

NATIONAL ASSOCIATION

OF

CEMENT USERS

PROCEEDINGS

OF THE

SIXTH ANNUAL CONVENTION

Held at Chicago, Illinois,
February 21, 22, 23, 24, 25, 1910

VOLUME VI

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SUMMARY OF THE PROCEEDINGS OF THE SIXTH ANNUAL CONVENTION.

MONDAY, FEBRUARY 21, 1910, 3.00 P. M.

Meeting of Section on Roadways, Sidewalks and Floors.
President Humphrey in the Chair.

This meeting was devoted to a topical discussion covering the preparation of materials, laying, joints, dusting, etc.

FIRST SESSION—MONDAY, FEBRUARY 21, 1910, 8.00 P. M.

The Convention was called to order by President Richard L. Humphrey.

An address of welcome to the City of Chicago was delivered by George M. Bagby, Assistant Corporation Counsel, on behalf of the Mayor of Chicago, the Honorable Fred A. Busse, as follows:

Mr. President and Honored Guests: I deem it a great privilege and honor to have the opportunity of representing his Honor, the Mayor, on this occasion, and in his name extending a most cordial welcome to business men representing not alone every section of our own great country, but I may say of the world; for I have been advised that there are delegates here who are non-residents of America.

The City of Chicago is annually the scene of conventions representing interests as diversified as those in which human activity is engaged or human effort is employed; but there is none to which this administration is more gratified to extend a welcome, than those representative of the business interests.

Chicago is essentially the product of the activity, alertness, energy and industry of its business men, and to them is justly attributable its wonderful growth and marvelous progress within comparatively recent years. The present administration of the city prides itself upon being a distinctively business administration. It has endeavored to employ the same accepted business methods in the administration of public affairs as those which have secured success in private affairs. The adoption of these methods in the conduct of public business involved a radical change from the methods that formerly obtained—and the many beneficiaries of the latter, together with their friends, have not always viewed the change with

equanimity, or placidity of temper. In some instances, reputable citizens, those whose voice and influence should be always on the side of public good, have not scrupled to criticise, and even denounce, that which they did not fully understand. We invite impartial investigation, feeling confident that when our good people are fully informed their verdict will be favorable to the administration which is being administered with the greatest economy consistent with efficiency, and from whose disbursements the public receives the greatest possible return.

In the past the people of this great city have devoted themselves so exclusively to the material development of themselves and the city, that very little heed has been given the city's beautification. It has been reliably stated that no investment of the municipality of Paris, France, has given such generous returns as the money expended in the city's adornment and embellishment. Its beautification annually attracts travelers from every quarter of the globe. It has made it the Mecca alike of those traveling for pleasure or business. This influx of visitors forms a ceaseless stream, every flowing toward and into the matchless city of the French. Business is thereby given an impetus and commercial activity is the order of every day. It is immune from those periods of business stagnation incident to almost every other city of the world; and this exemption is solely due to the fascination and attraction of its urban beauty.

Chicago has taken counsel of these things and has in contemplation the beautification of this great city. It contemplates the building of a connecting link of boulevards upon the street immediately east of Michigan Avenue, which will perfect a circle of parks and boulevards of the city. It has tentative propositions submitted looking to the subwaying of the downtown, or what is locally known as the "Loop" district, the primary object of which is to relieve the congestion upon the street surface and thus expedite and facilitate the transaction of business. The proper adornment of Grant Park on our immediate east is also engaging our most earnest thought, while a recent special session of the Legislature passed an act providing for an island in Lake Michigan just east of Grant Park as a proper location for the great museum, the munificent gift to Chicago by its great merchant prince, Marshall Field. These are but a very few of the important things Chicago has in view. Into their construction and completion, the commodity in the interest of which you are convened, must of necessity enter very largely; therefore, your meeting here, at this time, is indeed opportune.

And now, on behalf of the City of Chicago, and in the name of its Mayor, I again extend you a most cordial welcome, hoping that your visit here will prove, individually and collectively, beneficial and profitable to you all, and that when you return to your respective homes it will be with pleasant recollections of your sojourn in our midst and with a firm conviction that Chicago has a hospitable citizenship and is the premier convention city of the world.

In response to this welcome, President Humphrey expressed the appreciation of the Association in being able to again convene in the City of Chicago, and commented upon the remarkable advance in the use of concrete in that city.

President Humphrey then introduced Christian C. Kohlsaet, Judge of the United States Circuit Court of the Seventh District and President of the Lewis Institute, who extended a welcome on behalf of the educational institutions of Chicago;

Mr. President and Gentlemen: In assuming to represent the cause of education in connection with the sentiment assigned me, I own up to a consciousness of presumption on my part, since my vocation as a practical educator rests in disposition, rather than in experience.

Something more than twenty years ago, Allen C. Lewis, then a citizen of Chicago, departed this life. By his will, the sum of \$550,000 was set apart for the establishment of a polytechnic school. That amount seemed adequate for the purpose of those days; now we could hardly build one wing of such an institution for that sum. The fund was nursed until about twelve years ago, when it had been increased by wise management to the sum of about \$1,400,000. Land was then procured and a building erected. That was Lewis Institute. From time to time additional buildings and improvements have been added, until now we have a plant valued at one-half a million dollars; a teaching force of almost a hundred, and an attendance exceeding 2,600 young men and women.

My connection with the financial management of this great school is the only justification I can adduce for my temerity in speaking for education.

Last Saturday evening, in company with my wife, I visited your exposition at the Coliseum. We tramped up and down the aisles, seeking for some extraordinary display of your art. We found a few blocks, some columns, monuments, and other modest constructions—among them the cement sarcophagus, but took on disappointment at the meager display—judged from a lawyer's standpoint. Instead of things of beauty for the eye, we were beset by the bewildering din of the machinery. Then it occurred to me that you had gone beyond the point of showing what you could do. You have reached the point of showing how to do it. You were seeking for and disclosing the means rather than the result. It then became clear to me that you had so far conquered obstacles as to confidently claim that you had an article which could and in time would displace the present and past construction materials. To that proposition I am fully converted. Life's greatest lesson is to learn how to do things. To translate knowledge into works, is the crying demand of present-day education. In this respect, most of our schools have been remiss. Hands should be given to thought. The minds of school children might better be led toward the earth than

toward the clouds. Educationally, doing is the apotheosis of thinking. Men of action like yourselves should, in some way, bring your experience to the aid of those who are teaching.

There are in Lewis Institute something over 1,200 boys and girls who are learning to do things. We deem it the most important part of our work. Recently, we have inaugurated a scheme whereby the boys from the various factories can secure educational privileges. The employers have heartily co-operated with the school. The boys are allowed to spend each alternate week in the school, while their wages are kept up as though they were at the shop. In addition, the employers have paid the required tuition. If school duties are neglected, these wages of the boys are docked. The result has been very satisfactory. One of our prominent and public-spirited citizens has become greatly interested in the plan, Mr. La Verne Noyes, and has offered to pay the tuition of boys who wish to attend school and cannot afford to pay, up to the number of 200. This would require a very large sum of money. Thus, the boys are earning money for the home people, while at the same time they are training their faculties and their hands. What a world of opportunity such a provision affords! It is proposed that the girls, too, shall have their chance to make a practical application of what they are taught. What a helpless lot of housekeepers are sent into the world every year, to care for the wage-earners and their children! It seems appalling that so many women enter upon the wifely duties without any reasonable preparation for the arduous life. No knowledge of hygienic cooking; no skill in managing or sewing or making the best of life. How much of the misery—yes, the mortality of humanity is chargeable to ignorance in the matter of preparing food. The waste cannot be estimated. Surely, the major part of the food people eat is made injurious by the cooking. So we wish the girls to put their knowledge of science to practical cooking, clever sewing, and sane housekeeping. The moral of it all to you men is that you should become or cause to be produced centers of thinking and doing in your several localities. You cannot ignore this duty and be guiltless.

To my mind cement is coming; it is the one thing in building material that is growing beyond every other. It holds out great inducement to capital and skill—business and technical. I doubt if there be any other line of business which will attract and require skilled young men to as great an extent as will yours in the near future. Will you not give this matter your thoughtful attention? Lend your hearty support to every effort looking to the establishment of means for the head and hand education of the young. You will reap a rich harvest. The work is great and demands your best attention.

