



THE NEW YORK ARCHITECT

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INTERESTS OF ARCHITECTURE AND
THE ALLIED FINE ARTS.

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DONN BARBER, Editor
J. HOLLIS WELLS, Architectural Engineering Editor

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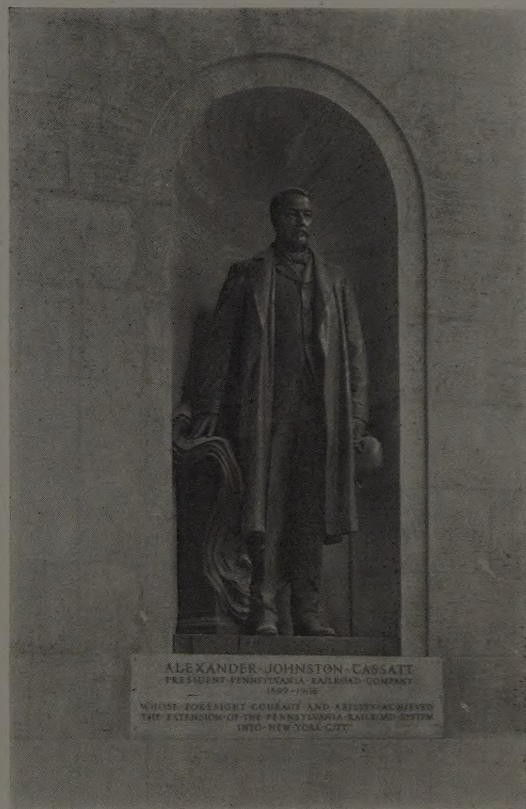
NOTES FOR ARCHITECTS.

Illustrations in Photogravure.

Seven years ago the eight-acre plot of ground in New York included in the area bounded by Seventh and Eighth Avenues and Thirty-first to Thirty-third Streets, was perhaps one of the most uninviting spaces in the whole of the great city. It was looked upon then as a place to be avoided by everyone except those whose business interests actually took them in that quarter. At the present writing this same spot is adorned with the noblest monument to a great industry that this country possesses, and it will now be a Mecca for the thousands who constantly surge

through the gates of the metropolis.

For years the Pennsylvania Railroad Company has been contemplating entering New York under the river, but it was not until 1903 that the actual construction of the tunnel extension was begun and the work of beginning the magnificent building which was to crown the tracks was not started until the following year.



CASSATT STATUE AT HEAD OF
GRAND STAIRWAY

New York people and the strangers within her gates for the past seven years have been watching with interest the transformation of the big hole in the ground which for years had all the appearance of a subterranean city with its tribes of what looked like pigmy human beings who flitted about on tiny engines with long trains of cars crawling along after them, many feet below the sidewalk level. Gradually the subterranean city began to take on a more

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definite form; some purpose seemed to be evolving out of the general chaos. Finally there began to rise above the track levels the beginnings of a wonderful building whose proportions were so vast that the eye could scarcely take it all in at once. And so, much as one would watch the growth of a favorite child, New York has finally seen the splendid structure come to full maturity in the largest building in the world ever built at one time—The Pennsylvania Railroad Station—which was opened to the public on September 8th.

The idea of the architects, Messrs. McKim, Mead & White, to have the building not only the practical center for the railroad's activities, but to be a lasting monument worthy of the great city of which it was to form the Western gateway, has been splendidly carried out. The architecture is of the Roman Doric style carried out in the noble colonnades which are a feature of the building and again in the treatment of the interior which suggests the great Roman monumental buildings.



SECTION OF COLONNADE
SEVENTH AVENUE ENTRANCE

Perhaps the most imposing of the colonnades is that which runs across the front of the building on the Seventh Avenue side—double at the carriage entrance, at the street ends and at the main front entrance for pedestrians in the center. It is a most imposing and appropriate entrance, the individual columns being 4 feet 6 inches in diameter and 35 feet high. Both the North and South driveways repeat

the colonnade which is here 63 feet wide and is fronted by double columns and pediments. The exterior walls of the driveways are of a pilaster treatment for a distance of about 300 feet. Over each entrance are ornamental clocks and eagles so that from whichever direction the Pennsylvania Station is viewed it almost seems as though one were looking at the front of the building.

