

SOME RECENT DEVELOPMENTS IN THE
CALCULUS OF VARIATIONS.*

BY PROFESSOR GILBERT AMES BLISS.

It is my purpose to speak this afternoon of a part of the theory of the calculus of variations which has aroused the interest and taxed the ingenuity of a sequence of mathematicians beginning with Legendre, and extending by way of Jacobi, Clebsch, Weierstrass, and a numerous array of others, to the present time. The literature of the subject is very large and is still growing. I was discussing recently the title of this address with a fellow mathematician who remarked that he was not aware that there had been any recent progress in the calculus of variations. This was a very natural suspicion, I think, in view of the fact that the attention of most mathematicians of the present time seems irresistibly attracted to such subjects as integral equations and their generalizations, the theory of definite integration, and the theory of functions of lines. It is indeed in these latter domains that the activities especially characteristic of the present era are centered, and the progress already made in them, and the further progress inevitable in the near future, will doubtless be sufficient alone to insure for our generation of mathematical workers a noteworthy place in the history of the science.

While speaking of present day mathematical tendencies I should like to take occasion to mention a remark which has been made to me a number of times by persons who are interested in mathematics primarily for its applications. The feeling of some of these scientists seems to be that mathematical research in America is drawing farther and farther away from the forms of mathematics most immediately useful in related subjects, and they wish to attract the attention and stimulate the interest of mathematicians in the directions of these intermediate domains. We should indeed sympathize heartily with this desire. It is not at all to be regarded

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