare, was a wool-carded; Burns, a plowman; Columbus, a sailor; Hannibal, a blacksmith; Lincoln, a rail-splitter; Grant, a tanner. I know of no better foundation from which to ascend than manual labor in youth.

Carnegie Institute of Technology
RECEIVED
OCT 24 1959
Library
"We have two notable examples of this in our own community whose fame is world wide: George Westinghouse was a mechanic; Prof. Brashear, a mill-wright.

"I believe that a first class technical school probably as large as that of Worcester, would develop latent talent around us to such extent as to surprise the most sanguine.

"If the City of Pittsburgh will furnish a site, which I hope will be of ample size for future extensions, I shall be delighted to provide the money for such a school, taking care to provide room for additions to the buildings to meet the certain growth of Pittsburgh.

"I would endow it with $1,000,000 five per cent gold bonds, yielding a revenue of $50,000 per year.

"The rare ability with which the Trustees of the Carnegie Institute have managed it, and the results which have so surprised and gratified me, naturally lead me to beg those gentlemen to take charge of the Technical Institute and its endowment. I had only to plead that their increased labors were for the good of Pittsburgh, to be assured by everyone, that I have so far had an opportunity of consulting, that they would gladly assume the enlarged responsibility.

"I propose, therefore, Mr. Mayor, to include the Technical School with the Institute and have therefore made its endowment equal to the latter.

"There are many questions to decide, involving investigation, careful study and much labor; among these, whether fees should be charged as at the Armour, Drexel, Worcester, and Boston Institutes and in fact I might say all the technical schools, or whether we can take a new departure and arrange that the students of the high school, for instance, should have the doors of the Technical School open to them free. This and many other questions must be left to the Commission. But I am in a position to assure you that the Commission is prepared to face the problem, and that my heart is in the work."

Very respectfully yours,

"Andrew Carnegie."
Preliminary Report to the Committee on Plan and Scope of the Educational Organization of the Carnegie School of Technology

Pittsburgh, Pennsylvania, 1902

This preliminary report of your Advisory Committee is submitted for your consideration at this time to enable you to keep in touch with our investigations, and is an expression of the thought which will determine our future recommendations.

In order to simplify the reading of this report we have subdivided it into the following distinct heads:

2. Its relation to other Technical Schools.
3. The Educational Situation in Pittsburgh and Vicinity.
5. School of Science and Technology.
7. School of Fine and Applied Arts.
8. Woman's Industrial School.
9. Enrollment, Equipment, and Building.

Scope of the Carnegie Technical Schools

The type of Industrial Education which your Committee is recommending for your consideration in this preliminary report as being best adapted for the Carnegie Technical Schools of Pittsburgh has been especially designed to meet the local, industrial, economic, and educational needs which are found to exist after a thorough investigation and careful study of the situation.

The Carnegie Technical Schools should offer instruction in all the educational branches in which art, science, and skill can be imparted to the individual for his own betterment, as well as for the benefit of those related industries which are essential to the prosperity of your community.

We propose, therefore, to recommend that courses of instruction be established covering a wide group of industries, all of which are essential to the welfare of Pittsburgh.

These courses should not encroach upon the field or purposes of your Universities, nor should they include the elementary or general education which is within the province of your Public Schools. Rather in every instance they should supplement, broaden, and enlarge the existing systems of
It should offer an opportunity to the journeyman mechanic to acquire increased skill and technical knowledge, so that he may aspire to the higher position of foreman, or become of greater value to his employer as a more skillful mechanic and a better citizen.

It should offer to the young men who have natural ability, and who are able to make a sacrifice of time, covering a period of two or three years, an opportunity to receive a technical and scientific training which will fit them for such callings as Engineering Assistants, Draughtsmen, Inspectors, and Foremen, etc., etc.

It should offer to those of artistic temperament an art training which will fit them for useful positions enabling them to become Designers, Illustrators, Decorators, etc., or giving them an opportunity to develop their talents in the direction of the Fine Arts.

It should offer to that large and ever increasing group of women wage earners an opportunity to acquire skill and efficiency, that they may be lifted from the unskilled group to the skilled.

It should offer to women of more mature intelligence, judgment and capacity an opportunity to train themselves for more important positions, such as Secretaries, Librarians, Costume Designers, Professional Housekeepers, etc., etc.

It should provide courses of instruction in all these various lines and to meet these diverse demands, during both the Day and the Evening.

The Day Classes for those who can advantageously devote their entire time to acquiring an education.

The Evening Classes for those to whom all educational doors would be closed unless they could receive instruction after their day’s work is done.

The Carnegie Technical Schools should offer courses of instruction sufficiently broad and flexible to almost encroach upon the professional on the one hand, and sufficiently practical and commercial to be within the reach of the ambitious laborer on the other hand. In this wide gap will be found the vast majority of your wage earning population of both sexes.

We have, therefore, prepared courses of instruction to do the following:

First, courses that will impart skill and intelligence to young men so as to increase their earning capacity, lift their standard of labor from the unskilled to the skilled, and raise them socially to a higher level.

