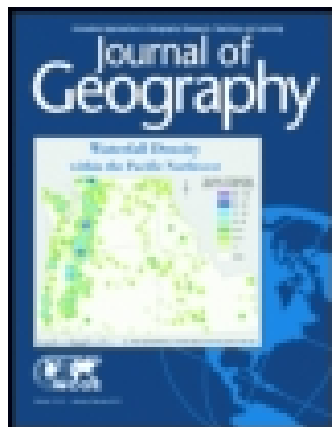


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### Ferrel's Law and Artillery Firing

F. V. Emerson

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this has been made out beyond question, and a fellow observer beside me agreed absolutely in this statement. When the fish rose again after touching the water, it invariably beat the water with fluttering fins.

Flying fish do not seem to have much strength of flight, such as a bird displays. Often, as in passing the Azores two days ago, one catches sight of the sturdy Mother Carey's chickens over the waves as they watch for the fliers, and nothing could be more striking than the contrast. The bird always hovers, darting and changing direction. The fish always moves in the direct line of propulsion, like a thrown ball. Like that, it may describe a slight curve or rebound on touching the water, but never is there in the flight of flying fish any resemblance to the hovering or fluttering about of small birds. Neither is there any resemblance to the soaring of the hawk which is spiral and circling; yet the fish certainly soars. There is the closest possible similarity, both in starting and landing, to the motion of an airplane.

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#### FERREL'S LAW AND ARTILLERY FIRING

It is well known that, according to Ferrel's law, the earth's rotation deflects winds in the northern hemisphere to the right and, in the southern hemisphere, to the left. During a classroom discussion, the question was raised as to whether this deflection of moving bodies is of sufficient importance in artillery operations to demand that allowance be made for it. Through the courtesy of the War Department, there was brought to the writer's attention the paper: "Effect of the Earth's Rotation Upon Point of Fall," by Major Fred M. Green and Major C. W. Green, *Journal of the United States Artillery*, May-August, 1918.

The authors conclude that, for a range less than about 20,000 yards (about 11 miles), corrections for the earth's rotation "will generally be less than the uncertainty due to other factors and their employment is therefore inadvisable." For calculating the amount of right-hand deflection, the procedure is as follows: multiply the angular velocity of the earth's rotation by the range time of flight in seconds, by the range distance and by the sine of the latitude.

F. V. EMERSON