but the initial impetus is due to pole migration. Eventually, one may detect that the right kind of foundation is lacking in the voluminous literature on digital filters.

The subject of digital filters is definitely in linear modulation theory which is much richer than linear network theory. Analogies of form are misleading and their partial successes are illusory. This reviewer prefers to be guided by numerical transforms; the missing simulation domain must be brought into existence before digital filter theory is firmly established. Other possibilities for building digital filters are inherent in a more fundamental approach.

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SCIENCE AND SYNTHESIS, edited by UNESCO. 206 pages, diagrams, $6\frac{1}{2} \times 9\frac{1}{2}$ in. New York, Springer-Verlag, 1971. Price, $10.50.

This book is a record of a UNESCO international colloquium organized to mark the 10th anniversary of the deaths in April 1955 of Father Pierre Teilhard de Chardin and Dr. Albert Einstein. As explained by the Director General of UNESCO, R. Maheu, in his welcome speech, p. xiii, "The aim of this Colloquium is to set the procedure and conquests of science against the demands of intellectual synthesis, as by definition required for our concepts of man and the universe".

To accomplish this, some fifteen main speakers were assembled and twenty-two others who contributed to the discussions at UNESCO House, Paris, in Dec. 1965. The volume is organized into three parts: Part One, "Albert Einstein and the Scientific Synthesis" (pp. 3–73); Part Two, "Science and Synthesis: Debates" (pp. 77–176); Part Three, "Teilhard de Chardin" (pp. 179–202). The four debates of Part Two are: (1) From Plurality to Unity (pp. 77–102), (2) Towards a Cosmology (pg. 103–133), (3) Determinism and Indeterminism (pp. 134–146), (4) The Organization of Scientific Research (pp. 147–176).

Part One, which is a sequence of seven lectures, gives considerable insight concerning Dr. Einstein and especially his humanitarianism and desires for unification. Some of it is valuable also as a record of reminiscences by distinguished men who had various degrees of contact with Dr. Einstein, for example, F. Gonsath, who as a student attended Einstein's first course. The paper by G. Holton, "Where is Reality? The Answers of Einstein", is particularly singled out and valuable for its insights into the Mach–Einstein relationship.

The debates of Part Two are weighted quite heavily toward physics and the view points of researchers in the field. The fourth debate should be of particular value to creative administrators and governmental planners, since it discusses means and consequences of organization within scientific disciplines.

The comparatively short Part Three contains eight discussions on the life and ideas of Father Teilhard de Chardin. As M. Barlhélémy-Madaule points out in the thought-provoking sixth of these: "Teilhard is so controversial just because he is the prophet of synthesis". Discussions though are brief on his synthesis with emphasis placed upon evolutionism.

Noting Teilhard's statement: "faith in the world does not differ noticeably from the acceptance of a scientific truth"* one realizes the value in bringing out this record of the Colloquium. For those interested in the development of man's ideas—especially those of these two of the

* Pierre Teilhard de Chardin, "How I believe", Perennial Library, Harper & Row, Publishers, New York, 1969, p. 21.

most creative of modern times—one would hope for a follow-up in the future.

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SIMILARITY METHODS IN ENGINEERING DYNAMICS: THEORY AND PRACTICE OF SCALE MODELING, by Wilfred E. Baker, Peter S. Westine and Franklin T. Dodge. 396 pages, diagrams, illustr., 6 × 9 in. Rochelle Park, New Jersey, Hayden Books, 1973. Price, $20.00.

For the engineer and scientist interested in the practice and art of scale modeling, this book is a must. Via illustrative examples, many drawn from their own practical experience, the authors briefly cover the traditional dimensional theory used for modeling and then reveal how this applies to actual industrial problems. The problems are mainly those where data exists for both a model and its prototype, and thus the reader can check the validity of the results obtained. This comparison may favorably impress the reader who is unfamiliar with the details of scale modeling.

The authors' intent, as stated in the Preface, is "to provide a general reference text on applications of similarity methods and modeling techniques to a wide variety of dynamic problems in engineering, using as many illustrations as possible". This has indeed been done.

The text is practical, superbly illustrated, and the best to appear in this area. It would be appropriate as a supplementary text for a senior level undergraduate class, for a graduate class or as a reference source for practising scale-modelers. (The reviewer has used this text for a graduate class entitled, "Dimensional Analysis, Similarity Analysis, and Similitude" along with the text, *Similarity Analyses of Boundary Value Problems in Engineering* by Arthur G. Hansen, Prentice-Hall Inc., 1964.)

Chapters 1–3 deal with the basic concepts of dimensions and dimensional analysis. Chapter 1 begins almost immediately with a model and prototype drop test experiment and then discusses dimensional and non-dimensional quantities, fundamental and derived units of measure, and the concept of two physical systems being similar. In Ch. 2 three procedures are taught for deriving modeling laws from a system of governing (ordinary differential) equations. In Ch. 3, a dimensional analysis technique utilizing the Buckingham Pi Theorem is revealed.

Scaling of blast waves and gas dynamics is the subject of Ch. 4. General comments on the important dimensionless groups in fluid dynamics are presented and those groups important in gas dynamics are discussed. Laws important in *blast* scaling are then introduced: Hopkinson, Sachs', and others. The final section of this chapter centers on modeling the blast waves generated from closed-breech guns and recoilless rifles. Interesting experimental results are presented graphically throughout the chapter. Chapters 5–8 focus on the response of structures and materials to transient loads.

Chapter 5 deals with modeling of rigid bodies. The authors' first step is to develop the important Pi terms in rigid body motion. Next they discuss how the Pi terms for the model and prototype are related. At this point, the first of four examples, the problem of blast loading on a truck is introduced, and a modeling law is deduced. A discussion of the problem of building the model follows. A figure is given which graphically compares roll angle–time data for the model and the full-scale truck. The second example concerns the study of the landing stability of the Lunar Excursion Module (LEM). Figures are used to compare model test results with a mathematical analysis of predicted LEM performance. The third example compares model vehicle collisions with actual collisions. The final example is a model study of the performance of an off-shore oil storage tank.