

PRESIDENT'S ADDRESS

By E. D. BOYER*

The honor done me by my election to the presidency of the American Concrete Institute has touched me deeply. Younger men than I might have been chosen for this office. But since I have been chosen, I feel that in making this choice, the membership has honored not only myself, but that my generation has also been honored for what it has given to and done for the cement industry.

Great changes have come in the cement industry during my lifetime. From an infant business, struggling against precedent, against competition, against all those indefinable prejudices that attach to anything which "has not been done before," I have seen cement and its utilization in concrete grow to a magnitude that is almost impossible to comprehend. It has been truly said that modern civilization, as we know it today, would be impossible without this mass employment of concrete, ever growing to greater and greater proportions.

In these past years, I hope that I may have contributed my part to the organization and systematization that is an essential part of an orderly growth. Certainly, I have sat in committee meetings for enough hours to make up one normal lifetime; and if my memory serves me, those who have worked with me in the selection, classification and unraveling of the apparently tangled skeins that have come before these committees for consideration would constitute an imposing roster of names of all who have written their names large in the industry and in the art.

Those days are joyous days to look back on. The meetings with my fellows; the arguments and debates pro and con; the joy of battles over unimportant points; the temporary flush of victories and the fleeting sting of good-natured defeats over some test as against another, and best of all the stimulation of companionship in some temple of good fellowship when the meeting was over—few of us can forget them and I, for one, never want to.

But under it all was the evolution of an art. Today that art is comparatively stable. Wide and successful usage along reasonably fixed lines has brought about a commercial art that may be pursued with profit to both buyer and seller. Cement as a product is tending towards a fixed article of commerce that may be had by all and is accepted by all. Design standards are coded so that safe structures are the rule, yet without unduly cramping superior skill or individual initiative. All this is true and all of this is beneficial in the main.

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But though I have spoken to you thus far as an old trouper and in a somewhat retrospective vein as of the past, I want also to speak to you as of the future as I see it and what must be the task if the concrete industry is to grow to its full and proper stature and breadth.

As I review the progress and growth just referred to, it appears to me that research and development in concrete have been confined to only a few agencies and that the progress of which we are all so proud has not sufficiently permeated the whole construction industry.

The researches of the Structural Materials Research Laboratory of the Portland Cement Association have been very thorough and of immense value in demonstrating in an orderly and understandable way, the laws of good concrete which before were only dimly seen and partly understood by makers of concrete immersed in pressing practical problems. At the Bureau of Standards, the Portland Cement Association Fellowship under the direction of Dr. Bates and Professor Bogue, a fundamental and scientific research is being conducted into the basic principles underlying the constitution of portland cement and its setting and hardening. This great work, because it is being conducted with almost unbelievable refinement and accuracy, has as yet hardly covered more than the preliminary stages. It is probable as this investigation progresses, the facts and principles developed will be applied to our everyday practical problems in concrete.

The many scientific and practical papers and discussions which occupy this and previous years' conventions of the American Concrete Institute, contain also a wealth of fact and data available to the construction industry.

But with all this research and progress in concrete, can we really say that it has reached more than a minute percentage of those responsible for work in concrete? Perhaps that may sound pessimistic in view of the tremendous amount of printed matter on concrete distributed by the Portland Cement Association and by this Institute. But surely if the results of this progress in research have reached afar, it has been heeded and followed by only a minority.

Some of the work in concrete which daily comes to my attention is of the smaller classes. While not spectacular or attention-getting, it is, nevertheless, that type of work which forms by far the greater part of the total use of concrete. The small builders who are responsible for this work though by no means unintelligent and unskilled in the use of concrete, rarely if ever have heard, and still more rarely heed, the importance of the principles developed by the tests and research of recent years. Are we in some way responsible for this condition because of a lack in bringing our knowledge to more direct relation and contact with field practices?

If this is true, the next great field for investigation and for research should be for those conditions where commercial considerations prevail and where laboratory conditions are almost wholly absent. At the present time the lowest bid and the lowest cost supersedes all else in the

mind of the buying public. It is a great tribute to the natural ability of concrete that it will endure and does endure in so many cases under such conditions.