Like my friend here, I do not feel like letting the occasion go without calling your attention to Chicago. You probably have heard the subject mentioned before. Its betterment and beautification are upon the hearts of many of our citizens. One can hardly fail to note among its defects the character of its buildings. Were one to go up in a balloon and take a

bird's-eye view down upon our streets, he would be reminded of the tooth lines of a five-year-old boy—some vacant places, some stumps, some fangs stabbing the air, and all broken and uneven. Here and there a twenty to twenty-five-story building with a whole village of tenants—a very Tower of Babel, whereby the builders have far outstripped the Babel of old, and have succeeded in laying hold of their god—money. Others have been content to build modestly. What will be the solvent which shall, as with a magic wand reduce this ragged line to symmetry and beauty? I think it will in a large measure be cement. Chicago must one day be beautiful as it will be great. You will, I am sure, do your share.

It is not long ago—one hundred and twenty years ago—there was a great battle fought down near Fort Wayne. Old Mad Anthony Wayne was the man who led the troops in that battle. He was the third one that General Washington had sent out to take care of the Indians. The others with their armies had been annihilated, practically. But Mad Anthony Wayne was not that kind. The old Indian chief said to his braves, "Be careful. Don't attack. This man fights. He never sleeps." But they tried it and he wiped them off the battlefield with such vigor that they were glad to make a compromise—glad to make treaties—glad to surrender. The result of that was, among other things, that a tract of land upon which this building stands, six miles square, at the mouth of the river, was ceded to the United States.

Now it is only one hundred and twenty years ago that we bought this by a bloody victory over the Indians. I have been here long enough to see the old frame buildings and the up-and-down sidewalks give way to level sidewalks and modern buildings, and these give way to the Great Fire, and the Great Fire give way to these palaces. This city has grown—grown wonderfully. And, gentlemen of the cement trade, this city will be your Mecca, because it will demand your services and your products. To my mind there is nothing that will fairly compete with you in building up cities. We hope to see your work carried to its best results right here in Chicago. We will give you a hearty welcome, and if you will help make Chicago look better and be better, we will welcome you every year that you choose to hold a convention here.

The President:

I think Judge Kohlsaat has touched upon one of the vital points of the cement industry when he refers to the necessity of training people to do things properly. In an industry as young as this there could be no more effective help given than to so train the men who actually do the work, that they can do it properly. I had hoped the Judge would say that in the school he has so well described there would be formed a department for the cement user, where one would go and learn how to do work properly.

I feel quite sure that we will sometime come back and see the beau-

tiful city of Chicago, which perhaps some of us may assist to create. I think this gives us a helpful thought for which we are thankful, and I wish to thank Judge Kohlsaas on behalf of the Association for his very interesting address.

There are a great many men in the city of Chicago who have been identified with important works and I want to introduce to you one of these, Mr. John M. Ewen, who is to speak to us on behalf of the engineering and contracting interests.

Mr. John M. Ewen:

Mr. President and Members of the National Association of Cement Users: When I was asked a few weeks ago to address you, I endeavored to ascertain upon what particular phase of concrete construction I was expected to talk, and having failed to receive any suggestion that might help me, I decided on my own initiative to touch upon two phases of the subject, the first one along the line of improvement and invention and the second one along the line of caution.

The first phase upon which I wish to dwell is one that I hope may lead to improvements in methods of construction and perhaps to invention. I speak from practical experience, as I have constructed a number of large concrete buildings. Ten years ago I was employed by one of the largest construction companies of America to make a report to them upon this new method of constructing buildings of concrete that we were all at that time hearing so much about. I found that at that time, as you all are aware, there was very little actual work executed in heavy reinforced concrete construction, so that I was forced to devote myself very largely to theory. I spent several months studying the subject and confess I became somewhat prejudiced against it, though I endeavored to keep an open mind and be fair to all of the interests concerned. I had never, up to that time, had to do with any reinforced concrete structures, so that in order to see what had been done I visited a number of cities of the country not farther west than St. Louis and gathered from all of these sources as much information as I could get. In Chicago, for instance, I found but a few of the important architects and engineers who would talk upon the subject at all and, while they generally approved of concrete construction, each feared to be the first to venture in the actual use of it for large buildings. While I found that the same feeling prevailed in other cities, I also found that the general sentiment was more favorable, for the reason, I believe, that the work was not so heavy, the buildings not so large.

I finally completed my report, embodying in my recommendation that concrete construction had come to stay. I believed in it thoroughly and urged in the strongest manner that the company, to keep abreast of the times, should adopt this method of construction in their building work. This, I am glad to say, was followed out, and to-day this company is doing its share of this class of work.

I have derived during the last few days a great deal of pleasure and benefit in the visits that I have paid to the exposition that is now on here in Chicago, and could not help but be struck by the great strides that have taken place during the past ten years. The character of the exhibits, the character of the machinery and the design of the excellent mixers are all of a higher grade than even of a few years ago. This advance in the art is bound to continue year after year. We are but on the threshold, and I predict that in another ten years we will look back upon the appliances of to-day and wonder that we could ever have used them, much as we look back upon the locomotive of earlier construction and wonder.

I do not believe that the lines upon which we are working in reinforced concrete construction for buildings are along the right direction. We are following the methods peculiar to steel construction too closely. Our monolithic floors are so designed that the strains follow the lines of the reinforced bars exactly as they do in the case of steel construction. A monolith of concrete should act as a monolith of stone. If construction made of concrete could be so reinforced with steel or other material that the strains in the monolith could be made to go in every direction to the bearings, I believe we would have an ideal method of construction for both economy and strength. To illustrate: If we should use a 6-in. steel slab, 20 ft. square, and place it upon four walls, the strains from the load superimposed would travel in every direction to these four walls. The strains would not act as they do in present reinforced work along the direction of the rods to the girders and then through the girders to the columns, but would travel directly in all directions to the bearings. Of course we cannot afford 6-in. steel slabs, and we know if we build concrete slabs of that thickness without reinforcement that they will not hold up. Therefore we place in these concrete slabs reinforcement in the shape of bars, a few inches apart, and carry the loads in the same direction that we do by the use of beams in the ordinary tile construction when if the reinforcing bars were so small, or of the same homogeneous texture as the concrete itself, we would carry the loads to the bearings in every direction. The nearest example that I can think of to illustrate is the introduction of a carpet of finely-meshed metal into the soffits of the slabs either by mechanical means or by electro deposits. At the present time this seems impossible and it may never be worked out, but improvement along the lines of my suggestion I firmly believe will be adopted in the near future. It is difficult to express my suggestions without drawings and illustrations, but I believe that those of you who are actually engaged in this work will understand what I am trying to convey and that work will be done along the lines I have suggested. This will simplify, if not entirely eliminate the very clumsy, expensive system that we now have for centering and for forms.

I do not believe it is necessary for me to emphasize the necessity for care that must be taken to prevent accidents, for I think the art has been so far developed that the chances taken are greatly reduced. But

do not forget that one accident is not only very damaging to the contractor interested, but is very damaging to the entire business.

Touching upon the second phase of my talk to you this afternoon, that of caution, it has been my duty a number of times to examine and make reports upon the business of companies engaged in concrete construction, and especially the business of those engaged in making concrete to imitate stone. The experience that I have obtained in doing this work I hope will be of benefit to those of you who are engaged in the development of the concrete business.

The companies in question became involved in financial difficulties, I believe, for the direct reason that they endeavored to execute architectural exterior work to compete with terra cotta, granite and stone, thereby deliberately setting for themselves a task most difficult to achieve. They made contracts to manufacture and set in place the concrete material in the same manner that a stone contractor would set his materials, and promised that their concrete would be equal to the material with which they were competing. They placed themselves in the position of inviting hypercritical criticism which is, as many of you know, almost fatal in construction work.

The art is new. There has been very little of the work done that is older than ten or fifteen years. The architects are forced into the position where they must be very careful in order to protect the interests of their clients, more careful than they would be if the material that was being used were stone or granite. The result in many cases has been that a great deal of the work that was projected had to be done all over again at great cost, or perhaps the whole contract was canceled, thereby causing great loss to the manufacturer.

My recommendation is that all companies doing work of this nature should first manufacture wholly standard stock material such as steps, curbs, copings, lintels, etc.; material that can be distributed among the building material dealers and which can be sold from stock; material that contractors can examine and buy; material that is not designed to follow architectural details; material that does not appeal to the artistic sense. Thus all unfair criticisms will be avoided and it will be possible to do a good business and to hold good customers with an increasing demand.

If such companies desire to become more ambitious and to imitate stone work as designed by architects, they can do so out of the earnings of the other business and not take the chances of having condemned work wreck them.

