Charles "Gabby" Street was a catcher for the Washington Senators from 1909 to 1911. He reputedly caught a 145g baseball dropped from the top of the Washington Monument which is 152m tall. Modern wind tunnel measurements suggest that the terminal speed of a dropped baseball should be about 42.7m/s.

1. Ignoring air resistance, find (a)the time it takes for the ball to reach the ground and (b)the speed when it gets there.

2. Find (a)the force of air resistance on the ball at terminal speed and (b)the coefficient of air resistance for the ball.

3. Find the time it took the baseball to reach 90% of terminal speed. Compare this answer with the time to fall from problem 1. Comment on the significance of air resistance for the fall of the baseball.

4. (a)Take the equation for the velocity versus time for an object falling with air resistance and derive the equation for the distance fallen as a function of time for the baseball. (b)Graph the distance fallen versus time to find the actual time to fall 152m. (c)Compare your answer with the answer from problem 1.