Interactions of the Earth With Very Large Meteorites *

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It is the experience of but a few to witness one of the very numerous meteorite strikes inexorably stitching the earth into the fabric of the universe. More may thrill to a first hand account of a meteorite strike given by a friend as he recalls, when a boy, the "cinder-like" piece which missed his foot by inches, or to another account of the thundering course of a meteor over Port Hope, Ontario, in the early 1940's spanning the landscape with a broad luminous band from one horizon to the other in a S.E. to N.W. direction. Many more marvel at the widely publicized account in 1954 of the meteorite which blasted through a house roof in Sylacauga, Alabama, glanced off a piece of furniture and then struck the housewife. These things can be believed; they are minor occurrences and they have been witnessed.

What witness is there to such occurrences which are not so minor? The moon, for one, displays on its always visible face about 30,000-35,000 circular scars accepted by most authorities to be the result of meteor collisions. These scars range in size from 500 meters to 600-1200 kilometers in diameter, with depths, in relation to the diameters, approaching 6,000 meters. This mute witness is almost 400,000 kilometers from the earth, but this distance is as nothing in the scale of the solar system. The moon and earth are essentially one object sampling a volume of space, so that the testimony of the moon leads to a very direct estimate that the earth should have a proportionate number of scars. However, estimates taking into account the greater gravitation of the earth increase the number by about 30 percent to a round million. This very number would seem to discredit the witness, for certainly this many could not have escaped notice. The most obvious explanations of the great discrepancy between the estimate and actual observation have to do with the severe weathering and the very effective concealment by the mantles of water, ice and sediments on the earth.

Weathering proceeds at different rates in different climatic, structural and compositional environments. If the problem involved only the weathering of known scars over the earth in the last

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Reprinted from Bulletin of South Carolina Academy of Science
Volume 24, 1962