I do not believe that there has ever been an industry that has been so "knocked" as the concrete industry. It therefore behooves all those engaged in it to be sure that whatever they sell shall satisfy the purchaser, for if it does not do so that particular manufacturer is seriously injured and the whole concrete industry receives a blow. You are all familiar with the many publications distributed throughout the country, containing photographs of concrete buildings that have collapsed. Some of these

accidents have been very serious and great pains have been taken to publish broadcast the details, all for the purpose of hurting the business. I believe that we have happily passed beyond the period where important concrete work is entrusted to inferior builders who know very little about the subject, and that the work now and in the future will be handled by those experienced in the business. The companies engaged in concrete work are making good every time. For every dollar received they give a dollar's worth, and their customers are satisfied and want more. If this program can be carried out every time, we will soon see the last of the "Knockers."

I want to congratulate the Association upon the splendid exhibition here in Chicago, one of the most interesting I have ever attended. I also want to congratulate the city of Chicago that it has an opportunity to see what you are doing. This exhibition will do more towards educating the public that concrete has come to stay and is a fixture in our construction work in this country than anything else could do. The future for concrete is a brilliant one, and it behooves us all to guard it and watch it carefully, and so far as we can to permit no one to do any but good work.

I thank you.

The President:

Mr. Ewen has touched some vital points, points which this Association stands for. During the five years of existence of this Association I think it can be truthfully said that one of its fundamental objects has been to promote the proper use of cement by trying to instill into the minds of those who are using it a thorough and intelligent knowledge of how it should be used. I think the statement coming from a man of Mr. Ewen's standing that "we have passed the period where stories circulated for the purpose of discrediting concrete cease to do harm," touches a notable period in the concrete industry. There is no doubt that concrete is here to stay.

I am quite sure that we were all interested in Mr. Ewen's remarks and am certain that I voice the sentiments of the Association when I convey to him our appreciation and thanks.

The Association has been highly honored by the gentlemen who have come here this evening to formally welcome us to the city of Chicago, and I feel that the Convention will join me in extending to them a vote of thanks for their kindness, Mr. Bagby, the representative of the city of Chicago, Judge Kohlsaat and Mr. Ewen.

The following papers were then read and discussed:

"The Development of Concrete Road Construction,"

Fred R. Charles.

"The Use and Cost of Concrete Blocks in Roadway Construction," George C. Wright.

The report of the Committee on Roadways, Sidewalks and Floors was then presented by the Chairman, C. W. Boynton, embodying the following:

- (a) Proposed Standard Specifications for Concrete Roadways.
- (b) Proposed Standard Specifications for Portland Cement Curb and Gutter.
- (c) Proposed Revision of the Standard Specifications for Portland Cement Sidewalks.

The Proposed Revision of the Standard Specifications for Portland Cement Sidewalks was discussed, amended and ordered to letter ballot.

The Proposed Standard Specifications for Portland Cement Curb and Gutter, and the Proposed Standard Specifications for Concrete Roadways, were referred for consideration to a regular session to be held at 2 o'clock on Wednesday afternoon, February 23.

The meeting then adjourned until Tuesday at 10.30 A. M.

TUESDAY, FEBRUARY 22, 1910, 9.00 A. M.

Meeting of the Section on Concrete and Reinforced Concrete.
President Humphrey in the chair.

This meeting was devoted to a topical discussion on the selection of materials, methods of construction, etc.

SECOND SESSION.—TUESDAY, FEBRUARY 22, 1910, 10.30 A. M.

President Humphrey in the chair.

The President announced, in view of the pending amendments to the By-Laws by which the President and the First, Second, Third and Fourth Vice-Presidents of the Associations are the only officers elected by the Convention, the Executive Board had anticipated favorable action by the Association and therefore decided to instruct the Committee on Nomination of Officers that they report only candidates for the President and

First, Second, Third and Fourth Vice-Presidents. In the event of the amendments to the By-Laws failing to pass, the Convention can then nominate Chairmen for the various sections.

The reason for this action on the part of the Executive Board is that under the present method the best qualified men have not always been selected for the various chairmanships, and furthermore, in many cases a plan of procedure inaugurated by a committee has been rendered void through the election of some other Chairman by the Association.

Many of the problems which are under consideration by the several sections do not admit of a final report in a single year. It is therefore necessary that the work should extend over several years. With a view to correcting this serious defect in the organization of the Association, it has been deemed desirable for the Executive Board to select the Chairmen for the various sections, since it has a more intimate knowledge of the work of each section, and is in a better position to select the man best suited for the chairmanship.

Through this means a Chairman who has shown proficiency in performing the work of his section can be continued in office several years, or until the work is so advanced that a change of chairman would not seriously affect the work. With these facts in view, the Committee on Nomination of Officers is so instructed, and the Executive Board announces the following Committee:

- P. Austin Tomes, *Chairman*, New York, N. Y.
- H. S. Doyle, Chicago, Ill.
- P. S. Hudson, Louisville, Ky.
- A. J. Maynard, State Farm, Mass.
- H. H. Rice, Denver, Col.

This Committee will report at the business session of the Convention on Wednesday morning.

The Committee on Resolutions, to report at the last session, Friday evening, will be composed of:

- Ernest McCullough, *Chairman*, Chicago, Ill.
- Alexander C. Birnie, Ludlow, Mass.
- Edward M. Hagar, Chicago, Ill.
- O. U. Miracle, Minneapolis, Minn.
- Emile G. Perrot, Philadelphia, Pa.
- Ira A. Williams, Ames, Ia.

Mr. Olaf Hoff then read a paper on "Laying Concrete Under Water—Detroit River Tunnel," which was followed by a discussion.

A paper by Thomas H. Wiggin on "The Comparative Value and Cost of the Groined Arch in Large Reservoirs," was, in the absence of the author, read by title.

The following papers were then read and discussed:

"Waterproofing Concrete," Cloyd M. Chapman.

"Preparation of Concrete—From Selection of Materials to Final Deposition," Harry F. Porter.

On motion, a recess was taken until 2.00 p. m.

Alfred E. Lindau, Chairman, then presented the Report of the Committee on Concrete and Reinforced Concrete, which was fully discussed.

The meeting then adjourned until 8.00 p. m.

THIRD SESSION—TUESDAY, FEBRUARY 22, 8.00 P. M.

President Humphrey in the chair.

President Humphrey stated that inasmuch as this is the natal day of the first President of our Country, it seemed appropriate for this National Association to make such a departure from the usual evening program as would be commemorative of the occasion.

President Humphrey made the following address:

In this introductory address I wish to dwell for a few moments on the life of Washington, and point out his close connection with the industry in which we are so deeply interested.

Among the first books relating to limes and cements it was my pleasure to read, was that which I hold, once the property of George Washington and now in the possession of Dr. George S. Webster, of Philadelphia, Pa. This book was published in 1780 by Dr. Bryan Higgins, on the title page, which bears Washington's signature, appears the following inscription: *Experiments and Observations made With the View of Improving the Art of Composing and Applying Calcareous Cements and of Preparing Quick-Lime: Theory of these Arts; and Specifications of the Author's cheap and durable Cement, for Building, Incrustation or Stuccoing, and Artificial Stone.*

It was this recollection of Washington's probable interest in cement that lead to some studies of his life which seem to indicate that he was one of the early users of cement in this country. It should be borne in mind, however, that the material which is to-day known as lime, was in those days called cement. That this material was of poor quality is indicated by the following extract from Dr. Higgin's book:

As the strength and duration of our most useful and expensive buildings depend chiefly on the goodness of the cement with which they are constructed, I looked to the improvement of mortar as a subject of great importance, in this country particularly, where the weather is so variable and trying, and the mortar commonly used is so bad, that the timbers of houses last longer than the walls, unless the mouldering cement be frequently replaced by pointing. But seeing that many years are requisite for the greatest degree of induration which cementitious mixtures like mortar can acquire, or for our discovering the imperfections of them; and that the life of man is too short to allow any considerable improvements of them to be derived from such experiments as had hitherto been made, I resolved in the beginning of the year 1775 to investigate more closely than I had hitherto done, the principles on which the induration and strength of calcareous cements depend; not doubting that this would lead me by an untried path to recover or to excel the Roman cement, which in aqueducts and the most exposed structures has withstood every trial of fifteen hundred or two thousand years.

It is probable that this material was made use of in the construction of the Potomac Canal with which Washington was early identified. You will recall that the use of cement in this country began in 1818, twenty-three years after Parker had obtained a patent for a material that he called Roman Cement. Canvas White at that time manufactured the natural cement which was used in the construction of the Erie Canal in which Washington was also interested, having made a reconnaissance for and an examination of the proposed route and predicted its commercial success.

Washington was identified with the promotion of our earliest canals, which mark the beginning of the cement industry in this country, and it is probable that the construction of the locks of the Potomac Canal, in which he was particularly interested, led him to acquire the book on limes and cements by Dr. Higgins.

