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Susan Jane Colley and **Gary Kennedy*** (kennedy.28@osu.edu). *The stationary train and the runaway train*. Preliminary report.

In work which we finished nearly 30 years ago, we used a tower of compactified curvilinear data spaces introduced in 1954 by Semple. The construction of this tower was independently rediscovered by Montgomery and Zhitomirskii, who called it the monster tower. They pointed out that if one applies the oriented version of the construction beginning with \mathbb{R}^2 , one obtains the configuration space for a standard system in mechanics: a truck pulling multiple trailers.

Within this system, one can pose two complementary problems: (1) Given the path of the truck, what will be the path of the last trailer? (2) Conversely, given the desired path of the last trailer, what should be the path of the truck? Of particular interest are what might be called stationary solutions, i.e., configurations of the train in which it moves as if it were a single rigid object. These stationary trains can be related to natural strata on the monster tower.

These same strata also arise when one studies the runaway train. Here one sets an initial velocity and angular velocity for the truck, and ask what happens as it moves according to Newtonian mechanics. The strata appear as bifurcation loci.

We will recount this story in detail in a book now being written with Corey Shanbrom. (Received September 04, 2019)