The first thing that impresses the visitor as he passes through the main entrance on Seventh Avenue is the quiet dignity of the architecture and its lack of ostentatious display.

The long arcade stretches away before one, revealing a vista that gives the sense of great distance but without disclosing at once the entire purpose of the building. Both sides of the arcade are lined with shops which have the effect of distracting the attention so that one comes upon the loggia with a feeling of surprise. The restaurant and café form one wing and the lunch room the other. Passing through the loggia the head of the grand stairway is reached, where is enconced the splendid bronze statue of the late Alexander Johnston Cassatt, and here one instinctively pauses to catch one's breath and exclaim at the sight that bursts upon the view.

The noble flight of steps leads down to the great waiting room, which stretches away on either side to an entire length of 314 feet. The height of this room is 150 feet and the width 108 feet. Semi-circular windows, three on each side and one on each end, flood the room with light. The walls, columns and pilasters—as indeed the stone work of the entire interior—are of Italian Travertine of a warm buff tone that gives a very restful and cheerful effect. This is the stone which was used in the buildings of Imperial Rome, and one of its peculiar qualities is the fact that it does not soil with age or usage, but instead takes on a high polish. For this reason it is much more desirable than marble in the construction of such a building as the Pennsylvania Station.

Through the waiting room one passes to the concourse, parallel to and connected with it by a wide thoroughfare. This concourse is one of the most remarkable pieces of architecture in this country. It is a covered assembling place about 300 feet wide by 200 feet broad. The first impression is of a burst of daylight, and this was exactly the idea that the architects intended to convey. It gives the suggestion of being out of doors. The light is diffused through a great dome of iron and glass, the design of which involves intersecting arched vaults. This is one of the most remarkable architectural features of the station and is one of the first examples in this country of structural work designed by architects.

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Underlying the concourse and located between it and the tracks is the exit concourse, 60 feet wide. It is 18 feet above the train platforms and is connected with them by two stairways and one elevator from each platform. The third level for the passenger is the train platform about 36 feet below the surface of the street. It will be seen from this brief description that the company has amply provided against the confusion and crowding usually resulting from incoming and outgoing traffic. This is one of the most interesting features of the station to the architect, as it suggests an excellent working out of the problem always presented by a great public building.

Although the vastness of the building and its wonderful general architectural scheme are of the greatest interest both to architect and the general public, there is in addition a great amount of interesting detail that deserves special individual study. One feature is the device for announcing the arrival, departure and destination of trains. These devices are placed on pillars forming gateways of the various stairways leading to the track levels, and in the top of each post is an indicator which flashes when the train is ready to depart, showing the ticket taker that no more passengers must be let through the gate. Another feature is the moving stairway, leading up from the exit concourse

to the private street, 100 feet wide, midway in the block between Seventh and Eighth Avenues beside the Thirty-third Street entrance, thus affording direct communication with the great crosstown thoroughfare—Thirty-fourth Street.

No description of the station is complete without a word about the wonderful tunnels, which were the *raison d'être* of the building. All told, the river tunnels are a little over six miles long and the land tunnels are of the same length. The Long Island entrance to the tunnels is on one side and the New Jersey on the other. The proposed initial daily service will consist of about 600 Long Island trains and about 400 Pennsylvania trains.

Two tablets placed on opposite sides of the main entrance on Seventh Avenue record a brief history of the work and the names of those who have been connected with it from the officers of the company to the architects and engineers—a work of which they may be justly proud, for not only will it be a lasting monument to their genius, perseverance and energy, but it will serve as an inspiration to the city of New York for the erection of other equally worthy public buildings and will be for all time to come a tangible object lesson for members of the architectural and engineering professions who may have the good fortune to be called upon to execute work of a similar kind.



REAR ENTRANCE PENNSYLVANIA STATION, SHOWING ALSO 33RD STREET FACADE.