George Washington began his career as a surveyor by taking a special course in surveying, although the facts relating to this period of his life are limited. Following this course in surveying he served an apprenticeship under Mr. James Genn, a licensed surveyor, and on July 20, 1749, was commissioned by the President of the William and Mary College to be the surveyor of Westmoreland County, Virginia. His proficiency as a surveyor at this age is remarkable, although he is said to have shown, at an early age, a marked aptitude for mathematics. He was connected with land surveys for several years, among his clients being Lord Fairfax.

In the latter part of the year 1753 Major Washington, then only twenty-one years of age, was delegated by the Governor and Council of Virginia on an important mission across the Alleghenies. He had been actively engaged three years prior to this surveying in the wilds of Western

Virginia and in the mountainous district at the headwaters of the Potomac River. He had acquired so high a reputation for energy, firmness and decision, besides possessing a thorough knowledge of the particular feelings and prejudices of the Indians and a practical acquaintance with the mode of living and traveling, which had accustomed him to the hardships and privations of camp life, as to attract the attention of Governor Dinwiddie as the most suitable person to undertake this mission; in the subsequent years of 1770, 1772 and 1774 he made several trips, examining the best route across the Alleghenies.

It was undoubtedly this early training as a surveyor that gave him his knowledge and ability as an engineer, and while to Major L'Enfant is given the credit for the preparation of the plans of what is now the City of Washington, it was, nevertheless, Washington who directed the work and selected the final site for the Capitol.

These facts, as interesting as they are to us, form but an incident in the life of Washington and the conspicuous part he played in the affairs of this country during one of the most eventful periods in the history of the world. His many qualities in all that relates to his public and private life form "altogether such a union of goodness and greatness in the character of one individual as to excite the warmest interest and command the admiration of mankind."*

He was great and good in all the positions he held—from a study of his first work as a member of a surveying party in the wilds of the Allegheny mountains, later as a special messenger from the Governor of Virginia to the Commandant at the Ohio, at the memorable defense of the stockade, at Great Meadows, then at the head of his regiment upon the plains of the Monongahela and later as the Commander-in-Chief of his countrymen, it would seem that his early career must have given him the experience and knowledge which made him a military engineer of no mean ability.

Upon resigning his commission as Chief of the Army of the Revolution, he retired to Mount Vernon, where, as he so feelingly expressed it, "he hoped to spend the remainder of his days in cultivating the affection of good men and in the practice of domestic virtues."

He had, however, enjoyed the quietude of his retirement for a few months when he left Mount Vernon on his first tour of the West at the close of the Revolutionary War, and on the first day of September, 1784, after having completed the examination of several routes across the mountains and the headwaters of streams which he proposed to connect, he returned to Mount Vernon in the fall of 1784.

He was deputized on behalf of the State of Virginia to serve on the Commission to meet with the General Assembly at Annapolis, of which commission he was chosen Chairman, and its report forms the basis of the

* See "A New Chapter in the early life of Washington in connection with the narrative history of the Potomac Company," by John Pickell. 1856.

legislative action upon which the Potomac Company was inaugurated and organized. This company elected George Washington its first President in 1785, from which he retired in 1788.

Washington was the active advocate of many of our great highways—he not only prepared the first plans and recommended the construction of the national pike and the Chesapeake and Ohio Canal, but he also was the first to recommend the route through the Mohawk Valley, which was afterwards followed by the Erie Canal and the New York Central Railway. The route of the National Pike between the Great Falls of the Potomac to Pittsburgh was planned and constructed under his direction.

Washington may therefore be justly regarded as the Father of the Cumberland National Route, Chesapeake and Ohio Canal and the Baltimore and Ohio Railroad, for it was to the doors in the Alleghenies that Washington was looking with anxious eyes at the close of the Revolution, and his connection with the Potomac Company was reluctantly severed when, upon the commands of the people, he assumed the office of the first President of the United States.

After a lapse of many years, the project of connecting the east and west through the Valley of the Potomac, and that of the most convenient tributary to the Ohio west of the mountains, was revived in 1823 in the form of a project for continuous canal navigation. In the consummation of this project the rights and privileges of the Potomac Company were surrendered to the Chesapeake and Ohio Canal Company and the original papers deposited in the office of that company. A study of these interesting records show that Washington had active connection with the construction of this canal.

This book by Dr. Higgins on the properties of limes and cements may be considered as evidence that Washington acquired it for the purpose of familiarizing himself with the material that was probably used in the construction of the locks of that canal in which he was interested.

The discussions of the properties of limes and cements by Dr. Higgins is exceedingly interesting as indicating the problems which confronted the manufacturers of the time of Washington. In the course of this discussion the writer states that,—

All these experiments and observations conspire to point out the circumstances in which mortar becomes indurated the soonest and in the highest degree, and operates most effectually as a cement. To this end it must be suffered to dry gently and set; the exsiccation must be effected by temperate air and not accelerated by the heat of the sun or fire: It must not be wetted soon after it sets; and afterwards it ought to be protected from wet as much as possible, until the mortar is finally placed and quiescent: and then it must be freely exposed to the open air as the work will admit, in order to supply acidulous gas, and enable it sooner to sustain the trials to which mortar is exposed in cementitious buildings and incrustations.

From these considerations we learn other causes, besides those already mentioned, of the speedy ruin of our modern buildings.

The mortar made with bad lime and a great excess of it, and debased in watering and long exposure, is used with dry bricks and not unfrequently with warm ones. These

immediately imbibe or dissipate the water and not only induce the defect above noticed, but, as the cement approaches nearer to be dry, whilst it is still liable to be disturbed by the percussions of the workmen, render it more nearly equivalent to a mixture of sand and powdered chalk.

But to make strong work the bricks ought to be soaked in lime water, and freed from the dust, which in common bricklaying, intercedes the brick and mortar in many parts. By this method the bricks would be rendered closer and harder; the cement, by setting slowly, would admit the motion which the bricks receive when the workman dresses them, without being impaired; and it would adhere and indurate more perfectly. The same advantages would attend the soaking of bibulous stones in lime water, and the use of grout; provided this were made with good lime sand and lime water.

Many of these problems being still under consideration at the present time, although in the century and a quarter that has elapsed since this book was written a most remarkable change has taken place both as regards the quality and in the development of the use of cement. From the above quoted remarks of Dr. Higgins it is quite evident that the cement of today far excels the cement of his time, and it is further evident from the following quotation that the cement described by Dr. Higgins excelled the cement of antiquity whose properties he sought through experiments to equal or excel:

With regard to the objections grounded on our short experience of this cement, I think they can have very little influence amongst informed men who know, from the writings of the antients, by the inspection of old cements, and by the analysis of them, that mortar made of lime and sand can endure every trial of the weather in the most exposed situations for a thousand years or more.

I am aware of the opinion, which is prevalent at this time, that the antients used something which is unknown to us in their mortar, and that this long lost ingredient is the cause of the duration and hardness of those cements, which we so much admire in some of their structures. A notion founded on conjecture does not demand a serious discussion. I will therefore treat it as a subject of conversation rather than of argument.

The same ignorance of the nature of lime is betrayed by Alberti and later writers. And since we do not find any scientific rules prescribed by literary artists, for the composition of calcareous cements with such chosen and sorted materials as I have described, or in such proportions of them; and since it is highly improbable that the remembrance of a useful ingredient, or any knowledge once acquired in an art practised in so many countries and by so many different persons in every age, should have been lost; we have the most satisfactory reasons for concluding that the antients had no skill beyond that of our modern builders, in the preparations of lime or mortar.

The ruins of Herculaneum and other reliques of their work, furnish us with abundance of bad mortar and defective incrustations, which are instances of their ignorance of those principles by which the best cement might be equally cheap. The total ruin and obliteration of many of their buildings, argue to the same end; for well cemented works suffer very little by dilapidation, by reason of the difficulty and expense of pulling them to pieces and applying the materials to other structures. If to these considerations I can add an exposition of the fortuitous circumstances which rendered some of their cements uncommonly hard and durable, I hope I shall not be suspected of ungenerous invidious motives, in saying that the aqueducts and other structures, which have been preserved to us through so many ages, by the strength of their cement, are monuments rather than of the good luck, than of any extraordinary skill, of those who built them.

In the concurrence of these circumstances, we find excellent cements of great antiquity which I need not point out to literary men; but since they are found no where else, that I have discovered; and since it is not probable that the antients had any art of this kind unknown to the moderns I think I am authorized to conclude that their best cementitious works, instead of being held forth as instances of their unequalled skill, ought rather to be considered as substantial proofs of the duration of mortar or stucco duly

composed of sand and lime, beyond all others, and of the utility of these endeavours which I have made for preparing calcareous cements according to scientific principles, which enable us to make them in the highest perfection in all places, and to accommodate them to every purpose of use or ornament.

