

STUDENTS' COMPETITIONS.

Editor CANADIAN ARCHITECT AND BUILDER.

SIR,—You published in your November number, conditions for a competition for a bath-room not to exceed 75 square feet. I entered this competition, and was surprised to see that "Birdseye" had been awarded first place for the design of a bath room greatly exceeding that limit in size.

I now see that in the December number of your paper, the clause limiting the size of the room was omitted. As my bath-room was planned before the December number was delivered, and I did not see the change, my design was placed at a considerable disadvantage.

It was surely unfair to amend the conditions within two weeks of the date at which the drawings had to be in, and then to judge a design prepared under the limitations of the first conditions, on the same basis as one that had profited by the change.

My French bath, which is criticised as being "unworthy of a place in a good bath room" would certainly be preferred to a common bath by many, particularly where the space is limited, and had the writer of the report figured the matter up, he would not have said its water-saving faculty was fallacious. The fact is, that the bath I show would take 40 per cent. less water to fill it than one such as "Birdseye" shows, which, if permissible in a 150 foot room, would leave room for little else in a 75 foot room. I assume that the reproduction of "Birdseye's" design is one half the size of the original, because it is mentioned in the conditions that the drawings must be reduced one half, and allowing a slight margin, the reproduction measures one half the size specified in the conditions.

The fact that the pipes may be got at from a bed room closet is another point in my design that is severely criticised. As the pipes should surely be accessible, I conclude the writer of the report would have them boxed out into the bath room itself. I do not see that this would much lessen the evil effects of a leak of sewer gas, and as "Birdseye" makes no such provisions, I do not think his design should be given any preference in this matter, for it is certainly better to place the pipes in a box in the thickness of the partition where they would be accessible, than to place them in the partition without the box, and inaccessible, as "Birdseye" evidently intended them to be.

"Birdseye's" fixtures are arranged without regard to cost in making the plumbing connections. The w. c. is placed in a separate compartment, which is destitute of light and ventilation. The shower-bath is closed round in a way that would make it difficult to turn on the water without getting in the bath-tub. The basin is too small to be used with comfort, and one of "Birdseye's" drawings is "cooked." The door is shown nine inches, and the basin five inches narrower in elevation than on the plan, giving the room a false appearance of symmetry. In competitions of this sort, surely any attempt at "cooking" ought to disqualify a competitor.

I can appreciate the generous motives that induced the committee of the Guild to undertake the difficult task of judging these competitions. Still I think that, having undertaken to make the awards, they should be willing to devote sufficient time to the work to fairly weigh all the merits and demerits of each design. That this was not done in the present case, seems to me evident.

The object of these competitions is to raise the standard of draughtsmen and pupils, and if the criticism of the designs is carefully and justly made, it will be of far more benefit to the competitor than the study necessary to the preparation of the design.

Yours, etc.,

"DADO."

[We were unaware until our attention was called to the fact, that any change had been made in the printed conditions governing this competition. It was found necessary to alter the wording of some of the conditions in order that their meaning might not be ambiguous. It now appears that in making these alterations, the omission of which our correspondent complains accidentally occurred. We can only say that we exceedingly

regret the circumstances, and the fact that it is now out of our power to make any reparation for the mistake, unless the judges of the competition should decide that, apart from the objection to the size of the bath, "Dado's" design would have been entitled to first position.—ED. C. A. & B.]

CANADIAN SOCIETY CIVIL ENGINEERS.

THE fourth annual meeting of the above society was held in the city of Montreal on Jan. 22nd. Aided interest was given to the occasion by the inauguration of an annual dinner, and the attendance thereof of His Excellency the Governor-General and a number of ladies. The President, Col. Gzowski, presided.

THE PRESIDENT'S ADDRESS.

The president's address, was, as usual, the chief feature of the meeting. Its most important features are reproduced below:

"The progress of the society since its recent organization has been very gratifying. The roll of members, as you will have observed from the report of the council, is as follows:—Honorary members, 7; members, 266; associate members, 100; associates, 66; students, 154; total, 523. The society has every reason to be congratulated upon and take pride in the representative value of its roll of honorary members."

