to Rosanna,
Beyond Apogee

I was watching an analysis of a rocket booster, and its mishap in landing. The booster tried to land in shallow water off the coast of Texas. It was successful in a slow decent and hovered for a microsecond above the water until it slipped into the water in a cloud of steam. By this time the booster had ceased firing and the cloud was not big enough to obscure the view.

The booster's landing legs were small triangles which did not fare well in the shallow water and it tipped to the side slowly. The microseconds stretched to seconds and in a grand arc the top of the booster moved to meet the small ocean waves that gently buffeted the landing legs. It was sideways in the water, still and perfect, smooth and bright in the waves. It was a monument now, to the energies that it had exerted in a brilliant lift-off.

It had reached apogee, velocity had reduced to a soft curve and it returned to the earth from which it came. This was its design. This it had achieved. The mishap that it had in landing, as it toppled over into the waves and so could not be reflown, was but an event in its journey, and unavoidable for rocket boosters that land in water.

Rocket boosters are the rockets that lift a second stage to an altitude where that second stage can take flight, so that they may reach orbit. It is the design and purpose of a booster to return to earth. The second stage might be another rocket, or a spaceship. Launching the second stage is the main purpose of the first stage. The second stage is the child of the first. There may be more stages, each carrying a smaller vehicle which is helpless to serve its purpose without the booster, and so a precious charge that the booster directs its energy to lifting higher.

The booster separates from the second stage, sometimes relatively close to earth. In some designs it might not fly all that high, in others it lifts the second stage almost to orbit. Sometime in their journey, there is a puff of smoke and the booster and its child become two pieces moving toward space.

The child moves toward space unimpeded by the atmosphere, while the booster, now without its charge, and changed in shape where it once carried a precious purpose, encounters the stronger force of the atmosphere. The booster and its child move at the same rate for a microsecond. Then the seconds stretch and the booster slowly increases distance. It slowly and irreversibly falls away from the child, as it moves against gravity. But gravity always loves boosters, and they must fall toward the earth. The child is a new vehicle under its own power. It lites up as blindingly bright as its parent and glows in a streak toward orbit.

The booster slows, frozen motion, stopped for a microsecond hovering above the earth while the child drives faster toward orbit, to a faster speed and to a longer distance than the booster could every reach.

201909.