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THE THEOREM OF THE ADDITION OF
VELOCITIES EMPLOYED IN CLASSI-
CAL MECHANICS

LET us suppose our old friend the railway carriage to be travelling along the rails with a constant velocity v , and that a man traverses the length of the carriage in the direction of travel with a velocity w . How quickly, or, in other words, with what velocity W does the man advance relative to the embankment during the process? The only possible answer seems to result from the following consideration: If the man were to stand still for a second, he would advance relative to the embankment through a distance v equal numerically to the velocity of the carriage. As a consequence of his walking, however, he traverses an additional distance w relative to the carriage, and hence also relative to the embankment, in this second, the distance w being numerically equal to the velocity with which he is walking. Thus in total he covers the distance $W = v + w$ relative to the embankment in the second considered. We shall see later that this result, which expresses the theorem of the addi-

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tion of velocities employed in classical mechanics, cannot be maintained; in other words, the law that we have just written down does not hold in reality. For the time being, however, we shall assume its correctness.