The Architectural Competition A Subject for Discussion

The subject of architectural competitions has recently again come up for serious and even somewhat heated discussion among the members of the profession, and recent developments would seem to prove that unless heavy restrictions are placed upon this originally valuable means of obtaining the best thought for a certain archi-

tectural scheme, it may be shunned in the future by architects of standing because of the abuses to which it is continually being subjected.

In our "Notes for Architects" this month we reprint in full a report of the withdrawal from the Montefiore Home competition of several

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prominent New York architects, as best showing the general feeling on the subject at the present time, and in another place in the "Notes" will be found the announcement that the New York Chapter of the American Institute of Architects will make a yearly award of two medals and four honorable mentions to those architects of the apartment houses in the boroughs of Manhattan and the Bronx which show the greatest excellence in exterior design.

Here are the two sides of the question. On the one hand the American Institute of Architects, which has always stood for certain principles of fairness in competitions, to which it has insisted that its members must adhere, and which look to the bringing out of the very best and most artistic work for the public or the individual who institutes the competition. On the other hand there are, as evidenced by the Montefiore fiasco the apparently unusual conditions to which architects who value their standing in the profession will not submit themselves.

The question undoubtedly must be thoroughly threshed out and some definite agreement reached, or else future worthy competitions are bound to suffer.

Among the several architects interviewed on this subject, Mr. J. H. Freedlander was approached as one who would be able to speak with

considerable authority inasmuch as he has been among the prize winners in several of the recent important competitions. Mr. Freedlander said: "There is no question but that the architectural competition, if rightly conducted, as were the Fulton Memorial and Oakland competitions, is of the utmost value to the architectural profession as well as to the general public, which benefits by the result, and personally I am always in favor of entering such competitions as have been found by the American Institute of Architects to be worthy. The great trouble is, however, that since the competition has been introduced into this country it has been subjected to great abuses by small builders and contractors, who in this way often draw an architect into a competition which has all the outward visible signs of fairness, but which trial proves to be simply an attempt to get ideas, which are then taken and adopted while the architect's submitted design is 'returned with thanks.' The only way I can see out of the difficulty lies wholly with the architect. He should conform to the rules laid down by the American Institute of Architects. These rules have been recently published in book form and can be had by anyone who is a member of the profession. It is only by conforming to some such agreement that the profession can hope to preserve its dignity."

ARCHITECTURAL ENGINEERING

Engineering Features of the Pennsylvania Station

It is with great regret that the NEW YORK ARCHITECT goes to press this month without being able to print interesting extracts from the official record of such portions of this work as came under the charge of Mr. Geo. Gibbs, Chief Engineer of the Electric Traction and Terminal Station Construction of the Pennsylvania Company, which he is now writing for the American Society of Civil Engineers, to whom the paper will be submitted before its use is permitted in the general periodicals.

From various sources, however, we have gleaned much of the wonderful detail of the work, and this article is an attempt to present to our readers in an informal way some of the problems which presented themselves to be worked out, many of them resulting in practically the adoption of many new and hitherto untried methods.

To begin with, it may be interesting to state the ground covered by engineers who had in hand the work of designing, supervising and constructing some of the major features of the terminal station itself. Without going too

much into detail this included the engineering for the necessary operations incidental to and connected with the electrical and mechanical development of the project and the specific designs of provisions for electric power, transmission, lighting, elevators, heating and ventilating, refrigeration, fire protection, sewage and drainage, steam, hot and cold water supply, foundations, steel structures and track arrangement.

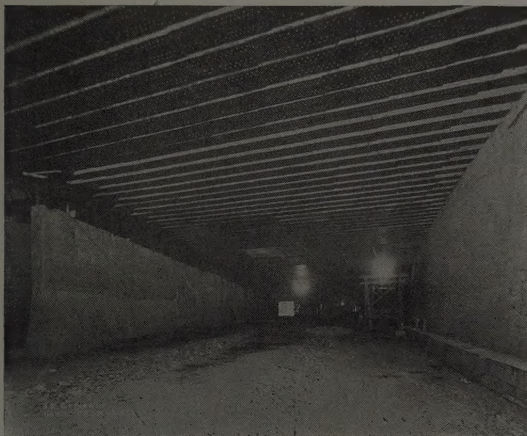
These problems were assigned to Westinghouse Church Kerr & Company, Engineers, who, through the experts in their several departments, have successfully, together with Mr. Gibbs and the architects, correlated these subjects.

