as in Egypt. The author goes into details in other directions which it seems unnecessary to follow, and he estimates the area requiring irrigation and producing crops twice a year by a consideration of the colour changes.

The Mechanical Engineer's Reference Book. By H. H. Suplee. Fourth edition, revised and enlarged. Pp. xii+964. (London and Philadelphia: J. B. Lippincott Company, n.d.) Price 18*s.* net.

THE first edition of this well-known book was published in 1903. Sections are included giving mathematical formulæ and tables, information on mechanics, materials, machine design, heat, air, water, fuels, steam boilers and engines, internal combustion motors, and electric power. While much of the information supplied is good, and renders the book of service to engineers, there is a considerable amount of space taken up with matter which is surely unnecessary in an engineering reference book. Some of the very elementary geometry given on p. 107 *et seq.* might be eliminated. There are few engineers who would require to consult a reference book in order to find out how to bisect a line by another line at right angles. The tables given on pp. 432 and 433 face one another, but the book has to be inverted before the second table can be read. On p. 274 there is a table giving the heights traversed by a falling body to seven significant figures. The American nomenclature in several places makes it somewhat difficult to obtain the precise meaning.

The real test of the value of an engineering reference book is the up-to-dateness of its contents, otherwise the book will be used probably for the sake of the tables of areas and circumferences of circles, logarithms, etc. The present edition is by no means up-to-date in several of its sections; those dealing with the strength and elasticity of materials and the properties of steam may be specially mentioned in this respect, where very little mention is made of the valuable developments which have taken place during the last ten years.

Outlines of Chordate Development. By Prof. W. E. Kellicott. Pp. v+471. (New York: H. Holt and Co., 1913.) Price 2.50 dollars.

PROF. W. E. KELLICOTT'S introduction to the study of chordate development begins with Amphioxus, which "affords in simple diagrammatic style, the essentials of early chordate ontogeny"; it lingers over the frog; it treats the chick more briefly, but lays emphasis on the embryonic membranes and the early stages; it ends up with the mammal, with particular reference to the early stages, the fœtal membranes and the placenta, and the development of the external form. The book is well arranged, carefully and clearly written, and effectively illustrated. We think that it might have been made more interesting and distinctive by being more definitely correlated with phylogeny and comparative anatomy; but that, of course, is a big business. The well-selected bibliographies point the way.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

Action of Radium Rays on Bakelite.

A DISC 4·2 mm. thick of the light yellow variety of transparent Bakelite was cut from a rod, polished and radiated with β and γ rays from radium. The colour of the disc darkened to a wine-red after three days, and exhibited an absorption band $\lambda=5700-6000$, which was not visible at first. The spectrum beyond $\lambda=4900$ Å.U. was also obliterated. A similar disc placed in radium emanation became also rapidly coloured. The coloration extended to a depth of 2 mm., and it could be completely removed by exposure to a temperature of 100° C. for about three hours.

In order to see whether ozone played any part in the action a Bakelite disc was exposed to the gas for six hours both alone and with radium near. Not the slightest coloration occurred. A portion of a rod was coated with paraffin wax and the radium rays caused to radiate the rod partly through the wax layer. There was no diminution in the rate of colouring under the wax. The effect, therefore, appears to be due to the direct action of β rays upon the Bakelite, for it would extend much deeper were it due to the γ rays. This new substance may prove to be a useful filter for therapeutic use, especially as it is cleanly and easy to work.

CHARLES E. S. PHILLIPS.

Physics Laboratory, Cancer Hospital,
May 14.

Respiratory Movements of Insects.

THE concertina-like movement observable in the abdomen in the case of wasps and bees is, I believe, the visible evidence of the act of pumping the air in and out for respiratory purposes, and a similar phenomenon may be seen in dragon-flies, except that in the latter the movement is lateral and slow, whilst in wasps and bees it is axial and rather quick. I have not noticed any such movement in other groups of the Hymenoptera, and it is apparently absent in the Diptera, except *Eristalis tenax*, the common drone-fly, which obviously mimics the hive bee and other small species. If this movement really is due to respiration can any reader say why it is so comparatively restricted in the insect world? One would have expected soft-bodied insects, such as Diptera, to exhibit it more obviously than the more chitinous species amongst the Hymenoptera. I, and probably others, should be glad of any information throwing light on this matter.

C. NICHOLSON.

MR. NICHOLSON has hit upon an interesting inquiry, and will probably not be surprised to find that it has already received a good deal of attention. The respiratory movements of insects were experimentally investigated by the late Prof. Felix Plateau, of Ghent ("Recherches Expérimentales sur les Mouvements Respiratoires des Insectes," *Mém. Acad. Roy. de Belgique*, tome xlv., 1884), who contributed a short summary of his results to Miall and Denny's "Cockroach" (pp. 159–64). Respiratory movements can be demonstrated in dipterous flies, but in them the enlarged thorax is alternately contracted in different directions by the action of two sets of muscles, which are figured in Miall and Hammond's "Harlequin Fly," (pp 100–102). Far more space than NATURE could