CAPT. THOS. DONNELLY, Inspector of Hulls, says that the Canadian canal at Sault Ste. Marie has two objections: (1) That the span for the drawbridge at the entrance to the lock is not wide enough, and (2) That at the entrance to the lock, the stone-work is built of very rough stone, instead of its being levelled.

Personal.

W. D. BISHOP has been appointed superintendent of the Dartmouth, N. S., water-works.

T. A. MACKINNON, general manager of the Concord & Montreal Railroad, has resigned and accepted a position with the Boston & Maine road

JAS. THORN, formerly in charge of the "Beaver" Line of steamships, has accepted the position of manager of the Hamburg-American Packet Co

WM W. KENNEDY, an old New Brunswick marine engineer, has been appointed engineer of the steamer "Lansdowne" in the place of the late James Morris.

JULIEN CHABOT, who recently resigned the position of general manager to the Richelieu and Ontario Navigation Co., was previously general manager of the Saguenay line.

ALFRED SMALLWOOD, manager of the Starr Manufacturing Co., maker of skates, Dartmouth, N. S., died of apoplexy on the 9th February. He had been connected with the company for 25 years.

N. H VERITY, founder of the plough works at Brantford, Ont., bearing his name, died recently at the age of 64. The business will be continued by his son He leaves a widow and twelve children.

WE are glad to hear that George A. Goodwin, the author of a paper on "Hoisting Machinery," extracts from which appeared in last number, has been elected president of the Society of Engineers, London, Eng.

E A AMOS, C.E., a graduate of the Royal Military College of Kingston, has joined the well-known firm of Mignault & Belanger, civil engineers and solicitors of patents, of Montreal. The new firm will take the name of Mignault, Belanger & Amos.

A. MCKENZIE, who has been for many years car service agent of the C. P R at Winnipeg, has accepted the position of general superintendent, at Montreal, for the Whitney syndicate of Nova Scotia Mr. McKenzie will occupy himself in winter, with the Dominion Coal Co's interests in Cape Breton.

Mr. Hy GRANGE, for many years purser of the R. & O. steamer "Spartan," has been appointed to the command of that boat The "Spartan" was always one of the most popular boats on the line, a fact that was principally due to Mr Grange's uniform polite attention to the care and comfort of all passengers, and now that this gallant officer has received his well-earned promotion, it is safe to predict that his ship will be even a greater favorite than ever. Both Captain Grange and the company are to be congratulated on the appointment.

THE PRESSURE OF WIND ON BRIDGE STRUCTURES.*

To the Editor of THE CANADIAN ENGINEER:

SIR,—With all the bracing of the falsework resting on the piles, and even had additional longitudinal bracing been put in, the swaying of the structure under wind pressure could not have been prevented except by transversely and longitudinally bracing the piles to a much greater depth from their upper ends. There was only some 16 feet of the upper portion of the piles braced, with 32 feet below unbraced, thus allowing this unbraced portion to give by bending or flexure at the level of the waling pieces just above the water level. The whole height and weight of the falsework above water was thus supported on so many stilts, exactly in the same way as the heavy trunk and head of a man can be swayed from side to side by his legs giving at the hip joint, which illustration any one can try for himself. It must have been evident to the builders, had they considered this feature of the falsework, that the bracing of the piles should have reached down from their upper level to a point much nearer to the river bed, which could so easily have been done by introducing eye-bolts through them at a few feet from the bottom of the river with iron ties reaching to above the water level.

The traveler is topheavy, and such a leverage, some 190 feet in total height, would require but moderate wind pressure to cause the whole to sway and the piles to give as stated.