Second, courses that will give to those of greater intelligence and natural ability a more thorough course fitting them, after proper experience, to direct the skilled labor, and to fill that great class of middle positions below the Engineer and General Manager, but above the skilled mechanic.
It should offer an opportunity to the journeyman mechanic to acquire increased skill and technical knowledge, so that he may aspire to the higher position of foreman, or become of greater value to his employer as a more skillful mechanic and a better citizen.

It should offer to the young men who have natural ability, and who are able to make a sacrifice of time, covering a period of two or three years, an opportunity to receive a technical and scientific training which will fit them for such callings as Engineering Assistants, Draughtsmen, Inspectors, and Foremen, etc., etc.

It should offer to those of artistic temperament an art training which will fit them for useful positions enabling them to become Designers, Illustrators, Decorators, etc., or giving them an opportunity to develop their talents in the direction of the Fine Arts.

It should offer to that large and ever increasing group of women wage earners an opportunity to acquire skill and efficiency, that they may be lifted from the unskilled group to the skilled.

It should offer to women of more mature intelligence, judgment and capacity an opportunity to train themselves for more important positions, such as Secretaries, Librarians, Costume Designers, Professional Housekeepers, etc., etc.

It should provide courses of instruction in all these various lines and to meet these diverse demands, during both the Day and the Evening.

The Day Classes for those who can advantageously devote their entire time to acquiring an education.

The Evening Classes for those to whom all educational doors would be closed unless they could receive instruction after their day's work is done.

The Carnegie Technical Schools should offer courses of instruction sufficiently broad and flexible to almost enroach upon the professional on the one hand, and sufficiently practical and commercial to be within the reach of the ambitious laboror on the other hand. In this wide gap will be found the vast majority of your wage earning population of both sexes.

We have, therefore, prepared courses of instruction to do the following:

First, courses that will impart skill and intelligence to young men so as to increase their earning capacity, lift their standard of labor from the unskilled to the skilled, and raise them socially to a higher level.

Second, courses that will give to those of greater intelligence and natural ability a more thorough course fitting them, after proper experience, to direct the skilled labor, and to fill that great class of middle positions below the Engineer and General Manager, but above the skilled mechanic.
Third, courses that will give to young men and young women who have some taste and ability for art, a training in the application of art to industry, enabling them to turn such talent to the best advantage.

Fourth, courses that seek to give to the constantly increasing number of women who must earn their living by their own labor the same opportunity that is given to men to increase their skill, their technical knowledge, and their judgment and intelligence; and thus lift their work to a higher standard, increase their opportunities for employment and broaden their field of usefulness.

Your Committee has subdivided the Carnegie Technical Schools into four distinct heads. Its purpose in doing so is to have the titles of the courses of instruction directly appeal to the widely diverging elements in the community which they are intended to reach, and to allow for the feeling of prejudice which would exist if the School of Science and Technology were confused with the School of Mechanics and Artisans; or the School for Fine and Applied Arts confused with the Women’s Industrial School.

Each of these four schools of your Institution will attract to its doors different types of individuals with different standards of life, different methods of thinking, and with equally different degrees of intelligence and capacity for training. This fact must be recognized by housing them in different buildings, with separate corps of instructors.

These are some of the considerations which lead your Committee to recommend to you in this Preliminary Report the establishment under the head of the Carnegie Technical Schools, the four Schools which we here describe, each distinct in itself, and each where possible supplementing the others; and the whole offering to your community and to the country a modern, well-balanced, salient factor in their social and industrial development.

Its Relation to Other Technical Schools

The Carnegie Technical Schools, of Pittsburgh, should stand in the same relation to your Public Schools, your High Schools, and your shops and factories, as the modern University does to its Preparatory Colleges.

It should receive each year, from all these sources, ambitious young men and women and help them to better their condition by giving them a training in skill directly applicable to their individual callings.

It should be a University for Specialization in Art, Science and Industry, of a secondary educational grade, doing and aiming to do what other secondary schools have done in specific instances for special industries; but assembling all of the most important and distinctly defined vocations and callings of men and women, with a single dominant thought, under the name of the Carnegie Technical Schools, so that its breadth of purpose may be as far-reaching as the noble philanthropy of its founder.

In order for it to do this, its courses of instruction must put into practice the most modern, concrete, and richest systems for imparting knowledge.
These courses will necessarily possess sufficient originality to make this School a school of a distinctively new type, which will include those features in other institutions which experience has proven to be of basic importance.

They should include all that is best in existing Scientific, Trade, Art, and Industrial Schools, absorbing all that is essential to their success, and adding to them breadth in plan, in scope, and in achievement.

The Carnegie Technical Schools embodying a scheme of Secondary Technical Education should be pitched between the Elementary Courses of the Grammar Schools and the Engineering Courses of the Universities, without encroaching on the General Courses of your High Schools.