I believe, therefore, that our Institute should encourage research in the commercial field and should foster the correlating of existing commercial practices with laboratory tests and conclusions, in order that a unified, dependable procedure may be evolved which will be so practical, so simple, and so sure of results that it will become the standard procedure of all engineers and architects, and even of the very small user of concrete.

As a step toward making more readily accessible the vast store of data and information contained in the papers delivered before this Institute since its inception, your Board of Direction for some time has been giving study to several plans for making this information available. If we can make it easier for our members, and for the engineering and construction world in general, to easily locate data on any subject treated in a paper presented to the Institute, we will have done our part toward the dissemination of the knowledge so laboriously collected and presented at the conventions. These are now available in the bound volumes of the *Proceedings*, which are properly indexed, but they are now so many in number and cover such a wide field of concrete practice and scientific investigation, that it is no easy task to locate all data on any particular subject sought for.

In view of these facts, your Board at its last meeting, recommended to the Institute the abandonment of the yearly publication of the *Proceedings* and the substitution of a monthly journal devoted to technical papers and discussions, abstracts of literature, news letters, and similar material, and at the business session yesterday their proposition was accepted by the membership and to my mind this will be a long step toward popularizing or making practical use of the scientific progress achieved by our members. Instead of presenting at intervals of twelve months a bound volume crowded with tests and data, the material will be spread out in ten installments—monthly, from September to June, thus insuring a more careful reading and a more complete assimilation of conclusions reached in our technical papers.

With this plan, any new facts, tests, or discoveries will reach our members much more quickly than if publication were deferred until the next convention.

So much for our plans for future papers—but how can the wealth of material contained in our past *Proceedings* be made more usable and accessible? One of the ways proposed for accomplishing this is to make a separate index or bibliography of subjects for the complete list of *Proceedings* from the year 1905 to date. Obviously this complete indexing and abstracting of so many volumes will be a long and laborious work which can be entrusted only to able hands. It is to be hoped that the details of this plan can be successfully worked out.

As men who are perhaps more interested in the practical aspect of concrete, we should not, in our efforts to secure a more universal use of

new knowledge in concrete, fail to encourage an appreciation of the artistic and beautiful. Most of our investigations are concerned with quality, and while this after all is the primary consideration, it must be remembered that the general public, whose funds make possible our concrete structures, are susceptible to the appeal of good appearance.

In the last few years we know that great strides have been made in our ability to make concrete a more presentable material from the standpoint of beauty of surface and modelling. The president of the New York Building Congress has said that buildings deteriorate in value more because of surface unsightliness than because of structural deterioration. This is a message which should be taken to heart, for it also means that buildings of concrete, which have a more presentable exterior and interior appearance than was possible a few years back, will find a greater extension of use and a greater value than can be had by any other means.

Of this we have many illustrations and not least is the great construction undertaken by the Department of Public Works, State of New York. Here not only enduring and satisfactory buildings are provided in concrete and concrete alone, but also at such a saving in cost that the appropriation made for the work is enabled to cover 18 per cent (approximately) more than it would in any competitive material. That is to say, these all-concrete buildings won out over all other competitive materials by a margin of 18 per cent and with, I believe, an advantage in appearance as well as fire-safeness and durability.

I hope, then, that the Institute will lend encouragement to every effort to make concrete a more dependable, a more uniform and, structurally, a more acceptable material than it is at the present and especially than it has been in the past. I am sure that this will be done and I hope that it may be done while I hold this present office as President of the Institute.

If I have seemed in this brief talk to have emphasized the needs of concrete and of the American Concrete Institute, it has been only because I know that we will see such progress in the coming years that our present knowledge will prove to have been only part of a great growth or evolution. Inasmuch as my life has seen and been part of this great industrial growth and evolution, I am thankful that an over-standardization and an undue contentment did not enter the industry, let us say, some fifteen years ago. Many sighed for it at that time and believed that with a rigid standardization put into force by one means or another, peace and prosperity would enter with this standardization and that all questions would be ended.