It is also evident that Dr. Higgins had to contend with the same opposition that many users of cement experience to-day, and,

in order to guard against abuses, and to make some compensation for the expenses and risques of the artists who publicly and boldly executed, on a great scale, what I had designed; I secured an exclusive right in my cement, by virtue of his majesty's letters patent, on the eighth of January, 1779. I authorized Mr. James Wyatt the architect of Queen-Ann street, Cavendish-Square, to use it in the fullest extent knowing that he, by his knowledge of this subject and his distinguished taste in architecture, will unite in it all the advantages of duration and elegance; I likewise extended this right to Samuel Wyatt, the builder in Berwick-street, Soho, who is well instructed, and provided with the means of executing any work with this cement, in the highest perfection; and I intend to reserve this privilege to them, until the public convenience requires that it should be extended to others, who are capable of making the same dispositions for the benefit of their employers, and for preserving the reputation of my invention free from the usual exactions of monopolists and the abuses of under-jobbers.

Dr. Higgins had also to contend with the inexperienced workman with which we are familiar to-day, and records the facts in the following:

The inexperience of the workmen, their obstinate adherence to their own notions, and the opinion which they entertained that some of the rules prescribed to them were insisted on rather through an affectation of mystery than for any useful purpose, operated strongly against the best endeavors of Messieurs Wyatt, in the incrustations first made on the great scale for use or ornament. In consequence of these disadvantages which will be obviated in future, their stucco, although it excels others beyond comparison and is far from being perishable, is not quite so hard as it might have been made. This I mention lest these incrustations should be mistaken for the best, which I have represented as exceeding Portland stone in hardness. These last demand a strict observance of the foregoing precepts respecting the season and the exposure as well as the materials and mechanical application of them.

It is evident that the cement of Dr. Higgins' time, in that it was more uniform and was scientifically prepared, excelled the cements which have been handed down from antiquity. It is also evident that the material which he called cement, and which we call lime, is far excelled by our Portland Cement.

It is also a matter of interest to note that the need for a fire-resistive type of building was apparently a matter of as much importance in those days as it is at the present time, and in evidence thereof I beg leave to again quote Dr. Higgins:

The public are indebted to Mr. Hartley for the experimental proofs he has given of the efficiency of his method of securing houses from fire; and to Lord Mahon for those judicious and expensive experiments by which he has shown that a calcareous incrustation answers the purposes of Mr. Hartley's art. I am afraid that their good intentions will be frustrated by the indifference of men to distant or improbable evils, and their dislike to any immediate expense which affords no extemporary convenience or ornament. But although such motives of economy should dissuade us from adopting their measures in the fullest extent, we ought certainly to avail ourselves of the useful knowledge which they have imparted, so far as to prefer a safe and durable stucco, wherever it is applicable by the assistance of hair before wainscot or wooden ornaments. For although no metallic or calcareous

covering can secure the wood of a house from being charred by a great fire, the danger of others is lessened as the combustible materials are secured from the action of the air and consequently from contributing to the deflagration.

Again, it is interesting to note that Dr. Higgins touches on cement roadways, which is one of the subjects now being actively considered by the Association, in the following manner:

I have thought that the small stones, which constitute the gravel chosen for our roads, could not be reduced to dust so soon as they now are, by the heavy carriages, if they were firmly bedded in a small quantity of coarse and good calcareous cement, so that the bodies which roll over them should rather compress them, than grind them against each other as they do at present. And as the frequent failures of pavement are manifestly owing to the infirmness of the ground and the looseness of the stones, I have imagined that a solid bed of cementitious work, in the manner of the Romans, and the setting of the paving stones in good mortar, would ultimately lessen rather than enhance the expence. I offer these conjectures in the hope that nobody will presume to decide on the subject, who does not know the difference between the common mortar, and the best that can be made of lime and sand; and that some public-spirited man will make the experiment, where lime is cheap and the expence of pavement or of gravel is considerable. If the expence should be found too great for any public works of this kind, the same may nevertheless be tried in private areas and walks, in which the neatness, duration and prevention of vegetation, may compensate for the extraordinary price.

These interesting topics, which were considered nearly a century and a half ago, are now under consideration and tend to prove that there is, after all, "nothing new under the sun."

While the principle of the function of cement may not be new, the development since the time of Washington in its quality and the uses to which it is put has been miraculous.

Certain it is that the present vastly surpasses any previous period in the history of the use of cement.

Washington's connection with the location and construction of the earliest canals of this country, which played such a prominent part in the development of the cement industry, should be a matter of deepest interest to the members of this Association. It is because of this possible interest that it has been my pleasure to bring to your attention this chapter in the life of this great man, whose memory it is our privilege each year to honor.

An address on George Washington was delivered by John A. Northrop, Assistant State's Attorney, Cook County, Chicago, Ill., in place of John A. Wayman, State's Attorney, who was detained by illness:

Mr. Chairman and Gentlemen: It is a matter of deep regret with Mr. Wayman that he is unable to keep his appointment with you this evening. Late this afternoon he telephoned me that by reason of illness he would be unable to be here to-night, and requested that I appear instead.

While sitting here it has occurred to me that the subject of cement

comes home to all of us in ways unthought of before. We can scarcely open our eyes without seeing evidences of that great industry, over which you grow enthusiastic, and it requires no stretch of the imagination to see that it will draw vastly more upon the enthusiasm of the future.

It is noteworthy that Washington, as your President has pointed out, so long ago realized the possibilities in the use of cement. It attests his marvelous many-sidedness, his wonderful power of observation, that he so early perceived the value of this product, that he foresaw a great industry which to-day holds the center of the stage.

But Washington was an earnest advocate of another cement, the cement of national unity. With prophetic vision he clearly saw that the colonies could accomplish little without union. He found that their interests were inharmonious and often hostile. Each feared the loss of its own power and prestige in the growth of rival colonies. Even in the face of imminent danger they were ready to fly at each other, or to abandon each other by reason of jealousy or fear. All through the Revolution this fact arose to vex and hamper the cause of freedom. At all times it was present to endanger any success of arms which Washington might achieve. However skillful he might plan his campaigns, however brilliantly he might execute them, this spectre arose to threaten disaster.

Therefore, it was that Washington deeply realized that the greatest need of the times was a spirit which would cement the colonies into an unbreakable union. Here were the elements of an imposing edifice. How to weld them into a durable and harmonious structure was an idea ever uppermost in Washington's mind. How the blood and the tears and the sacrifice and the hopes of that heroic epoch entered into the making of a cement which at last was strong enough to hold the union indissoluble forever, we well know. But the forming and the setting of the cement was a slow and painful process. When the last shot of the Revolution was fired, it was still far from complete. Indeed for a time thereafter we entered *the most critical period of American history*. The sword of freedom had indeed won its battle, the last "Red Coat" had departed from our shores, yet the old jealousies and rivalries flamed up more brightly than before. There was bitterness and danger of clashes along many a colonial boundary. Up among the hills to the North, the citizens of New Hampshire, and the Green Mountain boys patrolled the border with jealous and unfriendly eyes. Everywhere was apprehension, fear and distrust. Things seemed to be drifting into a chaotic condition where the results of glorious achievements should be forever lost. With almost infinite patience, with a vision far into the future, Washington labored to create a national sentiment. This work was carried on with all the splendid genius of Hamilton and Marshall and Webster. At last in the tears and blood of the Civil War, the cement of the national unity was firmly and forever set. Washington's vision was realized at length, and what had been but fragments were drawn into a mighty and indissoluble arch.

I shall dwell but briefly upon the earlier life of Washington. Your

chairman has given you a comprehensive account of his earlier exploits. I shall merely call attention to a few of his characteristics which we may always contemplate with profit and interest.

Washington's noteworthy achievements began when he was little more than a youth, yet such was his judgment and the confidence which he inspired, that men rallied to him on the field of battle, and relied on him in the councils of state. He had a bearing, a poise, and a stately quality of character which made him a natural leader of men.