After the selection of the route of the approaches, the location of the terminal station, the fixing of the centre line or base line of the work and the establishing of the grade line or profile of the trackage, the most important feature of the entire engineering problem connected with the terminal station itself was the arrangement of the tracks, for by means of the

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tracks the railroad company earns its money, the station building itself being largely an artistic shell to house the trackage and its appurtenances.

We do not wish to imply by this statement that the architectural part of the station is of less importance, but merely from a financial standpoint the railroad must first consider the practical problem of transporting its passengers.



33RD STREET THROAT

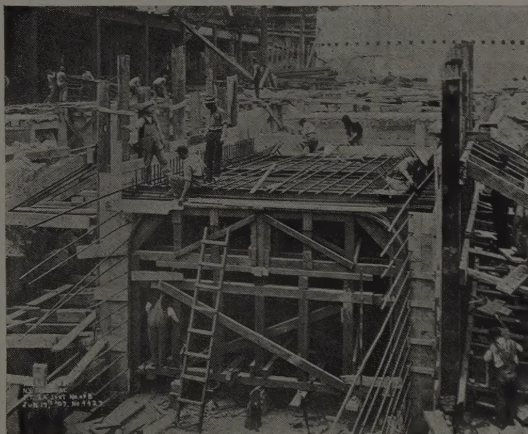
There are so many details to be considered in working out a track problem on such an enormous scale as the Pennsylvania Station that it is almost impossible to give any adequate idea of all of the features which had to be taken into consideration in planning this part of the work. There are no level tracks in this station. All tracks pitch east or west from a summit. Engineers will readily understand that this simple fact required a good deal requirements than if the tracks were level, as they appear to be to the eye. The matter of arranging tracks so that there should be freedom of movement of trains in both directions and the making of several movements at the same time required careful study. Attention had also to be given to the probable division of the trackage to suburban service, local express service and long distance service.

The question of moving passengers, from the streets surrounding the terminal, to the cars, and from the cars to the streets with the least possible confusion and with the greatest possible comfort, has been worked out by a series of stairways, elevators and escalators by levels of cross bridging over the tracks called main concourse and exit concourse, or mezzanine floors, so that passengers going to trains do not necessarily become confused with the passengers going from trains. An escalator, or movable stairway has been provided to transport passengers from the trains to the street from the level of the exit concourse on the

Thirty-third Street side of the station. Passengers are obliged to climb one flight of stairs before reaching this escalator. Passengers leaving the trains may also reach the street by other means such as stairways and inclines in various directions. Should the escalator established prove valuable in assisting the movement of passengers and feasible in its workings, arrangements have been made so that escalators may be established on all train platforms, reaching up to the main working floor of the station, whenever it is considered wise to install such facilities.

Next to the passenger in importance is his baggage, and this is to be taken from the trains to the baggage room by elevators, of sufficient size for baggage trucks, provided for that purpose. The baggage trucks will be operated on the train platforms with as little interference of passengers upon the same platforms as is possible. It has not proved practicable in this station to establish special baggage trucking platforms mainly on account of lack of land area which could readily be purchased to make room for such special platforms.

The building of the superstructure in combination with the arrangement of tracks, platforms, etc., for the railroad has been one of the most gigantic undertakings ever presented to architects and engineers. To make the steel skeleton fit the architectural plans involved a very unusual combination of column, girder and beam construction and great difficulties were encountered in solving the problems in steel



PIPE SUBWAY IN COURSE OF CONSTRUCTION

construction to accomplish the wonderful series of apparent arch construction in what is called the concourse roof. In fact some of the steel manufacturers were first of the opinion that what was desired in this roof was hardly practicable. It is the general popular opinion that the steel frame work for this concourse roof is arch work; that the waiting room ceiling and the ceiling of the vestibule approach from

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CONCOURSE ROOF, DURING CONSTRUCTION
LOOKING WEST

Seventh Avenue are all arches, but as a matter of fact there is not a single steel arch in the whole building. In their place concealed trusses or cantilevers take the place of arches. The immense structure covers an area of about 8 acres built upon and around a huge skeleton frame of steel supported by 650 steel columns resting upon concrete piers, capped with either granite or steel grillages, these piers finally resting upon solid rock foundations.

