Supplement to: "Early versus Late Wide Gauge Motor Performance", *Ties*, December 2013, pp 17-23.
John B. Gilmer Jr.

Unfortunately, the graphs giving the efficiency of the early and late motors, Figures 10 and 11 of the original article, are missing the legend on the Y axis. These figures show motor efficiency in units of scale miles per hour (mph) times the number of cars (mechanical power delivered), per electrically supplied Watt. This choice of unit was used for lack of calibration data that relate scale miles per hour per car to mechanical energy in Watts.

Since then, a circular test track driven by a pulley and weights was used to establish a relationship between speed and mechanical power required for various rolling stock, as seen in Figure 1. Results in Watts and scale miles per hour are shown in Figure 2.

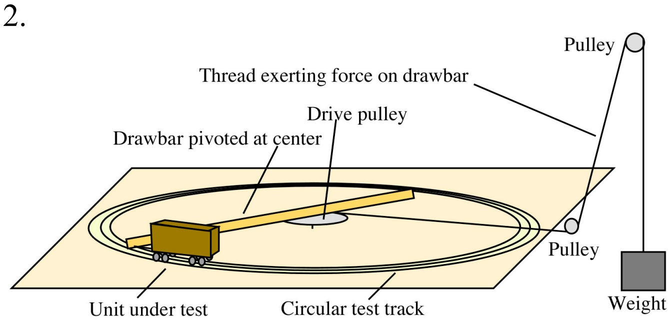

Figure 1 Test configuration for measuring mechanical power needed for various speeds.

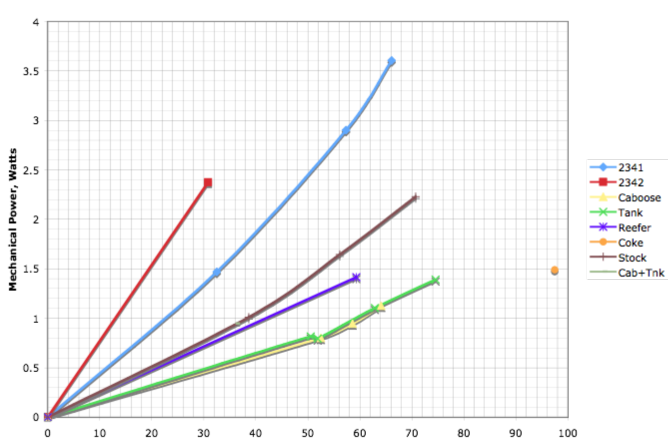

Figure 2 Power versus speed for various Ives rolling stock used in testing

The locomotives, not surprisingly, take much more power. They heavier, and the friction of turning the armature is included. The power is higher for the 2342 (late motor) because, for a given speed, the armature must turn faster. The car powers vary considerably, reflecting the conditions of the cars. Car power for a given speed varied by up to about a factor of two.

With these results, Figures 3 and 4 show for the two variations of the Ives standard gauge motors the mechanical power delivered in Watts. These graphs also reflect a revised calculation of AC power based on a "power factor" of .7. This results from a 45 degrees phase difference between Voltage and Current did not vary significantly with conditions.

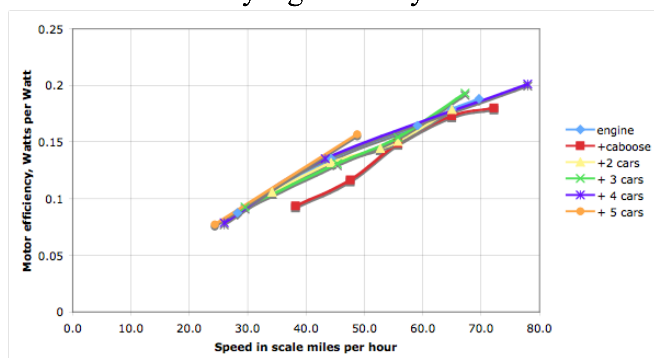

Figure 3 Efficiency of early wide gauge motor

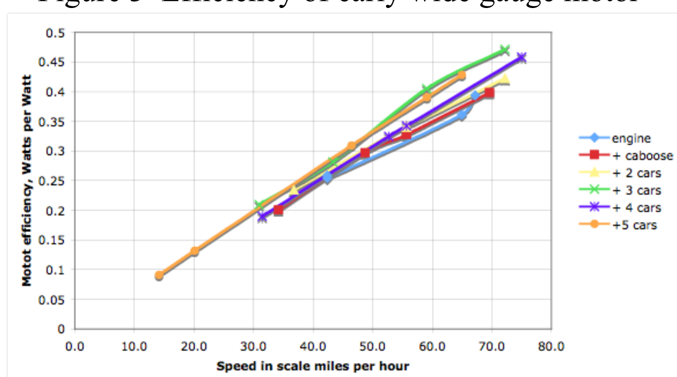

Figure 3 Efficiency of late wide gauge motor

At typical layout speeds of 50 scale miles per hour, the 2341 with its early motor is only about 14% efficient, compared to about 30% efficiency for the late motor. The early motor will draw more than twice as much power for a given load. That extra power is dissipated as heat in the motor. Heavy trains could clearly tax an early motor to the point of danger. It thus makes some sense that Ives would take the time and expense to develop the late version of the wide gauge motor despite other financial strains as this was occurring.