When we recall that Washington was summoned from his Virginia home to the elms there at Cambridge, to assume charge of an army which was little more than a mere rabble, and when we reflect what is necessary to provision, to organize and to discipline such a body of men in order to make it an effective power in war, we realize but faintly the task which confronted him. The raw levies of militia placed at his command had for the most part never seen a day's service in battle. In numbers, in equipment, in discipline, in organization, in everything which goes to make up an effective army, save physical valor alone, they were inferior to the foe. With such an army Washington was called upon to confront in fierce and bitter warfare, the most powerful nation of the earth. How well he did his part; how campaign followed campaign; how he was compelled to follow the tactics of Fabius in retreat after retreat; how he was bitterly assailed and criticized at the time for nearly all that he did and for what he did not do; how unfair and cruel he knew that criticism to be; how, for the common good, he ignored the cruel slings and thrusts, is familiar to us all; yet through all the fearful experience, in the bitterness and the blood at Valley Forge, in the reverses which befel his arms at Long Island, Brandywine and Germantown, in the desperation of retreat, his hope and his courage were never broken, and his army, though sorely depleted, was never once permitted to break up into a demoralized band. Out of the darkest gloom he was ever ready to strike a blow which might change the fickle fortunes of war. This very desperation led him over the icy Delaware and nerved his army to splendid triumph at Trenton, brought signal victory at Princeton, and led on to battle at Monmouth under such prospects of success that he fondly hoped the end was at last in sight. It was no fault of his that General Charles Lee, commissioned by the Continental Congress to lead the attack in this crucial battle, at the supreme moment failed him and failed the country. It but illustrated that a faction in the Continental Congress was ever ready to override his judgment, and how treachery and jealousy in the army were ready, in striking at him, to strike at the cause for which he so nobly stood.

It was the very cruelty and treachery of the circumstances with which Washington contended that best brought out the splendor of his character. It was in meeting these that we saw the real caliber of the man. Beyond all the intrigues and rivalries and jealousies of the hour, such as that which created the Conway Cabal, he looked to the nobility of his own spirit, and the nobleness of the cause for which he fought, for final justi-

fiction. To what splendid advantage he appears when his judgment is tested by that of the Continental Congress. In that test he was nearly always right, and the Congress nearly always wrong. He advised against the holding of Fort Washington on the Hudson, against the sending of General Gates to take command of the Southern army, and again he was justified by events. In nearly every instance where the Congress acted upon his advice, success and triumph followed the colonial armies.

But while individuals and factions here and there tried to foil the mighty purposes of Washington, the great majority yielded him their unmeasured confidence. His patriotism none could question; his high and lofty purpose was well attested when he said to the country, "My life and services are at your command. I ask no compensation for services in the field. I ask only when war shall have passed that I may be repaid the money I have advanced in the common cause." In triumph Washington had no scores to settle with those who had cruelly struck at him and the cause for which he fought. Unmindful of it all he pursued his purpose down to "Yorktown's glorious day," where in the vindication of triumph he forgot the darkness of the past and became enshrined in the public heart. He was surrounded by a soldiery whose loyalty and love were linked with his interests in the bitterness of defeat, and in the sweetness of victory; a soldiery which venerated him as the noblest spirit of earth; a soldiery more loyal to its commander than were the legions of Cæsar or the battalions of Napoleon. Little wonder that these companions in arms sought to call him king and sought to create for him a throne. But the very thought was alien to the nature of Washington, and so wisely and so firmly did he reject the unwelcome idea, that it never became necessary for him, as it did for Cæsar, to thrice reject a kingly crown.

But I have talked long enough upon the familiar story of Washington's characteristics. The American people can never fail to be instructed by studying his disinterested and lofty purpose. This is to be borne in mind when we contemplate a great character: even greater than the work which he achieves in his day and generation is the example which he gives to all succeeding ages. He may be great as a statesman, great as a warrior, great as a patriot, but he is incomparably greater as an exemplar. When you recall that in the wilderness of Kentucky and Indiana, the boy Lincoln drew his deepest inspiration from that quaint biography of Washington written by Weems, that the life and purposes of Washington became in a way the shaping force in the life and purposes of Lincoln, we realize the power of example. And all over this broad land the boys and girls were being influenced to patriotism and to higher purposes by studying that same great life. It would scarcely be too much to say that in the great struggle to save the Union, the spirit of the North drew its deepest inspiration from the noble example of Washington.

As the representative of a great industry which is scarcely yet more than in its infancy, you gentlemen will have a great part to play in the

progress of our times. How swift our material development has been we can scarcely realize. In speaking at the centennial of Washington's birth, in 1832, Webster characterized that century as the most marvelous one in history, remarking that it had accomplished more than five and tens of centuries preceding it. Those of you who have seen the old carriage in which Webster rode, now a relic in the Field Museum, realize that the advancement in transportation and material matters has been incomparably greater since the time when Webster spoke than during any time before. If the men of any preceding generation could return to earth and behold the evidences of material progress we can scarcely conceive their amazement. When we think of the wonders of wireless telegraphy, the wonders of aviation, the wonders wrought by the application of scientific principles to the uses of men, we can see no limit to the possibilities of the future. Science has penetrated the mountains and the seas, to lay tribute to man's use, the vast sources of nature. It has attacked every enemy of humankind. It has sought out those invisible monsters, which, lurking in the air we breathe and in the food we eat, breed contagion and pestilence. With his test tube and crucible, with his reactive agents and his toxins the scientist has set these foes of humankind into a warfare of mutual extermination in the whirling currents of the blood; he has brought them to their Waterloo upon the battlefield of a human tonsil.

One of the greatest demands made upon science in these modern days is the effort to conserve our resources, and in that connection you gentlemen may be characterized as genuine conservators. I am told that you make everything which man needs during and after his life with cement; that from the time we are ushered in upon this earthly scene we are likely to be cradled in cement, to live in houses of cement, to do life's work through instrumentalities of cement, and finally when we are shuffled off this mortal soil our remains are to be laid away in coffins of cement, to await the sound of the final trumpet. You are, therefore, no less benefactors in the race than he who makes two blades of grass grow where but one had grown before. When you commit our mortal dust to the dust of mother earth in caskets of dust, you leave the trees which else had been wrought into our last covering to wave in the forests, or to be used for living and not the dead. You are all the more true conservators, in that you draw upon a material which otherwise would remain inert and useless for all time. Now, we behold this otherwise useless material rising into splendid edifices, into beautiful cities, and taking on many forms expressive of our civilization.

These wonderful changes of the physical world have wrought a vast effect upon the organization of industry, and upon the political life of the people. Industry has been organized on a vast and intricate scale, great corporations and trusts have grown up. Scarcely less wonderful to the fathers if they could reappear upon the earth, would be these changes in the organization of industry than the wonders of invention, and the

progress of science. It is a favorite diversion with some people to wonder how earth's departed great would view these modern wonders; to wonder what they would approve and what they would condemn. The hobbyist is ever ready to believe that the spirit of Lincoln or of Washington would set its approval upon his own particular view. And so believe those who most loudly cry that the times are out of joint, and that ruin inevitably awaits our tendencies. But there is nothing in the life of Washington or of Lincoln that would warrant any departure from the firm and established principles on which our institutions are based. Some things they might disapprove, but we can be sure that they would implore us to keep in mind the great landmarks of the past, to keep our feet firmly planted upon the solid foundation upon which the republic was established. This fact ought to be self-evident: that those manifold powers of the human mind which have called into being, which have evoked the great forces of industrial activity about us, which have created the wonders of the modern world, may be trusted in the end to properly control those vast forces for the common benefit. It is taking a small view of human nature and a small view of the American citizen to believe that because the human mind has discovered and applied wonderful forces of nature to the uses of man, whereby the organization of industry has been vastly changed, that therefore the institutions which our fathers gave us are to be torn from their foundations. The power of mind which produced these great changes may not at once discover the best method of controlling them for the common good, but that it will eventually do so, is certain. Nor in my humble judgment is this to be accomplished by the many panaceas which lose sight of the ideas and the ideals of the founders of the Republic. It will be accomplished consistently with the principles upon which our great commonwealths have been established, and our splendid cities created. They will realize in the long run that these wonders of the modern world are not ends in themselves, but merely the means whereby humanity is to be made better and happier. This realization will come about without revolution, without any overturning of the institutions which we have, and all the wonders of industry and of science will find their place under our government and under the constitution. All will be wisely controlled and adjusted by the sober second thought of the American people, and come to serve their purpose as have the best institutions of the past.