In considering the planning of the general service equipment of so large a building as the Pennsylvania Station, a separate building was erected to contain the service apparatus and the railroad's sub-station machinery. This building is located outside the area of the terminal proper on the south side of Thirty-first Street, half way between Seventh and Eighth Avenues. The equipment occupies the five stories of the basement, the rest of the space being occupied by offices and store rooms on the upper floor. Here are accommodated the boiler plant, heating plant, electrical apparatus, a central system of water distribution, a hydraulic elevator plant, fire protection plant, compressed air plant, refrigerating system, and the railroad's power sub-station.

The heating and ventilation of the station building was one of the most complicated of the many features of the problem as it required an unusually large area between the walls for the fans and pipes.

Another interesting feature was the wiring and signal systems, which latter, in the Pennsylvania Terminal, is particularly complicated, as there must be absolutely no danger of confusion in operating trains. A large interlocking switch and signalling system in the railroad yard requires a pipe system of considerable extent and this general subject leads to one of



TRACKS, WITH STATION IN THE DISTANCE

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the most complicated and interesting parts of the whole construction—that of providing for the enormous pipe and conduit system for all purposes in the station.

In order to provide for every feature of such service immense pipe subways were laid under the track levels so that they might be readily accessible. These subways run about 25 feet below the sea level and are large enough so that men may walk through them to attend to any possible repairs that might be needed.

This part of the problem as may be imagined was exceedingly complicated owing to topographical conditions and here, as in the planning of the substructure of the station, conditions were found which could not be met with methods then known to the engineering profession so that new methods had to be devised to meet the new conditions and these methods will go down in engineering history as a study for those members of the profession who may have similar problems to meet.

It must be remembered that during all the five years that it took to complete this part of the work, traffic had to go on unimpeded on the three avenues which crossed and two streets which bounded the area taken up by the station. That this was accomplished at the same time that the tremendous work of the building of viaducts, the tunnelling, etc., was being carried on is a remarkable tribute to the skill and care of the engineers.

Complete harmony existed between the architects and the engineers during the construction of the building and it is believed that the interdependence of one upon the other and the helpful co-operation of the two professions as exemplified in this tremendous operation will lead to a closer association of interests among architects and engineers and a better understanding each of the others' work which will undoubtedly greatly influence building operations in the future.



Agreements for Building Contracts

Resumé of a paper read by Mr. William B.
Bamford before the American Society
of Civil Engineers.

In connection with the subject of the "Standardizing of Bronze Specifications," which was discussed in our last month's issue by Mr. Clarence A. Fullerton, the very able paper recently read by Mr. William B. Bamford before the American Society of Civil Engineers on "Agreements for Building Contracts" seems of peculiar interest.

In a general way Mr. Bamford follows the same line of thought suggested by Mr. Fullerton's article, only that in this case it applies to building contracts instead of contracts for special material. A brief resumé of the paper follows:

"In gathering material for a prospective book on 'Building Specifications and Contracts,'" says the writer, "numerous recent specifications and contracts were specially obtained from many prominent architects and engineers for the purpose of study and examination. A careful examination of these, as actual working instruments, and a study of recently published works or addresses, have led to the belief that there was probably a need for investigating and discussing the subject of Agreements (so so-called Contracts) in general, and Building Agreements in particular."

Mr. Bamford then proceeds to state the fact that the American Institute of Architects, co-operating with the National Association of Builders, adopted, a number of years ago, the "Uniform Contract," which was last revised in

1905, and he gives the American Institute credit for the excellent work it has done in collecting material for a new building agreement which is to be published some time in the future.

