between the beams, the cranks being 90° apart. A Corliss upright boiler delivered steam at one hundred and twenty pounds' initial pressure to the eighteen-inch high-pressure cylinder, whence it is passed, by a receiver, to the thirty-six-inch low-pressure cylinder, and thence to a surface condenser. Both pistons have six-foot stroke, and the steam was cut off at about one fifth. Four pump plungers,—three feet diameter, three-foot stroke,—two for each beam, on opposite sides of the centre, delivered, one after another, eighty-five cubic feet of water at each revolution. The number of revolutions per minute was 27.5. From three hundred and four indicator cards taken during the trial, it was found that the mean horse-power was 244.6, and that the coal burned per horse-power was 1.52 pounds per hour. The average actual duty for the whole run was 111,906,926 foot-pounds for one hundred pounds of coal.

An advantage is claimed for the Corliss over the direct-acting Leavitt pumps in the construction of the valves. The weight of the hinged valve of the Leavitt pump must be lifted by the engine when the valve opens, and solid substances may become squeezed in under the hinge and prevent the valve from closing. Mr. Corliss maintains that sewerage is liable to contain solid bodies, including even cats and dogs. So he puts the valve disk on one end of a horizontal lever, hinged at some distance from the disk itself, and attached at the other end to a vertical rod by which the valve is moved. The weight of the rod balances that of the valve, so that the valve requires less power to lift it. A spring is also connected with the rod. If now any obstruction—a yellow dog, for example—prevents the closing of the valve, the latter is not injured; and if the dog is not too large, he is at the next stroke carried serenely on his way.

Having wandered through the extensive works of the Corliss Engine Company, the delegation of embryo engineers next visited the large establishment of Brown & Sharpe, where they were cordially received and conducted through the buildings. A great variety of articles is made by this firm, and much time might be profitably spent in studying their various special methods and machines for doing nice, accurate work, as well as the model system by which the business is managed. The visitors were struck by the neat appearance of the shops and the careful provision for the comfort of the workmen. Even in the foundry, white curtains hung at the windows, the walls were clean and white, the room well ventilated and lighted, and made comfortable by steam radiators.

After a short visit to the Harris-Corliss Engine Works, the party took the seven-o'clock train for Boston. Such excursions may be made a source of much information and pleasure, and the boys say, "The more of them the better."

H. B. G.