In closing I desire to call your attention to brief tributes paid to the character of Washington, by some of the greatest men that ever lived. Many of these have come from great Englishmen. Lord Erskine declared in a communication to Washington, "You are the only being for whom I have an awful reverence." Lord Brougham, in speaking of Washington, said, "Until time shall be no more will a test of the progress which our race has made in wisdom and virtue be derived from the veneration paid to the immortal name of Washington." Gladstone paid his tribute in these words, "If among all the pedestals supplied by history for public

characters of extraordinary nobility and purity, I saw one higher than all the rest, and if I were required at a moment's notice to name the fittest occupant for it, my choice would light upon Washington." There have been many who were disposed to deny Washington the meed of military genius, but as his campaigns have been studied from a disinterested standpoint, the better opinion has come to coincide with that of Frederick the Great, who, in commenting upon the exploits of Washington before and after the battle of Trenton, characterized them as, "The most brilliant achievements in the annals of military action." In 1842, Abraham Lincoln, in an address upon Washington at Springfield, said, "This is the one hundred and tenth anniversary of the birthday of Washington; we are met to celebrate it. Washington is the mightiest name of earth—long since mightiest in the cause of civil liberty, still mightiest in moral reformation. On that name no eulogy is expected. It cannot be. To add brightness to the sun or glory to the name of Washington is alike impossible. Let none attempt it. In solemn awe pronounce the name, and in its naked, deathless splendor leave it shining on."

And so we to-night can add no glory to the twin luminaries, Washington and Lincoln. It is enough to pronounce their names in solemn awe, and leave them shining on in all their deathless glory.

Regretting, gentlemen, that Mr. Wayman could not be here this evening, and thanking you for the attention which you have given me, I close.

The President:

While we deeply regret the fact that Mr. Wayman could not be with us, we have enjoyed Mr. Northrop's thoroughly interesting address, and we are thankful to him for his goodness in coming this evening.

The program, after a musical selection, calls for Washington's Farewell Address, and following that will be musical numbers, humorous recitations and other matters of that kind. I hope that you will all remain and see if we cannot get away from the serious tone that has heretofore marked all our sessions.

After the close of the entertainment the Convention adjourned until Wednesday morning at 9.00 A. M.

WEDNESDAY, FEBRUARY 23, 1910, 9.00 A. M.

Meeting of the Section on Specifications for Cement Products.

President Humphrey in the chair.

Discussion on the Manufacture, Curing, etc., of Cement Hollow Building Blocks, Architectural Concrete Blocks, etc.

FOURTH SESSION—WEDNESDAY, FEBRUARY 23, 1910, 10.30 A. M.

President Humphrey in the chair.

W. P. Anderson, Chairman, read the report of the Committee on Specifications for Cement Products, presenting,

- (a) Proposed Standard Specifications for Architectural Concrete Blocks.
- (b) Proposed Standard Specifications for Plain Concrete Drain Tile.

The following action was taken on this report:

The Proposed Specifications for Plain Concrete Drain Tile were referred back to the Committee with instructions to confer with the Committee of the Interstate Tile Manufacturers' Association, and to report to the Convention.

The Proposed Standard Specifications for Architectural Concrete Blocks were discussed and referred to the Special Session at 2 P. M.

The report of the Committee on Machinery and Appliances was, in the absence of the Chairman, L. V. Thayer, read by title.

Business Session.—The report of the Executive Board and the Minutes of the Meetings of the Board were approved as read.

The following proposed amendments to the By-Laws were approved and ordered to letter ballot.

Amend Article I by striking out Section 5 and inserting a new Section 5 to read as follows:

SECTION 5. Resignations from membership must be presented in writing to the Secretary within thirty days after the close of the fiscal year and shall be acceptable provided the dues are paid for that year.

Strike out Article II and insert a new Article II as follows:

SECTION 1. The officers shall be the President, the Vice-Presidents, Secretary and the Treasurer, who, together with the five latest living Past-Presidents, shall constitute the Executive Board. Vacancies occurring during the year shall be filled by the Executive Board.

SEC. 2. The Elective Members of the Executive Board consisting of the President, the First, the Second, the Third and the Fourth Vice-Presidents, shall be elected annually by ballot at the convention at a business session fixed by the Executive Board and shall hold office until their successors shall qualify.

SEC. 3. The Elective Members of the Executive Board shall appoint the Secretary and the Treasurer; they shall create such special committees as may be deemed desirable for the purpose of preparing recommended standards concerning the proper use of cement for consideration by the Association, and shall appoint a chairman for each committee who shall be a Vice-President of the Association. Four additional members on each special committee shall be appointed by the President, in consultation with the Chairman.

SEC. 4. It shall be the duty of the Executive Board to audit the accounts of the Secretary and the Treasurer before each annual convention.

SEC. 5. The Executive Board shall appoint a Committee on Nomination of Officers and a Committee on Resolutions, to be announced by the President at the first regular session of the annual convention.

SEC. 6. There shall be an Executive Committee of the Executive Board consisting of the President, the Secretary, the Treasurer and two of its members, appointed by the Executive Board.

SEC. 7. The Executive Committee shall manage the affairs of the Association during the interim between the meetings of the Executive Board.

SEC. 8. The President shall have general supervision of the affairs of the Association. He shall preside at the Annual Convention, at the meetings of the Executive Board and the Executive Committee, and shall be ex-officio member of all committees.

The Vice-Presidents in order of seniority shall discharge the duties of the President in his absence.

SEC. 9. The Secretary shall perform such duties and furnish such bond as may be determined by the Executive Board.

SEC. 10. The Treasurer shall be the custodian of the funds of the Association and shall disburse the same in the manner prescribed by the Executive Board. He shall furnish bond in such sum as the Executive Board may determine.

SEC. 11. The Secretary and the Treasurer shall receive such salaries as may be fixed by the Executive Board.

Amend Article III to read as follows:

SECTION 1. The Association shall meet annually. The time and place shall be fixed by the Executive Board and notice of this action shall be mailed to all members at least thirty days previous to the date of the Convention.

SEC. 2. The Executive Board shall meet during the Convention at which it was elected, effect organization, and transact such business as may be necessary.

SEC. 3. The Executive Board shall meet at least twice each year. The time and place to be fixed by the Executive Committee.

Amend Article IV to read as follows:

SECTION 1. The fiscal year shall commence on the first of July and all dues shall be payable in advance.

SEC. 2. The annual dues of each member shall be five dollars (\$5.00).

SEC. 3. A member whose dues remain unpaid for a period of one year shall forfeit the privilege of membership and shall be officially notified to this effect by the Secretary, and if these dues are not paid within thirty days thereafter his name shall be stricken from the list of members. Members may be reinstated upon the payment of all charges upon the books of the Association.

Amend Article VI to read as follows:

SECTION 1. Amendments to these By-Laws, signed by at least three members, must be presented in writing to the Executive Board prior to November 1st and shall be printed in the notice of the annual convention. These amendments may be discussed and amended at the annual convention and passed to letter ballot by a two-thirds vote of those present. Two-thirds of the votes cast by letter ballot shall be necessary for their adoption.

Edward D. Boyer, Chairman, presented the report of the Committee on Contributing Membership.

The place for the next Convention was then considered, and an invitation extended on behalf of Atlantic City by Geo. S. Lehnhart, and communications were read from Chattanooga, Tenn., Cincinnati, Ohio, Rochester, N. Y., and St. Louis, Mo. The final selection of the place for the next Convention will be made by the Executive Board.

The Committee on the Nomination of Officers, Austin P. Tomes, Chairman, made the following report:

President, Richard L. Humphrey, Philadelphia, Pa.

First Vice-President, Edward D. Boyer, Catasauqua, Pa.

Second Vice-President, M. S. Daniels, Suffern, N. Y.

Third Vice-President, E. S. Larned, Boston, Mass.

Fourth Vice-President, F. A. Norris, Boston, Mass.

On motion duly seconded, the Secretary was instructed to cast a unanimous ballot for the election of these officers.

On motion, the following Resolution was adopted:

Resolved, That the Association extend to Mr. Merrill Watson and Mr. George C. Walters a vote of thanks as an expression of appreciation for the faithfulness and untiring zeal exercised in the discharge of the duties of their respective offices.

The meeting then adjourned until 2.00 P. M.

FIFTH SESSION.—WEDNESDAY, FEBRUARY 23, 1910, 2.00 P. M.

President Humphrey in the chair.

This session was devoted to a discussion of the Proposed Specifications for Concrete Roadways, for Portland Cement Curb and Gutter, and for Architectural Concrete Blocks.

After discussion, the Proposed Standard Specifications for Portland Cement Curb and Gutter were revised and approved for letter ballot.

The Proposed Standard Specifications for Concrete Roadways and Street Pavements were then considered, amended and approved for letter ballot.

The Proposed Specifications for Architectural Concrete Blocks were thoroughly discussed and referred back to the Committee for the collection of more data and further study.

The meeting then adjourned until 8.00 P. M.

SIXTH SESSION—WEDNESDAY, FEBRUARY 23, 1910, 8.00 P. M.

President Humphrey in the chair.

Richard L. Humphrey presented the Annual Address of the President on "The Use of Concrete in Europe."