He then states the general outline of his subject. He divides building contracts into four parts: First, matters preliminary to contracts; second, the agreement; third, the specifications; fourth, the drawings; and remarks again that his paper discusses only the second division, namely, the contract or agreement.

"A building contract," he says, "is entered into by the Owner in order to obtain the services of a contractor who is skilled in that particular kind of work and by the Contractor because he expects to make a certain profit in remuneration for his services and knowledge." . . . "The contract therefore should be drawn so that the Owner can demand and obtain his work and the Contractor his payments with the least delay and difficulty."

"The agreement," he says, "is only one of the divisions of a contract. It is the specifications and drawings, together, which must give the contractor a clear and complete knowledge of the work he must perform and the materials he must furnish and should contain all the information necessary to permit him to make an accurate estimate and to carry out the work properly. The specification requirements should define clearly the results, the accomplishment of which is the object of the con-

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tract. It is a general statement of the work to be performed, a description of the materials, the quality required, and the workmanship to be performed, with definite limits as to what tests must be made in order to determine compliance with the requirements of the contract, or what defects would be sufficient cause for rejection."

He suggests the following form of agreement for Lump-sum contracts:

This Agreement, made the day of, in the year One Thousand Nine Hundred and, by and between, of, hereinafter called the Contractor, and, of, hereinafter called the Owner.

Witnesseth, that the Contractor and Owner, for the considerations hereinafter named, agree as follows:

Article I.—The Contractor agrees to provide all materials and perform all works for the of a at shown on drawings numbered and as described in the Specifications marked prepared by, hereinafter called the Engineer; and to do all things required of him by the Drawings and Specifications and subject to the Conditions set forth in the Schedule hereto annexed (hereinafter referred to as "the said Conditions").

Article II.—The Contractor agrees to complete the works by and at the time or times hereinafter stated, to wit:

"The Contractor agrees that the time for completion of the works shall be considered as of the essence of the contract, and he agrees that for liquidated damages he will pay the Owner for the cost of all extra inspection and for all amounts paid for rents, or for more protracted services on the part of the Engineer, or Clerk of the Works, or both, and other expenses entailed by the Owner by delay in completing the contract, and the Owner shall be entitled to retain from the amount otherwise to become due to the Contractor an amount sufficient to reimburse properly the Owner for such expenses. Provided, however, that the sum collected as aforesaid for liquidated damages shall not exceed the sum of \$..... for each and every day's delay not caused by the Owner, or otherwise as provided in the said Conditions, Section XXIV (subject to Arbitration)."

Article III.—The Owner agrees to pay the Contractor for the execution of the contract dollars (\$.....) in current funds subject to additions and deduc-

tions as provided in the said Conditions, and upon the presentation of the certificates of the Engineer, as follows:

Before the day of each month, the Contractor may submit to the Engineer a written statement showing (a) the value of the work and materials actually wrought into the building to the first of the month, (b) the value of materials delivered at the building but not incorporated into the work, and shall deduct the aggregate of previous payments. On or before the day of the same month, the Engineer shall issue a certificate for% of the value of work as executed in the building, until the balance retained by the Owner amounts to the sum of \$....., after which time the payments shall be for the full value of the work subsequently executed. The Contractor shall be entitled, under the certificate to be issued by the Engineer, to receive payment of, being a part of the said sum retained in hand when the works are practically completed, and in like manner to payment of the balance within a further period of months, or as soon after the expiration of such period of months as the work shall have been finally completed, and all defects made good according to the true intent and meaning hereof, whichever shall last happen. The Engineer, however, shall have authority to retain out of any monies actually due the Contractor only such sums as are provided by the said Conditions, Section XXX.

Article IV.—It is mutually agreed that the term "the Engineer" in the said Conditions shall mean the said, or in the event of his death or ceasing to be the Engineer, for the purpose of the contract, such other person as shall be nominated for that purpose by the Owner, not being a person to whom the Contractor shall object for reasons considered to be sufficient by the Arbitrators or Arbitrator mentioned in the said Conditions. Provided, always, that no person subsequently appointed to be Engineer under this contract shall be entitled to disregard or overrule any decision, or approval or direction, given or expressed by the Engineer for the time being.