It should not be supposed, however, that this School will, in any sense, take the place of the Manual Training introduced into the Grammar and High Schools in many cities: rather such Manual Training would constitute a most excellent preparation for the courses that we are here describing; and the establishment of the Carnegie Technical School should, therefore, be an additional reason for the authorities in your City to carefully consider its introduction into the Public School Systems.

The technical training offered in the Carnegie Technical School would also be most valuable to those who wish to pursue their studies thereafter, and it would be well to encourage this by offering to those who show the greatest promise scholarships in your Western University.

The Educational Situation of Pittsburgh and Vicinity

The unusual and commercial activities of your City have produced an educational situation different from that of any other community in the United States.

Your rapid growth, numerically and industrially, has not been accompanied by an equal growth in educational facilities. This has necessitated the careful study by your Committee of the local situation in determining, with some degree of accuracy, your educational needs.

The results of this investigation have disclosed that within a sixty mile radius there are nearly two million inhabitants, and that based upon the averages of the census, each year there are over one hundred and twenty thousand (120,000) young men and women, of the age when they are seeking a system of training, or an education which will lead directly to their life work.

Within this radius, there exists today a great number of educational institutions, a large proportion of which are of the purely elementary grade, a small number are of the College and University grade, and a very few offer courses in industrial or technical training. In each of these latter the greatest possible enrollment would not be a material factor in solving your educational needs.
These schools, with few exceptions, are depending for their support upon voluntary subscriptions or private generosity; or must exact tuition fees out of all proportion to their comparative merit, when judged by schools of a similar character in other cities.

There is no provision being made either by the Cities, Counties, or the State to offer a suitable secondary education, such as would effectively prepare the great majority of the young men and women for their probable callings; and opportunities for Specialisation are exceptionally limited even though the demand for Specialised technical education is constantly increasing.

There exists in Pittsburgh and vicinity absolutely no school of any kind which will enable a young man to acquire the rudiments of a trade.

There exists no school which offers similar opportunities to young women. No adequate school of Fine and Applied Art comparable to the demand. No school of this grade in which Science or Technology is taught with direct reference to your industries.

And these are facts, in spite of the statement that Pittsburgh's position, geographically, commercially, and educationally, demands schools of this character more than any other community in the Country.

In a few shops the so-called apprenticeship system exists. It is there only within the reach of those young men who are in a position to sacrifice a part of their earning capacity for a period of years while receiving this apprenticeship.

For every instance where this apprenticeship system does exist, many other instances occur where there is no manner of training provided, except that of observation, or the much over-rated system of correspondence instruction.

The tremendous enrollment of the correspondence schools, in spite of their high charges for tuition, is merely added evidence of the demand for special instruction of a technical character.

In Pittsburgh alone we are informed that a single correspondence school has enrolled the names of thirty thousand young men in a single year. This merely gives some idea of the craving for education, and the desire for advancement permeating the wage earners of your City, who failing to find in their vicinity or within their reach proper secondary schools, take the only method offered irrespective of its adaptability and utility.

In the manufacturing and building industries of Pittsburgh and vicinity, it seems impossible to get a sufficient number of skilled mechanics of any kind. Skilled help, competent and self reliant, is at a premium. Whence is
to come the supply for the constant growth of your industries?

The United States labor statistics show that in New York over 70 per cent of the men engaged in skilled labor are of foreign birth; in Chicago, over 60 per cent; in Brooklyn, over 75 per cent; in Pittsburgh, what per cent?

It is in these figures that we find the answer to the question as to where your skilled labor must come from. It must be imported, either from other cities or from Europe.

Therefore, we are of the opinion that:

If an industry creates, by its growth, by its importance to the Community, and by the number of men and women employed, so as to have made for itself a distinctive place either in art or skill, a demand which must be supplied by imported or foreign skilled labor, it then becomes your duty to provide courses of instruction which will supply, in the shortest possible space of time consistent with thorough methods, an opportunity to young American men and women to fill this demand.

Your Committee's investigations have shown that by far the greatest part of your population belongs to the class that seeks to support itself in some field where labor, skill or experience may be productively applied to commerce or industry.

The number who do not produce something, or earn their own livelihood, by their skill or practical knowledge, in some branch of industry, is almost too small to enumerate.

Over 90 per cent of this great producing class are entirely unprovided for educationally, after they leave the Elementary Public Schools. And the system of apprenticeship which formerly served their purpose is fast disappearing. Under modern conditions it cannot be revived.

Some system of education must be found to take its place.

No schools of Mechanic Arts or other similar schools are within their reach; neither the general courses of your High Schools nor the Scientific and Classical courses of the Colleges and Universities throughout the country fit their needs.

They must have instruction that will directly help them in their life-work, or they cannot be expected to make the sacrifice of time and money necessary to get a further education.

