Another important era in our lives has come; with that courage, industry, and attention to duty which has characterized us in the past, let us go forward to meet it; let us meet it with thanksgiving in our hearts for past successes; with no pomposity for our learning, but an earnest desire to learn more; and finally, with a deep, true, never-to-be-forgotten love for our dear old Alma Mater.

“Clearance” in the Wheelock Engine.

Mr. Editor: Members of the Σ M. E. will remember that in a recent discussion of the Harris-Corliss and the Wheelock engines, there was a difference of opinion as to the loss due to the greater "clearance" of the Wheelock. In this engine, the clearance is increased during the expansion by the space between the cut-off and main valves; and when the exhaust takes place, steam is entrapped in this space and kept there till the beginning of the next stroke. It is claimed for this arrangement that there is no loss due to the space between the valves, because no steam is exhausted from it. Whether this view is correct or not can be easily shown; and as the principle involved is important and of general application, it may be worth while to illustrate it by an example.

Suppose we have an engine without any clearance, taking steam at 120 lbs. pressure during \( \frac{1}{6} \) of the stroke. Assuming Mariotte's law, the pressure on the piston at the time of cut-off, or \( \frac{1}{3} \) full stroke, is 120 lbs. At \( \frac{2}{3} \) stroke, the steam has doubled its volume, and its pressure is 60 lbs.; at \( \frac{3}{8} \) stroke it is 40 lbs.; at \( \frac{1}{8} \) stroke, 30 lbs.; at \( \frac{5}{8} \) stroke, 24 lbs.; and at the end of the stroke, 20 lbs. By calculating the pressure at a sufficient number of intermediate points, and taking the average, the mean pressure for the whole stroke will be found to be in this case about 56 lbs.; and if we deduct 16 lbs. for back pressure, we have 40 lbs. as our mean effective pressure.

Now take a case where we have a clearance of say 1 per cent of our original cylinder capacity. That equals 6 per cent of the space through which the piston has advanced at \( \frac{1}{6} \) of its stroke; so at the instant of cut-off there is 6 per cent more steam behind the piston than there would be without this clearance. When this larger amount of steam has expanded to fill the cylinder, its pressure by Mariotte's law would be about 21 lbs., or \( \frac{3}{4} \) of what it was at first; and the clearance space, which originally contained 6 per cent additional weight of steam, would now, owing to the reduced density, contain only \( \frac{2}{3} \) of that amount, or about 1 per cent. If this amount is entrapped between the valves until the next stroke, à la Wheelock, the net additional steam consumed on account of clearance is 5 per cent.

But if we calculate the mean effective pressure in this case in the same way as before, we find it to be 41 \( \frac{1}{8} \) lbs., a gain of 2.8 per cent over the 40 lbs. obtained without clearance. As any one can verify this result for himself, the arithmetical work is omitted for want of space. It is clear that to gain 2.8 per cent in power, we have had to expend 5 per cent more steam, showing a loss of over 2 per cent of steam for a clearance of 1 per cent between the valves of a Wheelock engine.

The outdoor spring meeting of the Athletic Club will be held at Beacon Park, Saturday, May 27, at 2 p.m. The following officers will probably serve: Clerk of course, H. Ward Leonard, '83; scorer and measurer, Chapman, '85; referee, Wendell, H. A. C.; judges, Snelling, '82, Richards, '83.