

are read before the Association. Neither would be complete without the other.

The first exhibition was held three years ago in Cleveland, Ohio. Then 25,000 square feet of space was sufficient. The Toronto exhibition will require five times as much space, and the attendance and interest will be proportional.

### A NEW DEPARTMENT.

With this issue we are opening a new department—a department of Costs. Costs readily divide themselves into three classes—actual, estimated and contracted. Figures of estimated costs and the figures for contract prices are not hard to secure, but figures of actual costs and the proper distribution of the various items of costs, as labor, material, superintendence, are difficult to secure—difficult to secure for two reasons, one reason being that too few contractors and engineers keep an exact check on work done, and the other, and the more real, is that those who have exact figures representing costs regard them as their trade secret. The first difficulty we hope to overcome by outlining from time to time simple methods of bookkeeping that will encourage the more systematic study of costs. The second difficulty we are not up against—as yet.

### LA SALETTE LANDSLIDE.

Dr. H. W. Ells, of the Geological Survey, who went to Notre Dame de la Salette the day after the landslide there, has made a report on the occurrence. Dr. Ells' report in part is as follows:—

"The length of the slide along the River Lievre from north to south was about 1,350 feet, with a maximum breadth of 350 to 400 feet. The height of the clay bank affected was about sixty feet above the present level of the river.

"The clay areas in which the landslides occur are bounded on both sides by hills of Laurentian rocks, granite and gneiss mostly, and the original clay deposits rest upon these rocks, which often show smoothed or glaciated surfaces, which have been caused by the action of the glacier ice. The known slides, however, do not move along the rock surface, but along partings in the clay deposits.

"When these deposits are undisturbed the clay is usually the blue, tough and plastic variety known as Leda clay. These are in places covered by sandy deposits known as Saxicava sands. The clay lies often in thick beds, nearly horizontal, or with a gentle slope towards the river, and the layers are generally separated by thin beds of arenaceous silt. This silt when saturated with water rapidly passes into a semi-liquid condition, and under the pressure of the overlying clay body tends to destroy the equilibrium of the whole mass, when the pressure of the upper portion, through the weight of the absorbed moisture, causes a slide in the direction of least resistance, which is usually furnished by some river valley.

"The direct cause of the slide or slip at this place was evidently the formation of a crack or fissure a short distance back from the front of the river bank. By this fissure the water from the surface, which was in a saturated condition from recent snow or from rainfall, percolated downward to an inclined bed of clay, which is exposed in the basal portion of the slip, dipping towards the river at an angle of 18 to 20 degrees. The pressure of the overburden evidently forced the overlying mass outward to the river. Here the ice, which was a foot or more in thickness, was lifted and carried eastward, up and over the low slope on which the village was placed, which had an elevation of about 10 to 15 feet above the river level. It was without doubt the sudden and rapid movement of the ice which destroyed, not only the greater part of the village, but a large portion of the people as well, since they were still in bed, and the action was too

sudden to admit of escape in many cases. The attendant wave of water from the river washed the debris of the ruined buildings, along with a number of bodies, to the slope of the hill, in the rear, where much of it was deposited at an elevation of about fifty feet above the stream. The receding wave swept away the greater part of the ice and the ruined buildings, with a number of the imprisoned bodies and carried them down the river toward Buckingham. The whole catastrophe could have taken but a few minutes. The channel of the stream was blocked by the sliding clay and silt and the water was dammed back to a height of eight to ten feet, which caused minor injuries in the north end of the village. This slide was, therefore, due to the breaking down of the front of an old landslide."

After reviewing previous landslides in the district Dr. Ells says:—

"The causes of these St. Lawrence and Ottawa landslides may be briefly summed up thus:—

"1. The silty and arenaceous nature of the Leda clays, rendering them capable of absorbing and retaining a large amount of water; and

"2. The increased precipitation during the seasons when these landslips occurred, which saturated the deposits and gave them greater weight than usual. These conditions doubtless produced unstable equilibrium of the beds, resulting in displacement and a flow of the semi-liquid portion, the more coherent clays breaking down as described and mixing with the soft materials produced a tumultuous mass of mud, clay and sand, which descended into the nearest valley.

"It does not appear possible to adopt any special methods to prevent these occurrences, and the simplest means to prevent loss of life is to place buildings at a suitable distance from the front of clay bluffs or shores where these sometimes unstable clay deposits are specially liable to be affected by the conditions already indicated. The loss of life at Salette is attributable in large part to conditions of ice which are not likely to be repeated, if proper precautions are taken as regards the locations of residences."

### PRACTICAL ADVICE.

In a recent address at the Massachusetts Institute of Technology Mr. Leonard C. Mason, president of the Athaw Construction Co., of Boston, gave some sound, practical advice to the students in civil engineering.

Speaking from the standpoint of extended personal experience in concrete construction, Mr. Mason emphasized the importance of conforming to business customs rather than attempting to do the unusual, the necessity of becoming familiar with methods of simple accounting, and the acquirement of special knowledge regarding estimating and costs, particularly of details. With especial force he pointed out the fundamental requirement of power to control men—its almost inborn character—and the difficulty of developing it. His hearers were warned against the mistake of ignoring the advice of superintendent, foreman, or even the workman, who, on account of close association with the work, may often be in a position to offer most helpful suggestions. Stress was laid upon the benefit of keeping in touch with the experiences of competitors and the adoption of the most modern methods of construction.

The close of Mr. Mason's address was devoted to a consideration of the new Edison type of concrete house and the difficulties attendant upon its successful construction. It was shown that the forms must be absolutely tight, sufficiently strong and securely held to withstand the pressure of the concrete, light enough and small enough to be easily handled, and durable enough to permit of continuous use. One of the greatest obstacles to success, especially in the hands of the inexperienced, was pointed out to be the difficulty of keeping the stone and gravel in suspension, and the prevention of air pockets.