the facts recently added to our knowledge of the triangle, and which indicates many others. A similar treatment of the quartic would follow. It is hardly an objection to say that the reader is not supposed to know about covariants, for here is as good a way as any to introduce them to him. The plan thus briefly sketched has, of course, no pretension to novelty; its claim to consideration here lies in its ability to classify and connect much of that matter of the book which is not already connected and classified by the methods of projection and reciprocation.

I have dwelt enough on defects in the author's programme. But in its handling so much power is displayed that one hopes he will set his hand to the plough again, and deal largely with some part of the present outlook as stated in Klein's "Vergleichende Betrachtungen" (BULLETIN, July, 1893); throwing examination schedules, if they interfere, to the four winds of heaven.   FRANK MORLEY.

WEST FALMOUTH, MASS., *August*, 1893.

PAPERS OF MR. CHARLES CHREE
ON VORTICES IN A COMPRESSIBLE AND ROTATING FLUID.

THE recent appointment of Mr. Charles Chree, M.A., of King's College, Cambridge, Eng., to be Superintendent of Kew Observatory as the successor of the late Mr. Whipple, leads us to hope that the study of the mathematical and physical problems whose solution is so important to the progress of meteorology will now receive a great stimulus in England. Mr. Chree has hitherto been known to us mostly through his excellent works in pure mathematics as applied to the subjects of elasticity and of vortex motion: his papers on vortex motion are probably but little known to the mathematical physicists of America, and with the author's help we are able to present the following account of his memoirs, which will be of interest to meteorologists in so far as the assumptions which underlie his mathematical solutions harmonize with the conditions that prevail in the atmosphere. On this latter point Mr. Chree very properly and modestly says :

" I should be sorry if any one supposed I profess to have actually solved the exact problems presented by nature. The lay reader is so much at the mercy of the mathematician that I think the latter is taking a most unfair advantage of his position if he avoid taking a reasonable care to prevent the