How greatly would we be the losers if that standardization had been brought about? In these past fifteen years, more has been learned about cement and about concrete than was learned in the preceding thirty years. That standardization on the uneconomical, narrow, and immature lines of fifteen years ago would be acceptable today, is unthinkable.

Yet today we stand on the verge of a new standardization in response to that same plea of bringing peace, prosperity and enduring happiness to

the industry through declaring, largely by force of propoganda, that all that is to be learned has been learned and that the book shall now be closed.

So long as the mind of man remains the brilliant, questing thing that it is this may never be done, for those who are slumberously content today will soon pass on and a new generation with new and better ambitions will displace them.

That is the history of the industry as I have seen it and that also is the history of the world.

And I know these new and better things will come, because I know they must come to meet our needs. In my daily task, I am constantly confronted with problems and ever new problems. Why did this happen? How shall this be done or that be accomplished? When may we hope to use cement and concrete for such and such a purpose so that the result we want may be had with concrete and without resorting to other materials that cannot but be less satisfactory by their very nature.

These, gentlemen, are problems of commerce, not of the laboratory. They are problems that are with every constructor; and as I have contemplated them, I have realized that the answer does not lie in an inflexible standardization, but in that forward march that goes beyond arbitrary standards and unlocks, one by one, the secrets of nature.

To the American Concrete Institute, I would therefore give the vision that is with me. By force of the experience of my life in the industry, this vision is of an industry better and broader, more careful in detail and more appreciative of the necessary correlation between the dicta of the laboratory and the unforeseen differences that attend field work than is the case today.

And this vision, too, is of a carrying on by both older and younger generations, a learning more and ever more and a building that knowledge into specialized and profitable work that shall be wholly and distinctively concrete. And if, in my lifetime, there may come before this body such summations of that knowledge as will create this broader and more useful knowledge, I shall feel well rewarded for whatever I personally may have been able to do in my day and in my time, which, since you have honored me as you have tonight, is far, very far from ended.

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At the 26th Annual Convention

BY EDWARD D. BOYER

A QUARTER-CENTURY ago there was organized in Indianapolis an association through which its members sought to share their rather incomplete knowledge of a relatively new construction material and increase that knowledge, so that they might do their own work more confidently and more efficiently, and better serve the engineering profession and the general public.

That was the National Association of Cement Users which with a change of name seventeen years ago became the American Concrete Institute.

For a number of years the Institute struggled for existence. Its members were few, its treasury depleted, and it was having great difficulty in paying for the printing of its annual *Proceedings*.

In 1914 Mr. Wason became president, followed by Dr. Hatt and Mr. Turner and with their efforts and persistent work the Institute took on a new lease of life. In 1920 the membership was 426; today it is about 2750 and I trust that before another ten years this membership will be where it should be—well over 10,000. Today we have a very substantial balance in the treasury and our bills are promptly paid.

As I pass on the office of president to my successor I would like to tell you why I think the material concrete can be made to serve the engineering profession very much better than it has ever done—and that without any apology for what it has done in the past.

Concrete appeals to the imagination. Its development has been quick and romantic. It has seemed a tractable, a willing servant of mankind. Plastic, accommodating, by the special

magic of its ingredients—a manner of magic, that even our wisest chemists do not yet fully understand—this plastic, accommodating conglomeration, in a short time solidifies to a veritable rock-of-ages. Now because of facility of accommodation, seeming ease of manipulation, this pliant service to whatever might be required, everyone dabbled with it. All over the land was soon heard the roar and grind of crushers disintegrating the hills into convenient particles and of mixers stirring those particles with water and the mysterious gray powder. Could anything be more simple? Engineers and farmers, municipalities and states, every back-yard putterer with a block machine—all doing their share in remolding rocky landscapes into serviceable concrete.

