Pergamon

Cement and Concrete Research, Vol. 25, No. 1, pp. iii-iv, 1995

0008-8846/95 $9.50+.00

0008-8846(94)00103-0

EDITORIAL

CEMENT and CONCRETE RESEARCH - 25 Years

The occasion of entering our 25th year of publication permits one to reflect a bit on the origins of **Cement and Concrete Research**, historical events and changes, and visions then and now.

The world of science and materials science has changed very substantially since 1970-71. The interdisciplinary theme was very new then. "Materials" first appeared in the name of a journal in 1966. And the "science" aspects from dislocations and point defects to "first principles" calculation, tended to dominate the field. Cement and concrete to many publishers would have sounded far too applied to attract good and sufficient papers.

Today the roles are reversed. Materials is all the rage, and, *mirabile dictu,* many physicists and chemists now want to call themselves materials scientists hoping there's more money in it. There isn't. But the change of the center of gravity of the materials field from the esoteric to the exoteric is profound. Industries have shut down virtually all corporate (long-term or basic) research laboratories. Applied research and coupled or joint research is all the rage.

And what of **CCR** itself in this context. Since the first tentative volume was published, the journal has grown steadily and substantially, more than tripling its annual contents. However, not only the volume of published papers has changed, but the subject matter has also been transformed slowly with time so as to be almost unrecognizable. Newer authors still, like Newton, "stand on the shoulders of giants!" This growth of the journal, and the success in meeting the cement and concrete community's needs for their own journal, has been the result of the combined efforts through these years of not only the editorial office, but the many contributing members of the editorial board and the large number of authors worldwide. We hope you all will join us in this celebration!

If one were to choose a single starting point, the origin of the journal could be pinpointed to a meeting of the soon-to-become Editor-in-Chief with several international colleagues who were to become initial members of the Editorial Board. This meeting occurred during the 5th International Congress on the Chemistry of Cement held in Tokyo in 1968. The need was confirmed during this meeting for the launching of a central, international periodical covering fundamental science and engineering research in the field of cement and concrete. While at that time there existed a number of nationally or societally affiliated publications, none was as deliberately international nor broad in scope to give adequate coverage to the field. Since cement and concrete are unavoidably linked through their applications, understanding of the one contributed immeasurably to understanding of the others. Investigations of the intricacies of the behavior of cements helped in understanding the performance of concrete, and knowledge of the applications and performance of cements in concrete provided guidance for research on new compositions and properties of cements.

The Tokyo meeting provided an ideal sounding board: It resulted in some 2000 pages of papers published in a 4-volume Conference Proceedings which in many ways was to become a landmark publication. Subjects at that meeting included, broadly, the chemistry of cement clinker, the hydration of cements, properties of cement paste and concrete, and admixtures and special cements. In retrospect, considerable understanding was exhibited of the crystallography and phase equilibria

of portland cements, and advances had been made in many other areas as well; but only beginnings had been made in the study of cement hydration and hydration products by sophisticated techniques for investigating microstructure; e.g., the electron microprobe was a relatively new instrument. Knowledge of chemical admixtures was limited and blended cements were relatively less used and the hydration behavior even less well understood.

At about the same time a 540-page publication on the Structure of Concrete also appeared as a result of an international conference on the subject held in 1965 in London, with treatment of composite theory, failure mechanisms, dynamic loading, shrinkage and creep, and other volume changes. One might, then, superficially have wondered if knowledge of the fundamental mechanisms regarding cement and concrete performance had reached a state of saturation. But that most strikingly did not prove to be the case.

The proliferation of international meetings and indeed, publications, since this journal's origin, many of which are featured in our listing of news items is extraordinary but their sustainability is questionable. The 9th International Congress on the Chemistry of Cement held in New Delhi in the Fall of 1992, and succeeding international conferences since that date, plus the pages of **Cement and Concrete Research** report the results of major new areas of research arising since the 5th International Symposium. Many new cements and cementitious systems have become a significant part of the picture: DSP, MDF, warm pressed, alkali-activated, regulated set, alinite, belite, sulfoaluminate, and other non-traditional cements. Responsible resource management/utilization is an increasing concern for the future; the effects of fuels on cement kiln processes and the nature of the cement is a major topic. A vast cadre of more sophisticated tools has been brought to the study of cements and concretes: SEM/EDX combined with image analysis, NMR, TMS, FTIR, XPS and enhanced analytical methods including fractal analysis and various approaches to modeling. Computer aided techniques are applied in a vast number of measurement techniques and analytical methods. Non-destructive evaluation is an important and growing area of development. Supplementary cementitious materials - and so called chemically bonded ceramics - are a major part of the current scene. A host of chemical admixtures have come into being to enhance the workability and performance of cement and concrete, and their use is based on a sounder understanding. The durability of cements and concrete is of major concern, and nuclear and hazardous waste management are now major areas of application. Transport of ions and other species and the relation between microstructure and performance are better understood, as is the science of fracture mechanics and related matters. The nano-structure of cementitious materials is also beginning to receive attention in current studies. Pore structure measurement and analysis, modeling, and their relation to properties and performance is a major growth area. The advancement in concrete structures is phenomenal: As reported in the recent Singapore international conference on High Performance Concrete, steel structures have now been clearly superseded by concrete in the world's tallest structures, from the Troll offshore platform (Norway) to the Petronas Towers in Kuala Lumpur. As in many other areas of science and technology, the first tentative "discoveries" of new products or potential applications must often be followed by years of thorough painstaking research to promote their development, and assure reliable performance of the modern engineering marvels.

We believe that a number of the cited contrasts then and now and examples of the progress made in these recent years provide evidence of the scaffold upon which much future growth of knowledge and technology development will be based. The current trends and future prospects provide a challenge to our journal, its editorial board, and especially authors as they look to the future, and make decisions as to which of the alternative directions to take in their research.

Some changes have been made in the journal beginning with Volume 24 to facilitate the transmission of new information. A new substantial set of changes will also be implemented starting with Volume 26. We hope the subscribers like the new look, and will join us in making the journal increasingly useful to both authors and readers.

Della M. Roy