These are the conditions which your Committee has found and over which it has no control. They are, however, the conditions which it has felt it necessary to meet, and which have materially influenced them in making this preliminary report.
SUBDIVISIONS OF THE INSTITUTION

Your Committee recommends, that the CARNEGIE TECHNICAL SCHOOLS shall be subdivided as follows:

1. SCHOOL OF SCIENCE AND TECHNOLOGY (for young men).
2. SCHOOL FOR MECHANICS AND ARTISANS (for young men).
3. SCHOOL OF FINE AND APPLIED ARTS (for both sexes).
4. WOMAN'S INDUSTRIAL SCHOOL (for young women).

SCHOOL OF SCIENCE AND TECHNOLOGY

The first types of Technical Schools to be established in the United States were all of University grade. They were designed to train leaders of thought and industry - engineers who could forge ahead into new fields of industrial activity, and who could solve untried problems.

The need for such Schools is still great to furnish the master minds to control your industries; but the country is already well provided with high grade Engineering Schools that can furnish the necessary training.

Your Western University is doing much for Pittsburgh and vicinity in this direction.

For more than forty years Germany has been building the most complete system of technical education that the world has ever seen; and to-day all are agreed in attributing to her secondary Technical Schools more than to all else her remarkable progress in manufacture and commerce.

It is true that the United States has Engineering Schools, but it should be remembered that Germany's technical schools of secondary grade that train those who cannot reach the Universities have done more for her development than have her Polytechnics of University grade.

This is because industrial prosperity is absolutely dependent upon trained and efficient subordinates; it depends for its stability on the broad base of the intelligence and skill of its workers.

In America comparatively few Technical Schools of a lower grade than the University have ever been established, and most of those that do exist are intended to meet the needs of a given locality.

In this Country we have no system of technical education that bears the same relation to our Schools of Engineering that our High Schools and Grammar
Schools bear to our Classical Colleges and Universities. We have no broad system of Secondary Technical Education.

It is to fill this gap, that your Committee has designed the CARNegie TECHNICAL SCHOOLS.

Both in the designing rooms and shops of all your manufacturing plants we have found an urgent demand for secondary technical education.

This demand is felt by employers who wish to have men of sufficient training in Applied Science to enable them to grasp the plans of their Engineer or General Manager, and who also have sufficient knowledge of the practical details of the business to enable them to intelligently carry them out.

This School is for those who desire a scientific training directly related to your various industries.

It is planned for those whose intellect and capacity will enable them to take positions above that of the skilled Mechanic, but who cannot reach the thorough courses of your Universities.

It is designed to cover a wide group of manufacturing enterprises represented in this vicinity; and its Courses should include Steel Manufacture and Metallurgy, Structural Steel Design and Construction, Machine Construction and Design, Applied Electricity, Power Generation and Transmission, Glass Manufacture, Clay Working and Ceramics, Gas Manufacture, and the refining of Petroleum Products, the Technical Side of Architecture, Applied Mining Science, etc., etc.

Among the graduates in its various courses, after a few years of experience, we shall find those who would efficiently fill such positions as Designers, Inspectors, Foremen, and Superintendents, and well trained men for a large group of similar positions of equal importance in your shops and factories.

The courses of instruction should aim to give their graduates some particular technical knowledge which will enable them to be of immediate service, and readily find employment upon graduation, in some occupation for which they are specially fitted.

The training, however, should be sufficiently broad to develop their power to the utmost, so that with experience they will rise to the limit of their natural ability.

The placing in the community of graduates of these courses is assured, since in each one of the industries we have mentioned we have found a great lack of technically trained men, and an eagerness on the part of employers to get such men to direct their work.

The Day Courses in this School should be three years in length, and should occupy the student's full time and energy. Those who enter these courses should be of sufficient maturity to insure earnest work.
This will mean that many will have had some High School training. But the entrance requirements should be sufficiently low to admit those who have gone to work after having finished the Grammar or Common School Courses, and who have found, after a few years, that special training is necessary for their advancement.

In every Course a large part of the instruction should be given in that kind of practical work which will best fit the individual for some particular place in the industry for which he is being prepared. And sufficient opportunity should be given for practice for him to acquire confidence and a considerable degree of skill in this kind of work.

To make this instruction thorough and effective, well equipped shops and laboratories will be necessary for each of the industries represented in the School. The instructors in these branches must be chosen from those who have proven in commercial work their ability and their mastery of their subject.

All of these Courses will be somewhat similar in character, giving a foundation training in Mathematics and those principles of Science which are fundamental and necessary to a clear understanding of the work for which such Courses are designed. But preceding and parallel with this Scientific training should be a large amount of work of a most practical nature in the shops, laboratories and drawing rooms. In this way the student is constantly given opportunity to see the practical application of what he is studying, and he learns the reason for everything that he does.

The Colleges of this country have in recent years adopted special courses in a number of the lines suggested here. But this School should offer to the young men who find it impossible to attend College or University an opportunity to equip themselves for those positions directly beneath the Engineering grade.

In a number of the branches that we have recommended for the CARNEGIE SCHOOL, however, no Courses of instruction have yet been offered in any Institution. Nevertheless, the importance of these industries in your community makes it necessary for this School to be a pioneer in establishing such Courses in order to meet the requirements which exist here.

