On Sunday a special memorial service was held at St. Giles' Cathedral, the sermon being preached by the Rev. Dr. Fisher, of St. Cuthbert's, the church in which Napier worshipped and in the churchyard of which he is buried. Dr. Fisher spoke of Napier as a citizen and as a writer on questions of theology. The service was attended by a large number of those present at the celebration.

Mention should be made of the exhibit of Napieriana and of tables and calculating machines. Early editions of works on logarithms, Napier portraits, Napier rods ("bones"), and the priceless Dantzig copy of Bürgi's Progress Tabulen were displayed in cases. All the leading types of calculating machines, models of solids and surfaces, linkages, tide predicting machinery, and other material relating to computation and to those parts of geometry in which Napier had an interest, attracted much attention.

The celebration was followed by a colloquium held under the auspices of the Edinburgh Mathematical Society. Lectures were given by Professors d'Ocagne and Whittaker, and by Messrs. E. Cunningham and H. W. Richmond.

The papers will appear in a volume under the editorship of Dr. C. G. Knott. A description of the exhibit appeared in dignified book form under the direction of Mr. E. M. Horsburgh, and a copy was presented to each participant in the celebration.

Those who attended the celebration were unanimous in their expression of pleasure at the success of the meetings and at the hospitality shown by the citizens of Edinburgh, the Royal Society, the Mathematical Society, and the University.

David Eugene Smith.

AN APPEAL TO PRODUCING MATHEMATICIANS.

BY GEORGE PAASWELL, C.E.

A perusal of modern mathematical treatises and dissertations for degrees makes the lay mathematician (I should say rather the amateur mathematician) despair of ever keeping up with the modern trend of mathematical thought. The tone of modern works is not that of disseminating new ideas, but rather that of clothing ideas already familiar to readers in slightly different form; a tone surely not that of a text-book and therefore precluding from its readers those not familiar with the subject.

There is, however, a more serious arraignment to be made. Hardly any treatise has attempted to discuss or analyze the serious problems of the applied science professions. The profession of civil engineering is teeming with problems awaiting the solutions of a St. Venant, a Laplace, a Newton. The problems are vital; fundamental truths await discovery and elucidation. Innumerable functions await an Abel or Jacobi to bring them into existence.

Glance through the standard texts on applied mechanics and marvel at the appalling gaps in analysis the engineer must bridge with assumptions far from rigorous or satisfactory, to obtain any practical result.

The profession of building is the oldest in the world and yet how little we have progressed in the analysis of the stresses in the frame itself. The knowledge of stresses in a column remains practically in the state in which Euler left it. There are, indeed, some empirical column formulas, but an empirical formula is always a sad apology for lack of scientific knowledge. It may be said that empirical formulas have sufficed in the past for design, but the failures of structures designed on that basis most effectively answer that. The failure of the largest bridge in the world—the Quebec bridge—was due to lack of knowledge of the action of large compression members (columns) and the only path open to engineers was that of experimentation on larger size test pieces: mathematicians had failed them.

When the simple case of the analysis of flexure is attempted, there is either the faulty Bernoulli-Euler theory or else one must wade through appalling intricacies of analysis to gain the desired kernel of practical value which is then found to be limited in its application. When we come to the analysis of structures proper, there are either empirical formulas or faulty analysis. So far, I have had in mind homogeneous bodies; but when heterogeneous bodies are included, such as concrete, plain or reenforced, the ignorance of the action of the material itself adds to the sum total of our ignorance.

When we come to the analysis of statically indeterminate structures—a most fruitful field—there are several fundamental principles to be had for stress analysis; but when the structures become less simple, the intricacies and the tediousness of analysis become inhibitive to further discussion. Yet these are the types of structures that make for economy of design and for rigidity and permanence. Here are abundant fields for mathematical thought, and every thesis and article would bring us nearer to a solution of these problems.

The subject of moving bodies with their resultant impacts and vibrations is at present hopeless—even the empirical formulas fail us here—and we must make up for lack of knowledge by excessive and wasteful strength. Likewise the study of earth pressures both vertical and lateral exists in a series of empiricisms.

There is sore need of a text on the theory of elasticity which, while more or less free of the involved intricacies, shall give a firm basis for stress and strain analysis.

In this connection the curriculums of the applied science schools are at fault. Just sufficient mathematical knowledge is disseminated to enable the student to interpret a few simple formulas and theories. No attempt is made to inculcate a rigorous and fundamental knowledge of mathematics nor to give even a hint of the vast fields of advanced mathematical thought.

The study of mathematics, per se, is a most soul satisfying and alluring pleasure, and those to whom is granted the opportunity of devoting the greater part of their time to its perusal are most sincerely to be envied; yet society asks in return a solution of its most pressing problems.

It may be visionary dreams of the wildest type, but the day may come when, from the knowledge of the chemical constituents of a body, its crystallographic history and its temperature and space elements, its stress and strain relations shall at once be known and the effects of external loadings, static or otherwise, at once interpreted.

There is hardly a branch of mathematical analysis that could not add its quota to applied science: the calculus of variations and the potential function to the principles of least work and infinitesimal distortions; the elliptic and related functions to the study of the elastica and allied problems; and general analysis itself to the reduction of the resulting expressions of stress analysis.

I have enumerated but a few of the vast problems frequently confronting engineers in daily life and fervently hope that they may elicit some dissertations that may bring light on these vital problems.

SHORTER NOTICES.

Die Mathematik im Altertum und Mittelalter. By H. G. ZEUTHEN. Erster Abschnitt: *Entstehung und Entwicklung der Zahlen und des Rechnens.* B. G. Teubner, Leipzig und Berlin, 1912. 95 pages. Price unbound, 3 Marks.

THIS little work is a portion of Teil III of the volume entitled Die mathematischen Wissenschaften, in the work edited by Professor Hinnenberg, Die Kultur der Gegenwart. Teil III has for its title Die mathematischen und naturwissenschaftlichen Kulturgebiete, and the part relating to mathematics is under the editorial supervision of Professor Klein.

No opportunity was afforded, in the brief space allotted to Professor Zeuthen, for any new contribution to the history of mathematics. Therefore all that can be expected is a mere résumé of the leading contributions to the science in ancient and medieval times. Professor Zeuthen first treats of early arithmetic, beginning with the primitive number systems, passing to the early mechanical methods of computation, setting forth the difficulties of notation in ancient times, tracing rapidly the development of our numerals, and making clear the obstacles met by all early peoples in the handling of fractions. He then considers the applications of number to commerce, astronomy, mysticism, and puzzle problems, showing the relation of this work to the primitive algebra of the Egyptians.

He next takes up the geometry of the Egyptians and Greeks. While giving only a cursory glance at the development of the science, he takes occasion to refer to the fact that the Pythagorean triangle is mentioned in the Sulva-sutras, which he puts as late as the 5th or 4th century B.C. He does not venture, however, upon the question of the antiquity of the theorem in China, a problem which probably can be solved only by the rise of native scholars who can give us a careful textual criticism of the classics of their country. It is interesting to see that Professor Zeuthen, than whom we have few authorities better recognized in the history of Greek mathematics, maintains the common view that the lunes of Hippo-