Now, as to the argument that because none of the trees or structures in the vicinity and within 300 feet of the bridge were affected by the wind, and that the wind could therefore not have been powerful enough to overthrow the finished span from which the falsework was removed, my experience in Quebec is to the effect that in the midst of an otherwise not absolutely hurricane-like gale, there may be at a certain point a much stronger current and amounting in force almost to that of a cyclone. Of this I will give you an instance which occurred here some five years ago at Dufferin Terrace. This is a structure 1,500 feet in length at 182 feet above the level of the St. Lawrence. It runs along the face of the cliff immediately below the citadel and glacis. Along this terrace and on its outer edge there are five octagonal kiosks, or pavilions, each 20 feet in diameter, supported by eight cast-iron columns bolted to the terrace flooring. The roofs of these project 4 feet all around and are therefore 28 feet in diameter. The framework of the roofing, rafters and purlins is all of cast and wrought iron securely bolted together, and the whole thoroughly fastened to continuations of the columns reaching to 4 feet above their capitals, which rise to the roof level, and are braced the one to the other by the cast-iron spandrel pieces forming the arched heads of the openings between the columns, on the capitals of which they rest as on imposts. The structure is further braced by 4x4-foot cast-iron brackets from each column supporting the projecting eaves of the roof, and again the rafters are radially tied to the centre of the structure by wrought-iron ties of inch round iron. The entire iron framework of the roof is screw-bolted to the under structure and the whole is covered with galvanized-iron sheathing riveted to the rafter flanges and the purlins. On several occasions of very high winds, the sheet-iron covering just alluded to, the kiosk being open on all sides, has been partially or entirely blown away, exactly as the covering of an umbrella would be, and often is, torn from its steel or whalebone ribs in a gust of wind.

Now, on the occasion mentioned, and though the wind all along the terrace blew a very strong gale from the east, or towards the citadel heights, and while the sheathing of four of the kiosks (five of them, including the band stand,) stood the gale, the whole roof of the second pavilion from the west end of the terrace, framework and all, some 2½ tons weight, was bodily wrenched from its moorings, snapping and tearing asunder all the screw-bolt fastenings, and hurled a distance of some 250 feet and to a height of, say 20 to 30 feet above the terrace level, and deposited by the wind on the adjoining glacis, with the rafters broken into short pieces and the tie-rods twisted into every conceivable shape. Now, if the wind could not only lift the weight of the roof (2½ tons, as already said), but exert the much greater force required to tear all the bolts asunder; while, as I said before, not even the sheathing of the four other kiosks was blown away, no other conclusion can be arrived at than that in the midst of the gale there was, as with the Gulf Stream in the ocean, a more powerful and cyclone-like current at this particular point to produce the effect related. And yet such a thing as a cyclone, in the true sense of the word, is, so to say, unknown in Quebec, or even in any other part of Canada, though we have had barns and the like blown down and roofing torn away on not a few occasions.

Now, if we put the tensile strength of an inch round bolt at only 12½ tons, or 25,000 pounds, and as the roof of the kiosk was held in place by S ⅝-inch bolts, it must have required five tons to break each bolt, or some forty tons for the whole, and as the roof area of the pavilions is, say 640 feet, while that of the bridge flooring was 16,500 feet, or 25 times greater, and as 25 times 40 tons gives 1,000 tons, it would appear that a wind of like force—that is, of say 120 pounds to the square foot—might have produced the bodily lifting of the span and throwing it into the river. But what militates against this supposition is the fact that winds of such cyclonic power are seldom or never found to have a breadth or amplitude of more than 200 to 300 feet, while if the theory is correct the gale must have had an amplitude of at least 500 to 600 feet to bring about the blowing away of the span thrown into the river.

Again, while in the case of the Quebec accident, the wind had an upward lifting tendency by being deflected by the cliff from its horizontal direction, how can it be claimed that the wind blowing up the river between Louisville and Jeffersonville could have had any such uplifting tendency, there being nothing there to deflect it towards the vertical, and even if its direction could have been partly upward, say at an angle of 45 degrees to the horizon, the vertical component of its parallelogram of forces to be as much as 120 pounds, would have required the whole force to be 170 pounds, or in excess of that of any cyclone ever known.

I should rather incline to think if, as asserted, the span was blown bodily away from the piers into the river, that this was due

*Originally written with reference to the fall of the Louisville and Jeffersonville bridge.