The following papers were then read and discussed:

"Reinforced Concrete Columns," Peter Gillespie.

"Proposed Method for the Reinforcement of Concrete Compression Members," Robert A. Cummings.

"Longitudinal Reinforcement in Concrete Columns," Sanford E. Thompson.

"Discussion of the Reinforcement of Concrete Compression Members," L. S. Moisseiff, read by title.

The meeting then adjourned until Thursday at 10.30 A. M.

THURSDAY, FEBRUARY 24, 1910, 9.00 A. M.

Meeting of Sections on Building Laws and Insurance, and on Specifications for Fireproofing.

President Humphrey in the chair.

The meeting took the form of an informal discussion on fire-resistant construction of buildings, building regulations, and their effect on insurance rates.

SEVENTH SESSION—THURSDAY, FEBRUARY 24, 1910, 10.30 A. M.

President Humphrey in the chair.

Report of the Committee on Building Laws and Insurance was presented by the Chairman, W. H. Ham, covering the following:

Part I. Proposed Standard Building Regulations for the Use of Reinforced Concrete.

Part II. Report on Insurance.

The Proposed Standard Building Regulations for the Use of Reinforced Concrete were amended and approved for letter ballot.

The Report on Insurance was accepted as read:

The report of the Committee on Specifications for Fireproofing was read by Rudolph P. Miller, Chairman.

The following papers were then read and discussed:

"Simple Method of Computing the Strength of Flat Reinforced Concrete Plates," Angus B. MacMillan.

"Long Span Light Floor Reinforced Concrete Construction with Cost Data," Emile G. Perrot.

"Cost Data on Reinforced Concrete Floor Construction with Separately Molded Members," Charles D. Watson.

The meeting then adjourned until 8.00 P. M.

EIGHTH SESSION—THURSDAY, FEBRUARY 24, 1910, 8.00 P. M.

President Humphrey in the chair.

A paper by J. H. Libberton, on "Cost and Advantages of Concrete Drain Tile" was read and discussed.

The Committee on Cement Products then presented the Revised Proposed Specifications for Concrete Drain Tile as

amended by the conference between the members of the Committee and the Committee of the Interstate Tile Manufacturers' Association.

The Proposed Specification was discussed, amended and referred back to the Committee with instructions to gather more data and report at the next Convention.

The Committee on Roadways, Sidewalks, and Floors then presented the following specifications revised as instructed by the Convention:

(a) Proposed Revised Standard Specifications for Portland Cement Sidewalks.

The Proposed revised Specification was amended and approved for letter ballot.

(b) Proposed Standard Specifications for Portland Cement Curb and Gutter.

The proposed specification was amended and approved for letter ballot.

(c) Proposed Standard Specifications for Concrete Roadways and Street Pavements.

The Proposed Specifications as revised, was amended and approved for letter ballot.

A paper by F. S. Phipps on "The Installation and Operation of a Steam Curing Plant" was then read and discussed.

In the absence of the author, a paper on "Essentials in Cement Hollow Block Construction," by Ernest B. McCready, was read by title.

The meeting then adjourned until Friday at 10.30 A. M.

FRIDAY, FEBRUARY 25, 1910, 9.00 A. M.

Meeting of the Sections on Art and Architecture, on Exterior Treatment of Concrete Surfaces and on Machinery and Appliances.

President Humphrey in the chair.

The meeting was devoted to a topical discussion on the artistic treatment of concrete surfaces of various kinds.

NINTH SESSION—FRIDAY, FEBRUARY 25, 1910, 10.30 A. M.

President Humphrey in the chair.

The following papers were read and discussed:

“Inexpensive Homes of Reinforced Concrete,” Milton Dana Morrill.

“Notes on the Use and Cost of Concrete for Small Houses,” C. R. Knapp.

The following Committee reports were then presented:

Report of the Committee on Art and Architecture, F. A. Norris, Chairman, read by title in the absence of the Chairman.

Report of the Committee on Exterior Treatment of Concrete Surfaces, L. C. Wason, Chairman. This report was read and discussed.

A paper by S. Cunningham, Jr., on “The Use of Concrete for Farm Buildings from the Sanitary Point of View,” was, in the absence of the author, read by the President.

The meeting then adjourned until 8.00 P. M.

TENTH SESSION—FRIDAY, FEBRUARY 25, 1910, 8.00 P. M.

President Humphrey in the chair.

The following papers were then read and discussed:

“Concrete for Maritime Structures,” by Chandler Davis, was, in the absence of the author, read by Ernest McCullough.

“Application of Concrete in Barge Canal Work,” R. S. Greenman.

“Results of Experiments on the Effect of Sea Water on the Tensile Strength of Various Mixtures of Cement and Sand,” Cloyd M. Chapman.

“Preservation of Piles and Timber with Concrete where Exposed to Sea Water,” C. C. Horton. This paper was, in the absence of the author, read by the President.

“The Essential Qualities and the Application of Concrete to Timber Structures in Sea Water for the Purpose of Increasing their Permanency,” by Ralph Barker, read by title.

The President then announced the appointment by the Elective Members of the Executive Board, of the Chairmen of the following Sectional Committees, who will also be Vice-Presidents and Members of the Executive Board of the Association:

Cement Products and Building Blocks, W. P. Anderson, Chairman.

Exhibition, H. S. Doyle, Chairman.

Fireproofing, R. P. Miller, Chairman.

Insurance, W. H. Ham, Chairman.

Reinforced Concrete and Building Laws, Alfred E. Lindau, Chairman.

Roadways, Sidewalks and Floors, C. W. Boynton, Chairman.

Treatment of Concrete Surfaces, L. C. Wason, Chairman.

The President announced the appointment by the Elective Members of the Executive Board, of Henry C. Turner as Treasurer.

The Committee on Resolutions, Ernest McCullough, Chairman, then reported as follows:

WHEREAS, A general interest in cement and concrete construction has been aroused; and

WHEREAS, The rapidly increasing prices of other building materials have rendered the use of concrete a matter of necessity and a working knowledge of its advantages very desirable; and

WHEREAS, The present short courses on agriculture and like subjects at many state institutions have proven their usefulness and value; therefore, be it

Resolved, That it is the earnest desire of the National Association of Cement Users that a similar course of instruction for cement and concrete be introduced into the schedule of courses of the various state educational institutions, to consist of both lectures and practical instruction and to be planned with two purposes in view:

First, That those taking the course may gain a general knowledge of the nature and characteristics of cement and concrete and learn some of the advantages of the material and the numerous purposes for which it is adapted.

Second, That they may obtain by lectures and, if possible, by practical instruction, a general knowledge of the relative values of the ingredients in a mixture and the correct method of proportioning, mixing and using concrete.

Resolved further, That the President of this Association appoint a committee to communicate or confer with the authorities of the various state institutions regarding this subject, setting before them the advan-

tages of such a course as above described, and urging strongly its adoption and its introduction into the list of courses now available.

This resolution was unanimously adopted.

Resolved, That the thanks of the Association be and are hereby tendered to the officials and other citizens of the city of Chicago for their hearty welcome, recognition of this Association and co-operation in making this, the Sixth Annual Convention, a notable event in the annals of the National Association of Cement Users.

Resolved, That the thanks of this Association be and are hereby tendered to the members who have aided by the presentation of papers, the members of the committees, the local and technical press of the United States for their co-operation and aid in furthering the interests of this Association.

WHEREAS, This Association is convinced that the work of the Structural Materials Testing Laboratories of the United States Geological Survey, Pittsburg, Pa., has been of great benefit to the building industry of the United States and the results published and to be published will be of permanent benefit, not alone to the United States, but to the whole world, thus laying all civilization under obligation to this country and its progressive inhabitants; Therefore, be it

Resolved, That this Association as a body, shall petition the Congress of the United States to provide an adequate appropriation for the purpose of continuing the work of the laboratories during the coming fiscal year.

Resolved, That the thanks of this Association be and are hereby tendered to the officers of the organization and to their capable helpers to whom this Association acknowledges a debt of gratitude for their faithful co-operative work which has borne fruit in the present high standing of this Association. To its able President, Mr. Richard L. Humphrey, this Association feels especial thanks and praise are due for his unceasing and effectual work in its behalf; and be it further

Resolved, That it is the sense of this Association that insofar as the funds of the Association will permit, our President be granted an honorarium as a more substantial recognition of the esteem in which his services are held.

The above resolutions were unanimously adopted, being approved as presented.

On motion duly seconded and approved, the Secretary was instructed to obtain information concerning the bulletins of the United States Geological Survey and in the next circular of the Association to advise the members how to secure copies of the bulletins.

The President thereupon declared the Convention adjourned *sine die*.