Article V.—It is mutually agreed that the said Conditions shall be read and construed as forming a part of this Agreement, and the parties hereto will respectively abide by and submit themselves to the conditions and stipulations, and perform the agreements on their parts, respectively, in such Conditions contained.

Article VI.—The Contractor and Owner, for themselves, their successors, executors, administrators, and assigns, hereby agree to the full performance of the covenants and agreements herein contained.

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In Witness Whereof, the Contractor and Owner have hereunto set their hands and seals, the day and year first above written.

In presence of

..... [SEAL]
..... [SEAL]

This form is followed by a valuable suggestion for a Schedule of Conditions of Contract, which, summed up, resolve themselves into a few general principles.

Among them are:

The Contractor's right to definite payments unless his work is not done properly.

A suggestion for retaining percentages until the completion of the work in order to insure its proper completion.

As to drawings and specifications—the work to be erected in accordance with the direction of the Engineer. Any extra work that the Contractor calls for to be stated to the Engineer in writing before proceeding with the work.

The Contractor to provide everything necessary.

The contract drawings and specifications to remain in the custody of the Engineer.

The Contractor to conform with the individual laws and ordinances of states and municipalities in which his work is done.

The Owner to have a survey made and guaranteed for the Contractor.

The Contractor not to sublet his contracts without the written consent of the Engineer.

Then follow several suggestions as to materials, the dismissal of workmen, access to work, work to be opened up, the removal of work, defective work, etc.

An interesting section deals with Variations and Extras, which it is suggested shall be permitted when the Contractor is authorized by the Engineer.

One of the most pertinent sections in the suggested contract is that on arbitration—a point which, as Mr. Bamford remarks, justifies the most careful study and attention. Around it centers the much discussed authority of the engineer or architect to settle all matters of every kind and description. It is quoted in part:

“Provided always that in case any dispute or difference shall arise between the Owner, or the Engineer on his behalf, and the Contractor, either during the progress of the works or after the termination, abandonment, or breach of the contract, as to the construction of the contract or as to any matter or thing arising thereunder” . . . “then either party shall forth-

with give to the other notice of such dispute or difference, and such dispute or difference shall be and is hereby referred to the arbitration and final decision of three disinterested arbitrators, one chosen by the Owner, one by the Contractor, and a third chosen by these two arbitrators. The decision of any two of these arbitrators shall be final and binding on both parties hereto.”

In case any member of such a commission is unable to act for any cause whatever, the president of the American Institute of Architects or the American Society of Civil Engineers is suggested as the proper person to appoint a substitute.

“The arbitrator, or arbitrators, shall have power to open up, review, and revise any certificate, opinion, decision, requisition, or notice, save in regard to the said matters expressly excepted above, and to determine all matters in dispute which shall be submitted to him or them, and of which notice shall have been given as aforesaid, in the same manner as if no such certificate, opinion, decision, requisition, or notice had been given.”

“Upon every or any such reference, the costs of and incidental to the reference and award, respectively, shall be in the discretion of the arbitrator or arbitrators, who may determine the amount thereof, or direct the same to be taxed as between attorney and client, or as between party and party, and shall direct by whom and to whom and in what manner the same shall be borne and paid.”

In conclusion, Mr. Bamford says: “The endeavor has been made to make the Agreement and Schedule of Conditions of Contract as broad and general as is consistent with good practice. There are additional conditions which may be desirable or necessary for particular buildings, but as these conditions are special and of only limited if not personal application, it is unwise to attempt to write them in a general set of conditions of contract.” He therefore advocates placing in the forefront of the specifications a chapter headed “General Conditions.”

The pamphlet containing this most interesting and valuable paper contains also discussions on the subject by Messrs. Norman R. McLure, William V. Polleys, Charles H. Higgins, W. G. Wilkins, William A. Boring, J. C. Wait, W. L. Bowman, Charles A. Ruggles, Oscar Lowinson, E. T. Thurston, Jr., John Mason Brown, J. A. L. Waddell, DeWitt V. Moore and Leslie H. Allen.

