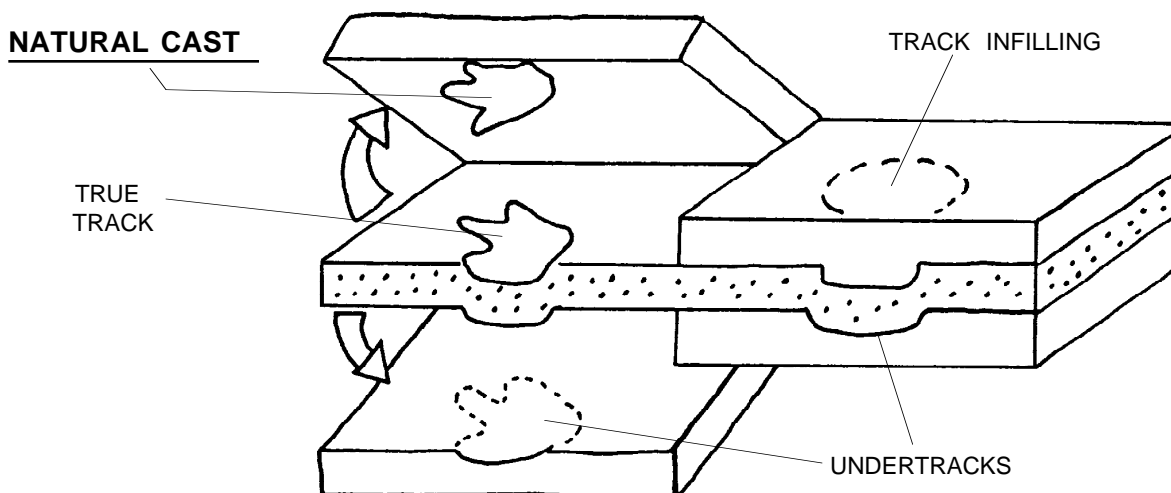


NATURAL CASTS OF FOSSIL TRACKS

Fossil tracks may be petrified replicas of the original footprint impression, essentially molds of the feet. Strictly speaking, these are dynamic impressions, or molds of the foot in all phases of motion during the footstep. Some trackers have gone so far as to differentiate these dynamic components, as the touch down, weight-bearing, and push-off or kick-off phases of the footstep.¹ These tracks may be noticeably different from the impressions taken from the feet of lifeless museum specimens.²

If footprint molds are filled in by sediment, *natural casts* are produced (see diagram). These are essentially replicas of the feet formed by the overlying sedimentary layers. They are sometimes referred to as tracks in negative relief, as distinct from the positive relief of molds. Dramatic examples are sometimes found in coal mines, where footprint casts bulge down from the mine roof after the coal seam has been excavated. (Such large downward bulges and projections are hazardous to miners. There is at least one report of a miner being killed by charging headlong into a footprint cast.) Whether molds or casts are preserved is largely dependent on the resistance of the rock in the track-bearing and the infilling layers. If a soft mud fills in a track in a firm sand that later becomes hard sandstone the track will probably be preserved as a mold after the soft shale has been eroded out. Conversely, if sand fills a shale mold, it will be preserved as a *natural cast*. Where two tough layers are preserved, we may find both the molds and the matching casts.



1. Identifying these dynamic phases of footsteps is not easy, especially in fossil tracks; however, it has been done in a few cases. Thulborn, R., and Wade, M. 1984. "Dinosaur Trackways in the Winton Formation (Mid Cretaceous) of Queensland." *Memoir of the Queensland Museum* v. 21, p. 413-517.
2. Because tracks represent the locomotion of animals, they represent the dynamic contact between foot and substrate rather than the simple molding of the sole. Some trackers have made molds from the feet of dead animals for comparison with fossil footprints. For example, Frank Peabody illustrated front-and hind-foot "impressions taken from a pickled specimen of *Sphenodon*," the New Zealand tuatara lizard. He then compared these with 250-million-year-old Triassic tracks. Baird, D. 1980. "A Prosauropod Trackway from the Navajo Sandstone (Lower Jurassic) of Arizona." In L. L. Jacobs, (Ed.) *Aspects of Vertebrate History*. Flagstaff: Museum of Northern Arizona Press, pp. 219-30. Peabody, F. 1948. "Reptile and Amphibian Trackways from the Lower Triassic Moenkopi Formation of Arizona and Utah." *University of California Publications Bulletin of the Department of Geological Science* v. 27 (no. 8), p. 295-469.