It will therefore be necessary to devise new Courses of study especially arranged to give the training to meet these new conditions; and in every Course the subjects taught, — whether they be Mathematics, Science, Drawing or Shop Work, should be taught with special reference to the use that is to be made of them.

EVENING COURSES

In addition to the Day Courses that have just been described the School of Science and Technology should offer Evening Courses of a technical character, and similar to those given during the day, but of necessity somewhat abridged on account of the limited time that is available.

Your Committee's investigations have shown that there is an undoubted and wide-spread demand for these Evening Courses, and in many instances the enrollment
in them will exceed that in the Day Courses.

To meet this demand your Committee recommends the establishment of Courses of instruction in the following lines: Mathematics, Mechanical Drawing, Architectural Drawing, Machine Designing, Bridge and Structural Steel Design, Physics, Chemistry in its application, Applied Electricity, Stationary Steam Engineering, Practical Mechanics, Strength of Materials, Building Construction, Mining Science, etc., etc.

These Courses should be thoroughly practical in character, with sufficient theoretical foundation to enable the student to firmly grasp the fundamental principles on which each subject rests.

The instruction in the Evening should not be given for more than three nights a week for six months each year in any one class, and no period should exceed two hours in length, so that individuals who are compelled to work during the day will not have their strength overtaxed, and so that they may have some leisure for recreation.

SCHOOL FOR MECHANICS AND ARTISANS

This school will offer a system of practical instruction, both day and evening, for the training of advanced apprentices in those manufacturing and building trades which are most important in Pittsburgh and vicinity.

The opportunity to acquire skill during an apprenticeship is a thing of the past. The workmen of the future must learn how to work skillfully before they seek employment.

The old apprenticeship system is not likely to be revived. The industrial situation has altered the possibility of making it successful.

Modern conditions make it imperative that some system of training be devised, which will do what the old apprenticeship system aimed to do.

The growth and development of your manufacturing and building industries have produced a tremendously increasing demand for skilled mechanics. Schools giving instruction fitted to produce them have in an equal degree been neglected.

Your Committee has investigated the various trades and has found, perhaps, in no one field of activity a greater dearth of efficient workers than in the so-called building and manufacturing trades. In all of these there is an absolute and unvarying demand. The compensation received by these mechanics is sufficiently high to offer an attractive inducement for young men to enter them.

In your industries the wages paid to the skilled workman are very nearly double those paid to the unskilled, and to no one is this condition more apparent than to the laborer himself. He will be alive to this situation when it concerns his children; and he will make many sacrifices to have his son
acquire that skill which will lift him to a higher position than he himself has attained. A close study of Pittsburgh and Allegheny will show that by far the largest percentage of your population is of the kind which we have just described.

Therefore: a system of education must be provided which will take the place of the apprenticeship, and one which will be moulded so as to embody all of the best principles and methods of said system. It should be upon a plane which will enable thorough, well developed courses founded upon theoretical principles to be given, in a shorter period of time than under the old method; and without sacrificing the standard of skill, ability, and capacity of the young man.

Such a school will appeal to young men who have had but limited intellectual training, most of whom will have gone from the Grammar School directly to work.

It will appeal to those young men already in the trades who find that observation alone - the only present means of instruction - is deficient since it does not give any explanation of the theories underlying their work.

And it will strongly appeal to that large group of young men on which Pittsburgh is so dependent, - its machine tenders, its semi-skilled laborers, and its so-called helpers.

This school should offer a course of instruction directly applicable to the local conditions, arranged so that a maximum amount of instruction can be given in a minimum amount of time. For it must realize that long courses mean financial hardships not easily borne by this element of your population.

It must offer courses of instruction carefully based upon the standard demanded in the skilled labor market; and must carefully adjust this standard to conform to the changing demand in the various industries consequent upon the use of new materials and new methods of manufacture and construction.

Its shops must be equipped in a modern and most complete manner, and its courses of theoretical instruction should be closely related to the practical work, equipment, and materials.

Its text books and printed notes must be in simple English, from which all unnecessary information has been eliminated, so that those possessing a comparatively undeveloped mentality will find them within their comprehension, and that the information they contain may be readily absorbed and assimilated.

It will aim to graduate advanced apprentices with sufficient skill to make them of value to employers at once.

We are of the opinion that the courses in the School for Mechanics and Artisans should be short.
It is also our opinion that the best system of instruction grounds the pupil thoroughly in the science and practice of his trade at the school, leaving him to acquire skill, workmanship, and experience after his course of instruction is finished.

It is essential to have as instructors in these schools workmen possessing unusual skill, who are chosen because of their character, intelligence, and ability to impart their knowledge and information to others.

It is desirable that the school shall exact the simplest form of entrance requirements, as frequently it will be found that the applicant may lack even elementary English training, but possess sufficient aptitude to enable him to excel at his trade.

They must necessarily be mature physically in order for them to be able to endure the demands and requirements which a long period of work would necessitate.

