

The scope of the book is sufficiently well described by the chapter headings, namely: "Diversion Headworks in Alluvial Rivers" (9), "Locks" (10), "Arches" (11), "Dams" (12), "Electrification of Irrigation Works" (13), and it is written in the lucid style which we have come to expect of this author. The text is extremely well illustrated, as will be evident from the number of figures, and includes a number of dimensioned drawings of existing structures, the most detailed of these being a set of working drawings showing the arrangement of the steel bars in a reinforced concrete skeleton of a completed power house.

As one might expect from an author with wide experience in Egypt, many of the works chosen for detailed examination were built on the Nile and much space is devoted to the formidable difficulties associated with structures founded on alluvium. For example, much of the first chapter is concerned with the types of cut-off utilized in this situation, the construction of temporary sumps, de-watering and methods used in building the floor of such structures. In the second chapter also, particular attention is given to the design of locks with continuous concrete foundations, which are necessary where the soil is particularly treacherous. This leads to a certain lack of balance of the treatment, which is particularly evident in the chapter on dams. This chapter takes up more than a third of the book and deals with the structural design of gravity, arch, buttress and hollow dams. The gravity dam is treated in great detail and includes an analysis of the thermal movements and stresses in dams and the effects of uplift. In contrast, the treatment of the others is somewhat superficial, although a number of references is given to supplement the text. This is perhaps natural, for gravity dams have been in existence for centuries and a well-organized body of theory and experience is available for their design, while arch dams are a relatively recent innovation and their structural design is not yet standardized.

Throughout the book, as in previous volumes, the approach is historical and discursive and the author has been at pains to show the gradual evolution of design methods and modifications in the light of experience. Such a treatment is invaluable to the student and research worker, and it may also commend itself to those designers who are not only interested in the more accepted design methods but also in the fringe areas of their subject where progress is still being made but advances are not yet consolidated.

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MINING RESEARCH

Proceedings of an International Symposium on Mining Research

Held at the University of Missouri, February 1961. Edited by George B. Clark. Vol. 1: Pp. xii+1-472. Vol. 2: Pp. vi+473-859. (London and New York: Pergamon Press, 1962.) 200s. net per set.

THE proceedings of the symposium held at the University of Missouri in February 1961 have been reproduced in two volumes, containing a total of 50 papers. Volume 1 contains 31 papers, 19 of which are concerned with explosives and blasting. Three out of the 19 papers deal with the composition of ammonium nitrate—fuel-oil explosives, and four are concerned with their application. There are

twelve papers on various aspects of blasting, one basic research into detonating pressure, and the remainder on applied research including the evaluation of explosive performance, techniques of blasting, efficiency of blasting, pneumatic cartridge loaders, pre-splitting, nuclear and chemical explosive cratering, blasting in cherty metallic iron formation, bench blasting with ammonium nitrate explosives and millisecond delay-firing.

The remaining contributions in Volume 1 consist of fundamental studies of liquid-solid systems in pipelines and steel wave behaviour in percussive drill-steels. Applied papers included the gyro-theodolite, mine environmental studies (a review), the life of drill steel equipment, the Castaing microanalyser, exploratory boring, applied statistics to determine mine working, methane drainage, ore analysis by X-ray and by γ -ray spectroscopy, and statistical analysis to plan sampling programmes.

Volume 2 contains 19 papers. There are several basic studies in rock mechanics, including direct measurement of strains by photoelasticity, behaviour and strength of rocks, correlation of rock properties, sonic techniques in exploring roof strata and roof bolting. Contributions to applied research in rock mechanics include block caving, subsidence, changes in stress accompanying wall closure in steeply dipping stopes, determinations of stress around an underground mine opening and the determination of dynamic elastic constants of rocks.

In addition to rock mechanics, Volume 2 contains papers on the use of jet-piercing for blast-hole production in taconite, disturbances resulting from shot-firing and also basic researches comprising studies of shock-waves in solids from explosives, effects of transient stress-waves in rocks, distribution of stress beneath a statically loaded drill-bit, stress-pulses in percussive drilling and the basic mechanics of coal ploughing.

The papers presented on explosives and blasting and on rock mechanics alone represent a substantial addition to the literature in these fields of study. The remaining papers, a little less than half the total, cover several aspects of mining research and include some interesting and very useful individual contributions. Half the papers presented come from the United States and the remainder from Great Britain, Sweden, France, Japan, West Germany, the U.S.S.R., Canada, Czechoslovakia, Austria and India.

The standard of the papers is high, and they represent a nice balance between fundamental studies, applied research and field trials. The work will be invaluable for reference purposes as well as providing much new information of immediate practical value. Its appeal will be not only to the mining engineer, but also to the civil engineer, engineering geologist, minerals engineer, etc. Most of the papers have a list of references or a bibliography attached, and there is a useful index at the end of Volume 2.

A word of praise is due to the editor for the presentation of the collected papers, which are conveniently arranged and suitably concise. The large number of graphs, line diagrams and photographs provide neat, adequate illustrations, and the two volumes are well produced with large clear print and attractive binding.

The work constitutes an important and welcome addition to the literature on mining research, and is a good example of the high standard of research presentation which can result from an international symposium.

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