But as always, there are those who will not let things go on haphazard. They are always asking “why” and “how” and “what happens.” They are forever bedeviled with a violent urge to know. Their very sleep is disturbed by visions of a better way.

Here was concrete—strong, willing, cheap, as simple as mud. But they had to take it into the laboratory and weigh and measure and test, and go out on the job and pester everybody about better methods, more exact methods, more constant and unwavering methods. The concrete industry has never had the relaxation of smoking jacket and slippers.

Now, most of these strivers after a better way with concrete were members of the American Concrete Institute. I am ready to resist any contradiction of the statement, that the American Concrete Institute is the hardest working of all engineering associations. Its annual conventions have worked eight to ten hours a day—they sit up until well after midnight to discuss and to adopt forty odd amendments in an effort to create the best possible, most workable and economically serviceable building code under which reinforced concrete construction may come into new eras of human service.

But I am getting ahead of my story!

From the very first there were those with that foresight which revealed new worlds to be conquered in the application of concrete to construction. They were not satisfied with empirical formulas for the design of structures nor with empirical mixes for

making concrete. They were not satisfied with the brute massiveness of masonry construction nor with the often lusterless gray of the surfaces of those masses. They foresaw that more material than is needed means waste and that less than is needed means disaster.

They foresaw that with a powder so potent as cement, rule-of-thumb methods of proportioning it to the aggregates left much to be desired. They foresaw that structural sections might be refined from needlessly large and awkward dimensions to thin, serviceable lines that would combine grace, economy, and a saving of billions of dollars to the building public while presenting a more beautiful appearance to the public eye.

They foresaw that concrete is, after all, a synthetic stone, always responding wonderfully to increased accuracy of control; that its dominant characteristics should be imparted by the particles of aggregate—limitless possibilities of varied color and texture.

These foreseeing minds have been the leaven of the American Concrete Institute. In them, through them, research has prospered. There always has been dominant the attitude that facts should show the way.

The result is this: Never has a construction material been so intently, so intensively studied. It is doubtful if any material has been the subject of so much research.

If the American Concrete Institute had been organized for promotional effort instead of for highly professional and scientific study, it could not have built a promotional effort on a more solid and enduring foundation. For after all, there is no promotion more convincing than the naked honesty of fact. If ever we can find out how best to do a piece of work for enduring results we can be sure that those results are in themselves the best promotional effort.

In recent years thirty odd committees of the organization have studied good design and construction practice in relation to the special application or fields of interest to which they were assigned.

Hundreds of individuals—certainly numbering many of the best minds in engineering thought—have set down so that all

might apply them, the lessons they have learned in their work with concrete.

Annually, these committee reports and papers are presented to the American Concrete Institute; they are studied and discussed and must pass muster before the combined experience of a constantly growing membership—a membership more than six times as great as it was eight years ago. It is such connotation of progress that the American Concrete Institute published in its annual volumes of *Proceedings*. The 25th of these volumes has been added to this row of books—not yet a “five foot shelf” comprising the sum of human knowledge, but a three foot shelf in which is the record of the steps by which concrete design, construction and manufacture have come up from haphazard guesswork to well-calculated precision.

I have referred to vast studies and minute research. The American Concrete Institute has not done these things. It has no laboratory; it has no employed field force. Nevertheless the American Concrete Institute is the technical mouthpiece of the industry in which its members are all seekers after progress. The American Concrete Institute is a piece of machinery of correlation, a forum for discussion, a bureau for dissemination. In short, the object of the American Concrete Institute is “to provide a comradeship in finding the best ways to do concrete work of all kinds and in spreading that knowledge.”

And gentlemen, from a thoroughly human standpoint, it is a wonderful comradeship. To feel and to understand the spirit that actuates the leaders in this field of thought is to begin to understand the nature of the progress that has been made in our knowledge of concrete and of the technique of its successful application.

Within this comradeship there has been a friendly but insistent matching of the dictates of laboratory research to the necessities of field methods. The meticulous care of the laboratory cannot be set up in the hurly-burly of job conditions, but the constant effort of the Institute has been to accept no unworkable formulas. Refinements that are not also economies—practical and workable economies in the far-sighted and best sense—are certainly not worthwhile refinements.