The courses of instruction should be so arranged that the greater portion of the time would be spent at actual work in the shops acquiring a familiarity with materials and skill with their tools, enabling them to overcome any awkwardness.

It should be constantly kept in mind, that it is necessary for the student not alone to be able to do good work, but they should understand and thoroughly comprehend the reason for its being done. In this way a considerable amount of theoretical instruction can be imparted without lessening the efficiency of the practical work.

A course in mechanical drawing pitched upon a plane which is directly applicable to the trade instruction, is of the most vital importance.

It is also necessary that the student should become familiar with technical terms and trade phraseology and kept in touch with the journals and trade publications, closely allied to his particular industry. This will serve a double purpose: It will widen the horizon of the individual and keep him in touch with modern methods and appliances, and also permit him to compare his progress with the best that his trade is exacting of the master workman.

It is a careful consideration of these conditions, now existing in Pittsburgh and vicinity, which causes your Committee, in their Preliminary Report, to make the following recommendations for the SCHOOL FOR MECHANICS AND ARTISANS:

That the Schools should have two subdivisions:

First: Courses of instruction in the Building Trades.

Second: Courses of instruction in the Manufacturing Trades.

Each of these two subdivisions to cover the following groups:
BUILDING TRADES

Courses of instruction in Plumbing, Blacksmithing, Bricklaying, Masonry, Carpentry, Painting, Electric Wiring, Sheet Metal, and Cornice Work, Steam Fitting and Hot Water Heating, etc., etc.

MANUFACTURING TRADES

Courses of instruction in Pattern Making, Moulding and Foundry Work, Blacksmithing, Machine Forging, Tool Making, Machine Work, etc., etc.

It will be noticed that these groups are incomplete, and we reserve for a later Report a more specific and detailed recommendation.

In each of the subdivisions of the School for Mechanics and Artisans we recommend that these courses of instruction be given both Day and Evening.

Day Courses: The Day Courses should cover a period not exceeding six months in length.

Evening Courses: The Evening Courses in order to be standardized upon an equal plane with the Day Courses should approximate the same number of lesson hours given three nights a week.

COURSES OF INSTRUCTION FOR JOURNEYMAN

The School for Mechanics and Artisans should recognize that the journeyman mechanic, as well as the apprentice, is eagerly looking for influences which tend toward his betterment and his possible advancement.

Many journeymen are thoroughly convinced that given a proper opportunity they could creditably fill a higher position. No more earnest group of men exist in your community.

We, therefore, suggest a Technical Lecture Course of Evening Instruction for these Journeymen, in such lines as: Moulding and Foundry Work, Stationary and Steam Engineering, Pattern Making, Plumbing, Electrical Workers, etc., etc.

SCHOOL OF FINE AND APPLIED ARTS

As its name indicates this school has a double mission to perform.

First: It should cultivate an appreciation of Art in the community and train those who will lift the standard of Art in this Country to a higher plane.

Second: It should foster Art as applied to industry and graduate young men and women with ability and training in design, composition, and color-harmony, together with sufficient knowledge in technique to enable them to successfully enter Art industrial pursuits.

Art has received a remarkable impetus during the last few years, especially in its commercial applications; and it is fast coming to be recognized that
strength in design, beauty in form, and artistic finish are essential to the ready sale of many kinds of manufactured goods.

It is also true that in the United States we are manufacturing more and more of these articles embodying in their form of decoration, taste and artistic skill; and each year we are becoming less dependent upon foreign importation for them.

At present within a short radius of Pittsburgh and throughout the entire country there are many industries that are becoming hampered in their development by the difficulty in finding skilled designers and Art workers who are familiar with their technical requirements.

With this increased interest in Art, and this growing field for its commercial application, there must come greater opportunity for Art Education.

The one feature in Art Education which has received the most thought and attention in the United States is the training in the so-called Fine Arts. But very little of a definite character has been done in the training of young men and women in the field of Applied Art.

The growing importance to the whole country of this field of Art, has led your Committee to believe that in the Carnegie Technical Schools special attention should be given to this type of education.

We would, therefore, recommend that there should be offered a variety of technical courses in the most important fields in which Art has been applied to industrial enterprise. And it should be the aim of the Carnegie Technical Schools to broaden this field and to train its graduates for the large number of important places in Art Industries, for which at present there is no means of obtaining an adequate preparation.

We have grouped in a tentative manner the following, as those which may be properly covered: Pottery and Glass Design, Design applied to Stained Glass, Tiling and Mosaic, Illustration and Book-cover Design, Ornamental Metal Work applied in Iron, Brass and Copper, Interior Decoration and Furniture Design, Art Typography preparatory to Electrotyping, Engraving, Etching and other Reproducing Processes.

In each of these subjects there should be full time Day Courses of at least two years in length.

They should include all of those branches of Art Education which will best develop artistic appreciation, cultivate originality in design, and stimulate freedom and individuality of Art expression.

They should also give special and thorough training in the technique and all the mechanical processes in these Art Industries.
In order to carry out this scheme there will be needed well equipped work-rooms, where the student can actually apply his designs and gain skill and experience in the mechanical operations under conditions closely resembling those that he will find later in commercial work.

