

courses to provide both the medical and the engineering training which such officers require. But it is not expected that these courses should be a part of the training of every physician and of every engineer, nor even that every school of medicine or of engineering should establish such courses.

There already exist under university or government control several stations or institutions devoted to research in the problems of engineering. This research is naturally largely experimental, and these stations provide the opportunity of a career for the man who has the aptitude and the desire for this work. If such stations enter upon the field of the mathematical problems of engineering the door will be opened to a career in this line also.

With a definite demand for men competent to attack the mathematical problems of engineering will come the inducement for men to train themselves for the work, and with this inducement, a demand for suitable courses. To meet this demand a few institutions, already strong in both mathematics and engineering, may well organize graduate courses analogous to those which now lead to the degree of Doctor of Public Health.

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### FUNCTIONS OF LINES.

*Leçons sur les Fonctions des Lignes.* Par VITO VOLTERRA.  
Recueillies et rédigées par JOSEPH PÉRÈS. Paris, Gauthier-Villars, 1913. 8vo. vi+230 pp.

THESE lectures were delivered by Volterra at the Sorbonne during the months from January to March, 1912, and were later published as one of the Borel series of monographs on the theory of functions. It would be difficult to determine precisely the historical origin of functions of lines. Special cases of such functions, for example the ordinary definite integral or the integrals of the calculus of variations, have occupied a large share of the attention of mathematicians since the beginnings of the calculus itself. But the conscious formulation of the definition of a function of a line and its derivative, and the study of a general theory, belong to a recent period of investigation in which Volterra has been an earliest pioneer. The development of our knowledge of functions of lines and their applications, since Volterra's