Within the forum of the Institute the research man has had to see his results weighed in the balances of practice. The big and effective work of our organization is to coordinate theory and practice.

The whole program of the Institute is built up carefully to reconcile the technical and scientific aspects of good concreting with the practical considerations of everyday work—translating the conclusions of the laboratory into field and shop practice.

We are beginning to see the results!

For eight or ten years there has been more and more emphasis placed on a higher degree of quality control—methods at first greeted by many practical minds as impossible of attainment on the job.

The Institute has not been satisfied merely to preach better concrete, honestly facing and carefully studying every defect for its cause, but it has now attained to those riper and more gratifying years in which it is year by year recording the successful results of practicing what it has preached. Nor must it be imagined that we have attained any final goal—far from it.

I should be remiss if I did not especially note outstanding new enterprises of the Institute. There comes a time when the lack of new information is an apparent obstacle to progress. There are doubtless many gaps in our knowledge which we should try to close but we do not always discover them promptly. The new committee work of the Institute is being directed to serve the double purpose of determining the nature of those blind spots and the means to correct them.

Notable among the new committee undertakings of the last year is the program of the committee on Reinforced Concrete Column Investigation, which the Chairman, Mr. Slater, has described to you. The purpose of this study of columns is to establish the fundamental relationships between the load, elastic properties and ultimate strength as affected by such factors as quality of concrete, size of column, amount and quality of longitudinal and lateral reinforcement, rate and method of applying load, and effect of continuous loads over long periods of time. This information will cost, according to present estimates, thirty-five to forty thousand dollars, involving as it does the making and testing of more than 500 columns.

The American Concrete Institute is sponsoring this effort and considerably more than half the needed funds, including the direct and indirect contributions of Lehigh University and the University of Illinois, are assured. It is believed that the knowledge to be gained will be of such value in reinforced concrete design as to make the cost insignificant. The funding effort is still in progress and I feel it is my duty to urge that further contributions be made promptly as an investment toward more rational and therefore more economical practice.

The column tests are devised to give us new information. Yet we are frequently impressed by the fact that we are not making use of all the information now available. There must be a constant effort to reduce to definite conclusions and put into common practice the knowledge fruits of past experience. Our knowledge is recorded piecemeal; it is scattered, uncorrelated, undigested. We must bring it together in one basket and sort out of it those items of fact which are most significant in our daily work. The Institute is undertaking such an enterprise as a part of its present committee program.

Still another work—not at all spectacular but having in it, even in its small beginnings, the possibilities of great helpfulness to every member of this Institute and to many outside this Institute—is the new JOURNAL section of *Abstracts* of current literature significant in the field of cement and concrete. An able committee is cooperating with the Secretary's office in determining the scope, the character and the detail of the work. With many abstractors in this country and abroad scanning every contribution to the literature of our field and extracting the essence of each such contribution for the pages of your JOURNAL, there is made available to all of us as never before the full moving panorama of progressive experience as it relates to our special work.

We have progressed so far in learning about concrete that we have unlearned much of what was once our store of knowledge.

While we have adopted standard specifications and recommended practice for doing many things in concrete design, construction and manufacture, we know very well that we are at but a stage of the journey—that we are going to amend and improve these standards.

That is one of the fine things in the motive force of the Institute—its members know there is so much still to learn. But they have the satisfaction that comes with a feeling that within the organization they are in the right place to observe activities on the frontiers of progress in their field and are always alert to the prospects of new achievement.

This year we have entered upon a new era. We have ceased publishing the yearly book of *Proceedings*; we have scrapped all the old committees, and in their place we give to the members a monthly JOURNAL, new committees with Author-Chairmen and critic members with a promise of increased interest.

In relinquishing the presidency to my successor I am proud of the fact that for all these years I have had an official connection with your Institute, and I look forward to a future for the Institute which shall make our present progress seem but the first step of its march toward the perfection of an art.