All of these courses will be somewhat similar in character, especially in the first year, since they must give a thorough foundation in original design and composition.

In the second year of the courses, however, your Committee would recommend that opportunity be given for a high degree of specialization in the Art training, as well as in the applied design and technique; and that it all be taught with special reference to the use to which it will be put.

Art standards are flexible but have distinct basic principles, which can be taught to those of artistic temperament and applied to articles of Commerce, Design, Illustration, etc.

We therefore believe there will be a largely increasing demand for this kind of instruction.

COURSES IN FINE ART

Besides these courses in Applied Art there should also be in the Carnegie Technical Schools courses in Fine Art, where those who wish it may get a broad Art training.

Courses should be given in Free Hand Drawing, Perspective Sketching, Drawing from Cast, Historical Ornament, Still Life and Life, Composition, Modeling, and the History of Art, etc. And for those who have received this instruction there should be an opportunity for selection from the following groups: Water Color and Oil Painting, Life and Portrait Painting, Sculpture and Stone Carving, Architectural Design and Ornament and Wood Carving, etc., etc.

EVENING COURSES

We are recommending Evening Courses, as well as Day Courses, for the school of Fine and Applied Art, of the same general character as those recommended for the other schools which we have described.

WOMAN'S INDUSTRIAL SCHOOL

This school offers a distinct opportunity for the Carnegie Technical Schools to raise the level of woman's work, and set a higher and more practical educational standard.

Few schools have endeavored to reach the wage earning women, and the subject of Industrial Education for them is an undeveloped one.
Existing schools for women have been of two general kinds—both pitched upon a different plane from that which seems desirable for the Carnegie Technical Schools.

One kind is of the cultural or collegiate grade, offering general educational advantages. The other kind is of the purely normal grade, with limited opportunities for Specialization.

We are, therefore, advocating that an Industrial School of a new type be established, which will stand in the same relation to wage earning women that the proposed schools of Science and Technology and for Mechanics and Artisans stand to men.

We are suggesting such a School because there exists no logical reason why women should not be able to secure, in a school, similar knowledge and practice underlying the various industries, which might enable them to become of value in the skilled labor market, to their marked advantage.

The field for the exercise of women's skill is a limited one. This field has been largely curtailed by the prejudices existing that women are unfitted physically, intellectually, and by other conditions, for entering many avocations in which men are employed. This prejudice is deep seated, especially when women become competitors with men in any given field of work or enterprise.

The wage earning women are constantly increasing in numbers, present conditions increase their growth, and an educational movement which does not recognize and seek to assist this element of the community is narrow and deficient.

The home-making art has fallen into disrepute in the minds of the masses, because of the onerous conditions under which the house-maid and the servant have to live.

The factory women of your city and elsewhere have exceedingly limited opportunities for advancement and almost absolutely no opportunity for a system of instruction comparable to the apprenticeship for young men.

The more intellectual type of self-supporting women in your community, such as, stenographers, clerks, bookkeepers, saleswomen, etc., find it difficult to advance themselves beyond secondary positions.

In order to relieve this situation we are suggesting that the Woman's Industrial School shall offer courses of instruction to meet this demand and these conditions, in such a way as will be most effective.

Therefore: it is the opinion of your Committee, that if a system of education can be devised for imparting skill to young men, so as to increase their wage earning capacity, lift their standard of labor from the unskilled to the skilled, and raise the young men technically to a higher standard, the same opportunity should be given to women that is offered to the young men of your community.
This school should be strictly practical in character, and should have for its principal aim the training of young women to earn their livelihood. It should offer courses of two different and separate grades:

First: Short courses of a trade characterized for those of comparatively little natural ability and intellectual training, to enable them in the shortest possible time to become skilled workers.

Second: Longer and more technical courses for more mature women of intelligence and training, to train them for more responsible positions.

The courses of instruction for the technical branches of the school are designed to be of about three years in length.

The courses of instruction in the day and evening classes in the trade section of the school should be as short as is consistent with the proper instruction in the various subjects taught.

The purpose of making this latter course short and covering a period not exceeding one year in length is in recognition of the intense struggle for existence to which the average wage earner is compelled to resort, and the impossibility of her participating in a course of instruction which was placed financially beyond her reach, which longer courses of instruction would undoubtedly do.

We have grouped in a purely tentative manner subject to revision in a later report, the following courses of instruction:

Technical Courses: for Dressmakers, Costume Designers, Professional Housekeepers, Librarians, Secretaries, etc.

Trade Courses: for Milliners, Seamstresses, Stenographers and Typewriters, Bookkeepers, Office Assistants, Cooks, Waitresses, Housekeepers’ Assistants, and perhaps additional courses, such as: Compositors, Upholsterers, Bookbinders, Box Makers, Leather Workers, etc., etc.

