templates of the arch-stones. The centering was eased on the forty-first day after the arch was keyed, and struck on the forty-second day; the arch subsided one inch during the erection of the work, and half an inch after first easing the centering; two inches having been allowed for the whole subsidence. The arch being completed, the abutments and wing walls were brought up to their proper level, and the cornice and parapets added; the crown of the arch and top of the abutments were covered with concrete, 1 foot 6 inches thick, upon which the foot-paths of Aberdeen granite and the roadway of screened gravel are laid. The approaches are bounded by retaining walls, as shewn in the drawings. The bridge was opened on the 14th of February, 1839, three years and ten months from the commencement of the operations.

The communication is accompanied by seven sheets of drawings, having the old, new, and temporary bridges, and their various parts, in elevation, plan, and section, with all the dimensions, accurately laid down.

“A new plan of construction of Sliding Gates for the Entrance Locks of Docks, &c.” By J. C. Singels, Engineer of the Waterstaat, Hollande, &c. &c.

Sliding
Lock
Gates.

The improvement suggested consists in substituting for the ordinary Lock Gates, Sliding Gates, traversing the ends of the lock on rails laid on sills, drawn across by chains and capstans. The author in proposing this mode of construction assumes, that when a lock exceeds 50 feet in width, ordinary gates must be abandoned and caissons used. The advantages offered by it are, diminishing the length of the lock by that of the ordinary opening gate, consequently the volume of water to fill the lock is lessened in the same degree, and reducing the number of the locks; for as a small elevation is essential to the strength of the ordinary gates, the sliding gates may on the contrary be made of almost any height without any fear of impairing their strength or solidity.

In the description of the Plans accompanying the paper, great stress is laid on the whole length of the lock, with the exception of that part across which the gate traverses, being constructed on an invert arch, thus giving greater solidity than where a flat floor only is used, either for the whole length, or for the wide space necessary for the ordinary gates to swing upon. It is acknowledged that more masonry is required in this mode of construction, but it is

argued that the extra expense will be met by the saving in the length of the lock and in the quantity of the water used.

In constructing the Sliding Gate, the timbers of which are cross braced and strutted, and then covered with planking on both sides, the rule to be observed is, that the thickness of the gate is one-fourth of the width of the lock, so that the main bracing timbers are at an angle of 20°. These are crossed by other timbers, also diagonally braced, extending the vertical height of the gate, so as to give that combination best calculated to withstand the pressure of the water on either side. To obviate the difficulty of setting in motion so heavy a mass as the sliding gate, it is proposed to place within it some barrels filled with air, which by their buoyancy would relieve the rollers of some portion of the weight, and enable the gate to traverse more easily.

Mr. Palmer observed, that the author could hardly be acquainted with the modern practice in constructing locks in this country, as timber had for a long period been but little used in the lock chamber. His practice had been invariably to have an invert arch at a lower level than the lock chamber. He was now constructing at Port Talbot, in South Wales, a lock of 45 feet span, in which there was an invert arch built of stone, 3 feet thick, with lias lime, placed on a stratum of concrete, 2 feet thick, the concrete being composed of four parts of gravel and sand to one of lime; above this invert, the floor was filled in with 2 feet thick of brickwork, laid in Roman cement. Beneath the roller curbs, stones were placed to bed them upon. Each lock gate weighed about 40 tons, one half of which was borne by the heel-post and the other half on the rollers, yet there was no difficulty in moving it at pleasure. The depth of the water was 30 feet, and sometimes the whole column pressed on the gates, yet no injury was feared. There had been great difficulty with the water during the course of construction, but the invert and the side walls placed on it were perfectly sound, and able to withstand any pressure. He apprehended that the sliding gate would be much heavier than the common gate—that the expense of construction would be greater—and he could not discern any compensating benefit to result from its adoption.