Here followed a reference to a number of engineering works that have attracted attention the past year. First of these was

THE ST. CLAIR TUNNEL.

under the Detroit river, to connect the Grand Trunk system in Canada with its connections in the United States at Sarnia. The total length of the tunnel with approaches will be two miles and 1,145 feet. The length from face to face of the portals is 6,000 feet. The depth of open cutting at the east, Canadian side of the tunnel, is 62 feet; at the west, United States end 52 feet. The length of that part which is under water will be 2,310 feet with a gradient to the west, rising one foot in one thousand. The greatest depth of the River St. Clair on the line of the tunnel is forty and one half feet. The minimum thickness of the rock is 16 feet. The bottom of the tunnel is about ten feet above the rock underlying the clay. This has been ascertained by very accurate soundings and borings taken near the line of the tunnel at each 20 feet. It may be well to say that the flow of gas was found immediately above the rock, indicating that its source was in, or below that strata, the gas escaping and giving fissures in the rock. Locating the bottom of the tunnel above the rock and yet securing sufficient thickness of material to support the roof was in order to avoid meeting with gas. The material through which the tunnel is driven is clay, with pockets of wet sand and gravel. The tunnel in cross section is circular with an inside diameter of 19 feet 10 inches. It is a circular tube lined throughout with flanged plates of cast iron, two inches thick, five feet long, bolted together. The ends of these plates are planned to make a close joint, and before being used they are heated and soaked in oil. The lower half of the lining is encased outside in three inches of grout, formed of the best Portland cement and coarse sharp sand. Holes are made in the upper part of each plate, through which the grout is poured in. Under the river the whole of the outside of the cast iron lining will be covered this way. In the prosecution of the work, an iron shield is used, under the protection of which the excavation is carried on, and the cast iron lining is put together. The shield is just large enough to enclose the cast iron lining, and as the excavation in front of it is advanced, it is moved forward just far enough to put together one section of the tunnel lining. As the width of these sections or rings is only eighteen inches, and as the rear portion of the shield which encloses the lining overlaps it thirty-nine inches, the forward end of the lining is always within the shield. To ensure safety as far as possible in the event of a sudden strong flow of quicksand or water, an iron diaphragm or bulkhead is built across the shield forty-eight inches from the rear of it, with two sliding doors which can at once be closed. The total length on both sides of the river of the completed tunnel to 22nd January, is 2,006 feet; in Canada, 844 feet; in the United States, 1,162 feet. The time named for the completion of the tunnel is July, 1891.

THE BRIDGE ACROSS THE FRITH OF FORTH.

The Frith is five miles wide, and blocks the direct line of the east coast railways. Its construction was long delayed owing to the great width and depth of the Forth. It is not easy to realize how vast is the difference between a bridge with a 1,700 feet span and the largest span of a railway hitherto constructed. The height of the steel work is also exceptionally great, being equal to that of the golden cross of St. Paul's, 350 feet, while the total height of the bridge is just equal to that of the Great Pyramid, 460 feet. As regards the principle of design, "Cantilever" is a 200 year old term for a "bracket," and the Forth bridge spans are made up of two brackets and a connecting girder. On these brackets there is a horizontal pull of 10,000 tons, and on their bases rests a weight of 100,000 tons. The principle of bracket and girder construction is as old as the hills, as it lends itself particularly to timber construction, which preceded masonry. A wooden bridge built 230 years ago in Thibet, with a span of 182 feet, was the true prototype of the Forth bridge, which only became possible when Bessemer steel was invented. One of the advantages of the cantilever system is facility and safety of erection, as such bridges can be built by working out from the piers, and adding successive bays of the cantilever right and left until the whole is completed. There is no so moment when the safety of the whole structure is dependent on the integrity of some temporary staging. The cantilevers or brackets of the Forth bridge are enormously strong. Mr. Baker says that half a dozen ironclads might be hung upon them. The works of the bridge were commenced in 1883. Mr. Arrol, of Glasgow, was the contractor. A start was made with the pier work simultaneously with the erection of shops and machinery for the manufacture of the superstructure. Each main pier consists of a group of four cylindrical masonry piers about 70 feet diameter. These are founded on rock or hard boulder clay at depths ranging up to 90 feet below high water. Six of the cylindrical piers were put in place by the use of compressed air. The piers were floated into position by building them hollow in the first instance and filling them with solid masonry subsequently. The whole bottom of the pier was placed about seven feet above the level of the cylindrical skin, so that a huge diving bell, 70 feet in diameter and 7 feet high, constitutes the bottom of each pier. When in position, the water was driven out of the chambers by forcing in compressed air. Workmen then entered through airlocks, and carried on the excavation 90 feet below the waters of the Forth. The superstructure of this gigantic bridge