ENROLLMENT, EQUIPMENT, AND BUILDING

The probable enrollment in the Carnegie Technical Schools should receive careful thought before the appointment of the architect who is to plan the buildings, so that suitable provision can be made for the special equipment which the courses of instruction demand.

Your Committee has given some attention to this subject and to the growth of the Schools, and in this preliminary report gives you the result which their experience leads them to expect at this writing.

An institution such as we have planned in this report would have enrolled in its four Schools the first year approximately all whom you could make
provision for, if this total does not exceed three thousand for both day and evening students in all departments.

The growth should not be less than 10 per cent a year, and at the end of five years provision for not less than four thousand students should be provided. This ratio of growth will be found to be much less than actual figures.

The original equipment in many of the various departments will be of the utmost importance in determining the success of said departments. And with the schools' growth in numbers and the rapid advance being made in machinery of the various industries, it will be necessary to constantly expand and improve on this equipment, so that class-rooms allowing space for such changes and growth must be provided in the beginning.

The buildings should be designed so that their interior arrangement will be specifically adapted to the shop or department uses to which they are to be put. Some rooms will require strength in construction far in excess of others, but every care should be taken to provide ample light and ventilation, while permitting such grouping of the various shops as would be most desirable.

We have not prepared accurate data as yet covering the subject of enrollment, equipment, and building, but in a later report we expect to give further and more detailed information.

Arthur L. Williston,
Arthur A. Hammerschlag,
C. B. Connelly.
SUGGESTED OUTLINE FOR CARNEGIE TECHNICAL SCHOOL

TECHNICAL SCHOOL OF APPLIED MECHANICS

Day Courses – Three years, nine months each. Entrance age 16 years or over.

1. Steel Manufacture and Metallurgy.
2. Structural Steel Design and Construction.
5. Power Generation and Transmission

Night Courses – Two or three years, 6 months each, 3 nights a week.

1. Mechanical Drawing and Machine Design.
3. Bridge and Structural Steel Drawing and Design.
4. Applied Chemistry.
5. Applied Electricity.

SCHOOL FOR MECHANICS AND ARTISANS

Day Trade Classes, six months each, eight hours each day; age of entrance, 18 to 25.

1. Machine Forging and Blacksmithing.
5. Plumbing.
7. Masons and Bricklaying and Fireproofing.
8. Carpentry and Cottage Building.

Night Trade Classes, two years, six months each, three times a week.

1. Mechanical Work.
2. Foundry Work.
4. Blacksmithing and Forging.
5. Furnace Masonry and Lining.
6. Template making for Structural Steel.
7. Steam Fitting and Hot Water Heating.
8. Sheet Metal and Gormice Work.
10. Masonry and Bricklaying.
11. Electric Wiring.
12. Carpentry and Cottage Building.

Technical Lecture Courses, weekly for Journeymen,

1. Journeymen Steel and Iron Workers
2. Journeymen Moulders and Foundry men
4. Journeymen Electrical Workers.
5. Journeymen Steam Engineers.

Technical popular lectures free to the public, weekly, on Industrial Topics, Local Industries, Science and Achievement.

NOTE - All evening classes to meet three times a week for two hours, and for six months in the year. Applicants must be seventeen years of age.

No. 4 SCHOOL OF DOMESTIC SCIENCE AND ART

Technical Courses.
Industrial Courses (for women).

No. 5 SCHOOL OF FINE AND APPLIED ART

Technical Courses.
Industrial Courses (for men and women).

No. 6 SCHOOL OF MECHANICS AND ARTISANS

Enrollment 630

The method of computing area is based enrollment of the following number men in each department:

Plumbing, area based upon 100 sq. feet per student.
Sheet Metal and Cornice Work, 150 sq. ft. per student.
Bricklaying, 200 sq. ft. per student.
Electric Wiring, 200 sq. ft. per student.
Steam Fitting and Hot Water Heating, 200 sq. ft. per student.
Painting, 200 sq. ft. per student.
Carpentry, 180 sq. ft. per student.
Structural Steel, Templet Making, 120 sq. ft. per student.
Machinist Work, 150 sq. ft. per student.
Moulding and Foundry Work, 200 sq. ft. per student.
Pattern Making, 200 sq. ft. per student.
Blacksmithing and Forging, 150 sq. ft. per student.
Square Masonry, 150 sq. ft. per student.
House Smithing, 150 sq. ft. per student.
Drawing-room for entire school, 150 x 50 feet.
Lecture-rooms, 150 x 50 ft.
Store-rooms, 150 x 50 ft.
Office and Reading-room, and Janitors' quarters, 150 x 50 ft.
Exhibit room, 150 x 20 ft.

In the Technical School, provision has been made for a total of one thousand students. The necessary amount of floor space as approximated, 110 sq. ft. per student.

Size of the buildings for the School of Domestic Science and Art is based upon an enrollment of about 500, and 200 sq. ft. is allowed per student.

In the School of Fine and Applied Arts, 200 sq. ft. is allowed.

In addition to these the Administration Building, Power House, etc., necessary room for light and air spaces have been calculated.