working. Hence it becomes a matter of the greatest importance that the mechanical properties of the particular model chosen should not merely approximately, but with mathematical precision, represent the corresponding electrical properties of the circuit it is intended to represent.

It becomes thus necessary to idealise the mechanical model by attributing to it properties which differ more or less from those it actually has in its natural condition. Take as an example the conceptions of electric current and ohmic resistance. According to the author's "foundations," these are respectively represented by speed (linear or angular) and friction. But what kind of friction? The coefficient of friction as applicable to solid bodies will not do, for this implies the existence of pressure between the surfaces in contact, and there is nothing analogous to pressure in the electrical case.

Thus one is driven to assume that ohmic resistance can only be represented by liquid friction of a particular kind, namely, of a kind which will cause the frictional resisting force to increase exactly in proportion to the speed with which a body is moved through the liquid. The author takes a boat which is towed through the water, and assumes that the pull in the tow-rope is exactly proportional to the speed. As an alternative to the tow-rope he assumes that the boat is fitted with a propeller which exerts the same thrust at all speeds, and he uses this model to illustrate the case of an inductive circuit. The mass of the boat corresponds to the inductance; the frictional coefficient, that is, the resisting force per unit speed, corresponds to the ohmic resistance, and the speed to the electric current. The E.M.F. is represented by the thrust of the propeller. Under these conditions the speed of the boat will increase by a logarithmic curve, and approach asymptotically the final value where the thrust of the propeller is exactly balanced by the frictional resistance. Thus, having discarded our conception of the real nature of ships' resistance and propeller thrust and substituted an idealised model, the performance of this model is an exact representation of what goes on in an electric circuit, and the equation of the speed of the boat is identical with the equation of the current in the electric circuit.

The author has not contented himself by merely imagining mechanical models, but has actually constructed one so as to be able to demonstrate the properties of an electric circuit. The model consists of a square frame, one side being provided with rails for a car to travel along. To represent ohmic resistance, the car can be fitted with a paddle moving in a liquid. The mass of the car represents inductance, the force with which it is pulled along stands for E.M.F., the speed for current, the displacement for quantity of electricity (coulombs), and if a capacity effect is to be shown an elastic string is attached to the car. In addition to this model, the author has others to show various electrical phenomena, all of them very ingenious and instructive, especially when he shows side by side curves of harmonic motions obtained by oscillograph attached to the electric circuit, on the one hand, and, on the other,

curves obtained by mechanical means from the corresponding models.

The book is divided into four parts. In the first the fundamental principles are established by mechanical analogies; then comes an exposition of harmonic motions; whilst in the third part the properties of alternating-current circuits are studied in detail, including a chapter on the symbolic method. In the fourth part we find practical applications to transformers, motors, polyphase circuits, and high-frequency oscillations. At the end we find a number of problems given as exercises for students. These are well selected.

GISBERT KAPP.

OUR BOOK SHELF.

The New School of Japan, Founded for the Purpose of Making the Use of the Newly Invented Letters. Pp. x+58. (Tokyo: Dokuritsu Bungakki.)

THIS singular production is an attempt, by means of a quaintly conceived dialogue between two Japanese script reformers, to enlist home and foreign support, especially financial support, towards the promulgation of yet another script for the purposes of the Japanese written language, by modifications of and additions to the roman alphabet of the West. But European scholars have already accomplished this, and the existing system of romanisation is sufficiently perfect for all practical purposes. That system uses the roman letters, as we use them, to transcribe the characters of the Japanese syllabary, each of which represents a vowel or an open syllable; thus *ka*, *ki*, *ku*, *ko*, *ke* represent simply and adequately corresponding simple *kana* (syllabic) characters. But the proposed system would use single alphabetic letters to represent the *kana*. Thus *ka*, *ki*, &c., are written *n*, *v*, *u*, *k*; for *ke* a sort of reversed *k* is used. The modifications of sound, voicing, doubling, and lengthening are denoted by ordinary devices and combinations of these, and a few new letters are invented. Thus *Kono hon wa, Okuma Shigeru to Yamada Eizo* . . . (this book contains a talk between Okuma Sh. and Yamada Ei.) is printed, according to the new system, *Pk cx g Tuf-Cat m Ofr-Tict* (two or three new letters are represented here by their nearest usual ones). Eizo Yamada is the "originator" of the new system; the preface, dated November, 1909, is signed by him and Muneyasu Oki, who is "business associate," and photographs of inventor and associate follow the preface.

For our part we fail to see any advantage whatever in this proposal. Why the Japanese continue to put their thought on paper under a variety of forms that render mere decipherment an impossibility to all foreigners save a very few who have time and patience, or are under some necessity to undertake a most repulsive study of several years' duration at least, the people of Japan alone can tell. Written Japanese, mainly on this account, is more difficult to acquire, even to read merely, than Chinese, yet with a very few changes the difficulty might be very greatly lessened without change of character, and with romanisation would largely disappear. In no long course of time, probably, the unintelligent use of the Chinese ideograph would diminish, the assimilation of written to colloquial speech would develop, and Japanese would present only the ordinary difficulties incident to a strange vocabulary, a syntax based upon impersonality and lack of inflections, and a mass of idioms necessarily differing widely in allusion and reference from those of Aryan languages.

F. VICTOR DICKINS.