AN ADVANCE IN THEORETICAL MECHANICS.

Théorie des Corps déformables.   Par E. COSSERAT et F.
  COSSERAT.   Paris, A. Hermann et Fils, 1909.   vi+226 pp.

IN a recent review* of the French edition of the first half of
Chwolson's monumental treatise on physics, we purposely
and explicitly omitted comment upon two extended notes†
of the Cosserats on the foundations of analytical mechanics
other than first to state that, owing to the difficulty of the
notes themselves and the lack of a general theoretical treat-
ment of mechanics in Chwolson's volumes, these notes seemed
out of place, and second to promise that these important con-
tributions of the Cosserats should shortly be reviewed.   The
Théorie des Corps déformables is a reprint, with repagination,
of the second of these notes, and may be obtained separately
by those who may want it without the rest of Chwolson's
highly valuable treatise.

The underlying idea of the Cosserats is to base analytical
mechanics, in its most widely extended sense, not upon
Newton's laws or Hamilton's principle, but upon what they
call *euclidean action,* and to define the common concepts of
mechanics in terms of this euclidean action; to develop a
general theory which shall include as special cases newtonian
mechanics and its various derivatives or extensions, of which
there are so many, hydrodynamics, elasticity, and electro-
magnetism, and which shall extend in its generality to an
infinity of possible non-newtonian systems of mechanics, of
which at least one is now familiar to students of relativity.
This ambitious task they have certainly accomplished, and
from the favor in which their work seems to be received by
such authorities as Appell, it is by no means impossible that
Hamilton's principle, which up to the present has contained
the most general and unifying theory of mechanics, may
rapidly become replaced by the Cosserats' euclidean action.

The fundamental geometric element of their system is not
the point, but the point carrying a system of rectangular axes,
that is, the trirectangular triedral angle.   It is clear that the

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* This BULLETIN, volume 18, pp. 497–508, July, 1912.
  † Chwolson, Traité de Physique, volume 1, pp. 236–273, and volume 2,
pp. 953–1173.