

is first an intellectual quarrel, then an attack on the institution, and third an expression of a genuine desire for God." But Mr. McCulloch pleads that it is "fundamentally topsy-turvy to attempt to build up a religion by starting with a search for one which is intellectually watertight". This is doubtless the case in so far as the religious need is not *primarily* an intellectual, but an emotional one. At the same time, a religion that is not "intellectually watertight", or at least reasonably so, is not of much use to anybody. Such a religion can only be a more or less deceptive fantasy, and cannot be relied on in a crisis.

The trouble with institutional religion as it exists to-day is that it does not take the claim for "intellectual watertightness" nearly seriously enough. Merely to bring the technique of worship up to date, and to scrap the parochial system (as Mr. McCulloch suggests), is just to scratch the surface of the problem. Beautiful and inspiring worship, and efficient organization, avail nothing if the religion stresses as important beliefs which are not historically or scientifically true. Yet Mr. McCulloch has written an honest, stimulating book. J. C. H.

Physics

Electrical Measurements in Principle and Practice
By H. Cobden Turner and E. H. W. Banner. Pp. xiv + 354. (London: Chapman and Hall, Ltd., 1935.) 15s. net.

THE always inadequate literature of electrical measuring instruments is notably strengthened by this addition. The frontispiece in itself is worth having, though it merits printing on three separate pages normally oriented in place of the single much folded sheet, which demands some proficiency in acrobatics for its full enjoyment. The treatment of the measuring instruments of power-engineering and of audio-frequency work is in general satisfactory; that of the more fundamental work, and of oscillographic work, is not so good; while the treatment of radio-frequency measurements is definitely amateurish.

Local patriotism and the camera have combined to weaken the balance and usefulness of the work as a whole. The predominance of Lancashire does not extend so far into the instrument field as the proportion of "Salford" illustrations suggests. Photographs, without the inclusion of the invaluable foot-rule, are much less useful to the reader than are line diagrams. The authors have allowed the sales and publicity men to unload on them an undue share of their facile material, as, for example, on p. 241, a "Valve Oscillator. Mains All-Metal Type". The learned judge might, with more reason than usual, ask "What is an all-metal oscillator?" Whether he might advantageously be invited to turn his attention to p. 143, "experience in the supply of testing instruments to the Government Services has produced robust instruments able to withstand the maximum of rough handling", is a high-politico-legal problem.

The definition of a galvanometer (p. 109) is not good; the reference to oscillographs on the same page is worse. A galvanometer is not necessarily

sensitive; it is of its very essence that it does not, directly, "measure" D.C. or A.C.; oscillographs are not merely "a form of galvanometer" and are not of two types—moving coil and cathode ray. The moving iron oscillograph deserves mention, the moving coil oscillograph is not sensitive (as a member of the authors' class of galvanometer must be) and the cathode ray oscillograph would still be a laboratory toy were it only a galvanometer.

The power engineer will probably find the book more valuable than these critical comments suggest. A good book, first edition, would be a very good book, second edition, if attention be given to the points mentioned.

Tables of Physical and Chemical Constants and some Mathematical Functions

By Dr. G. W. C. Kaye and Prof. T. H. Laby. Eighth edition. Pp. vii + 162. (London, New York and Toronto: Longmans, Green and Co., Ltd., 1936.) 14s. net.

It is difficult to imagine a modern physical laboratory which does not possess its well-thumbed copy of "Kaye and Laby"; and it is a special pleasure to see that our old friend, clad in gayer harness than has been his wont, has now reached his eighth edition.

Kaye and Laby's Tables is a work the utility of which is quite out of proportion to its modest dimensions. In a small and handy volume of tables, the editors have to pick and choose, and they have two main duties to perform: to see to it that they let down the users of the tables as infrequently as possible, and to arrange their matter so that the searcher for a number may find it with ease. How well the editors have accomplished their task is obvious—an eighth edition speaks for itself.

This edition preserves all the old features, and a number of recent data have been added. If a very mild criticism may be ventured, it is that the editors, in their anxiety to introduce new data under the appropriate heading, have had to cut short the amount of new information which they could have given us. In all instances of physical properties which vary with pressure and temperature, it is advisable to list these properties over as wide a range as possible—preferably by means of equations, when dealing, say, with homologous organic compounds. For heavy water, some preliminary investigations have been made, and density, viscosity and surface tension, for example, have been investigated at different temperatures. Exigencies of space have made it impossible for the editors to do more than quote one or two figures—it were impossible otherwise to squeeze them in under their appropriate heads. It is much to be hoped that the editors will, in the ninth edition which is surely contemplated, give the latest information which may be needed in any detail by way of a separate sheet or two at the end of the book. A detailed index, which already exists, would serve as guide, and much more additional information would be easily made accessible to the reader.

The new edition may be heartily commended, both to users of the old editions, and to those unfortunates who know not how Kaye and Laby's Tables *delectant domi, non impediunt foris*. A. F.