a length of 47 ft. was divided into three equal spaces of 15 ft. 8 in. Above the third floor typical spacing was used.

Heavy construction was used in the ground floor to support transformers estimated to weigh 75 tons, together with handling equipment necessary for their installation. The upper floors were designed for a live load of 250 lbs. per sq. ft., except where special loadings occur. The roof is designed for a load of 100 lbs. per sq. ft.

In this building the exterior walls are of concrete slabs 10 in. thick with a 2-in. air space, formed by means of a sand-core which was washed out before the unit was set. The basement walls are 12 in. thick and of reinforced concrete.

The concrete units were brought to the building on flat cars from the unit yard located some distance from the site. The casting yard was provided with a track about 400 ft. long down the centre from which a locomotive crane with a 50-ft. boom handled distributing buckets of controllable discharge type to forms disposed on each side of the track for a width of 50 ft. The effective area of the casting yard was 36,000 square feet.

There are 3,916 units in the power house and 1,602 in the transformer house, the total amount of concrete being 6,111 cu. yd.

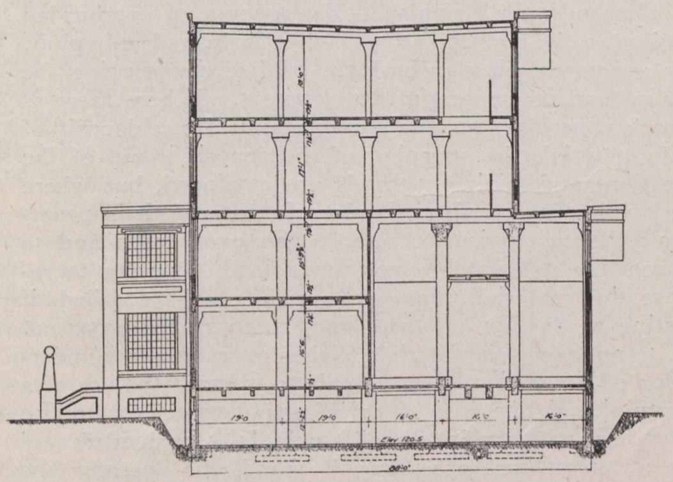

**Fig. 3.—Section Through Transformer House.**

In his paper Mr. Conzelman presents some very interesting information respecting details of unit construction and laboratory tests covering them. In closing he claims as a chief advantage for the method the fact that the units may be made under what may be called factory conditions. The forms can be strongly built and carefully bedded. The system provides for easy inspection and test, if desired, before incorporation into the intended structure. The reinforcement is easily held into proper position. There is also more certainty, according to the writer, in a unit design as the loads are carried by a definite system of units, and the joints occur exactly where a designer wants them. Although unit methods are not advisable for all reinforced concrete structures, they were recommended by Mr. Conzelman for those consisting of a series of similar bays involving considerable duplication of parts. Again, as in the case of the Cedars Rapids power house, it is often advantageous to cast the units sometimes before foundation is ready to receive the superstructure.

At the recent convention in Jacksonville, Fla., of the American Public Health Association, the convention city for 1915 was chosen to be Rochester, N.Y.

## ENGINEERS FROM THE CONTRACTOR'S VIEWPOINT.

In an address delivered to the Albany Society of Civil Engineers, Mr. Richard W. Sherman, chief engineer of the New York State Conservation Commission, notes the impossibility of complete harmony existing always between engineers and contractors, and attributes this to the fact that they represent opposing interests in a considerable degree. The engineering graduate starts with an educated prejudice against contractors, whom he believes to be, in the main, determined to get the best of engineers, and therefore he is on his guard and purposes not only to take care of himself but to get the best of the contractors.

Contractors dread the "boy engineer" just from college. These young engineers are extremely technical. They expect a literal compliance with every iota of the contract obligations by the contractor.

With rare exceptions, men greatly improve in learning, wisdom and disposition as they grow older. After 20 or 30 years, a man is surprised to find how little he knew when he started his professional or business career. He has grown in riper judgment, and has developed greater caution, discretion and justice toward others. He grows considerate, amiable and kind.

Contractors are largely influenced by their opinions of engineers. The engineer who has a reputation for ability, honesty, fairness and good disposition will attract bidders for any work of which he has charge and the desire to do work under him would be an incentive to reasonably low prices. It is a feature of contracting to "size-up" the engineer with as much accuracy as possible.

In bidding for work, contractors are almost as sensitive as weathervanes. It may be possible to make a profit at a given bid under one engineer and impossible to avoid a loss under some other engineer, with all other conditions similar and the quality and the merits of the work constructed being equally good at the same cost to the owner in each case.

A majority of bids are too high. The highest bid is often twice as much as the lowest even when the lowest is sufficient. Over-anxiety to secure the contract is the commonest cause of low bidding. Low bids are often made to keep a contractor's organization together for future work on which he hopes for better prices.

Contractors who do not care for the contract often bid fairly high up, without any expectation of securing the contract but merely to avoid a reputation among contractors of being low bidders, and with the bare chance of getting the work at good prices. Excessively high bids are usually the result of lack of knowledge of the value of the work and lack of time to become familiar with it.

If an engineer's preliminary estimate is believed to be too low, it drives away bidders and tends to indifferent, high bidding. Some over-anxious contractors may be influenced thereby to bid too low. They may secure the work, in which event the engineer has an unpleasant task during construction. There is almost sure to be a disposition on the part of the contractor to save himself from loss and he is thus tempted to slight the quality of the work. Both contractor and engineer are in some degree injured by the work having been done at less than cost.

An engineer who can make reliable preliminary estimates will find his services in demand by municipalities, corporations and other owners, or if he chooses to practice as a contractor's engineer, he will find his services of