

lowed to select their labor bosses, carpenter foremen, and to some extent were given a free hand in the number of carpenters and laborers that were to be employed on their respective buildings. A bonus was promised to these two foremen, to be divided in a given proportion according to the labor economy realized on the two buildings in executing the work.

The Aberthaw Company organized the job on the plan followed in all its larger work. A superintendent, with such clerks as he required, was given responsible charge of the entire job, and the handling of all local and minor business details. He reported to the president of the company who visited the work at short intervals and put in such time as was necessary. In addition to the superintendent the company detailed from its own permanent forces a time-keeper; two foremen, one for each wing of the building; one labor boss; and a carpenter boss with six or eight experienced men under him for each wing. All the rest of the labor force was recruited on the ground. The company uses an accounting system which shows unit cost of each item, the progress, and the cost of labor and material used. On this job the reports on each wing were kept separate. Placing the forms and handling the concrete naturally made up the chief labor cost of the work.

Rivalry between the two sides began at the start of the job and continued with increasing keenness until the end.



Reinforcement in place.

The carpenters on the two wings were separated only by the width of the central court and were in plain view of each other. The amount of centring placed by the carpenters on one side was carefully noted by the men on the corresponding work of the other building, who made an effort to do better. The north wing started two days ahead of the south building, and the marks set up by the men on the north side drew corresponding speed from the men on the other side. The two mixers were placed side by side on the Winchester Avenue end of the buildings, so that the two concrete gangs worked from the same stock pile side by side.

A 50 per cent. increase in the amount of concrete laid in a day was striking testimony to the gain in labor efficiency that resulted largely from the competition. At the outset the casting of two bays length of floor the full width of the building was counted a good day's work. But towards the end of the job three bays were laid in eight hours. Part of this gain was no doubt chargeable to practice, but the spirit of the gain deserves most of the credit. The labor boss on the north wing had been with the Aberthaw Company for a long time, and has handled well the labor on the eight-story Baxter Building, at Portland, Me., when the company had built at the rate of a story per week. But neither on the Portland job, nor on other large work that he had handled success-

fully, had this foreman ever put in concrete so cheaply, or so great an amount per day, as on the New Haven job.

In computing the saving on labor costs due to this competition of working gangs, the basis of comparison is necessarily somewhat a matter of opinion. The Aberthaw Company adopted as a basis the unit labor costs per yard of concrete, per square foot of forms, and per ton of steel, in two other concrete buildings of about the same size as those at New Haven. Using this standard it appeared that the saving in labor costs on the New Haven job was 19 per cent. on the concrete labor, 5 per cent. on the labor on forms, and 22 per cent. on the labor on steel erection. The total saving on all labor items was 10.8 per cent. of the labor cost for the job as it would have been without competition, figured from the other buildings taken as standard work. In any such estimate there is, of course, room for differences of opinion because the labor cost in concrete buildings is so largely influenced by matters of design, and in estimating the weight to be assigned to such differences judges might not exactly agree. But with all reasonable allowances on this head it seems evident that by this competitive system the Aberthaw Company did get out of their New Haven job with an outlay for labor about 10 per cent. less than that outlay would have been without the rivalry between the working gangs. There was less than \$400 difference in the labor cost of the two wings.

So far as the laborers were concerned the spirit of rivalry created an atmosphere of play which pervaded everything and lasted throughout the job. The concrete laborers were largely Italians, but they, as well as all the others, showed the keenest interest in the progress of the competition and went at their jobs day after day with all the zest of sport.

Carefully restrained and not pushed to the extreme which would lead to the evident mistake of over-hasty and imperfect concrete work, competition of this sort evidently has a considerable practical value, and gets from the laborer more work, and work done in a spirit of greater content and interest, than is otherwise possible. The superintendent in charge needs considerable tact in dealing with the workmen, and he needs to insist very rigidly on the best quality of work; but with all these complications the competitive system is evidently within limits a practicable way of raising the efficiency of labor and thus of cutting down the total labor cost of construction.

The present tendency toward the generation of steam in large units is being exemplified by the Detroit Edison Co., who have just purchased four 13-retort Taylor Stokers to be used with two 2,300 horse power Stirling boilers. This great output from a single boiler is secured by double firing with a stoker at each end, each boiler having a furnace 26 ft. by 15 ft. The Taylor Stoker was selected because of its great overload capacity. So far as known by the American Ship Windlass Company, manufacturers of the Taylor, these are the largest stokers in the world.

There is one feature of the activity now prevailing throughout the United States that insures permanent benefits to the country at large and to the various localities in which this form of progress is most in evidence. We refer to the past year of enlargement of the volume of building operations and to the very evident fact that 1910 is to be the record-breaking year in the building annals of the United States. There is not a single city of importance in the country but reports contracts closed, being prepared or in process of negotiation to a far greater number and value than ever before known. What is true of the cities is true of the towns, the villages and the rural districts of nearly all the states and territories.