the tide, and is thrown on the beach ; then, by the action of the high north winds, the sand is carried up from the gravel, and raises the land several feet above the level of the sea, and in some places as much as 12 feet.

Another cause is, that along the Firth of Forth, and particularly between Leith and Newhaven, the sea has made great encroachments, and about a mile west of Musselburgh harbour, many acres of land have been swept away, the lighter portions of which, are carried eastward by a current setting in that direction, and are lodged near the mouth of the Esk.

The communication is illustrated by two small sketches, showing the several lines of high-water at various dates, and a section of the strata of the new formation.

No. 608. "Description of the hydraulic traversing Frame, at the Bristol terminus of the Great Western Railway." By Arthur John Dodson, Assoc. Inst. C. E.

Railway
traversing
Frame.

The object of this machine is to transport the railway carriages, from the arrival side of the terminus, to the departure side, or to any one of the several intermediate lines, without the use of turn-tables, which cannot always be conveniently or safely introduced, and also without any intersection or derangement of the rails.

The apparatus consists of a wrought-iron frame, connected by cross and diagonal pieces, and supported upon eight cast-iron wheels. At the four corners of the frame, cast-iron hydraulic presses are fixed, and at one end of it, two force-pumps are placed, connected with the presses by copper pipes and gun-metal nozzles. Upon the wrought-iron plungers of the four presses, two additional frames rest ; these are attached to the lower frame, by four sets of parallel-motion bars, to ensure their rising perpendicularly.

The action of the machine is described as follows :—

An opening being made in the train, the apparatus is pushed on to the line of rails, and the carriage required to be moved is placed over it when the frame is quite down. As soon as the carriage is brought directly over the apparatus, a man works the larger pump acting upon the four hydraulic presses, which raise the frames until they are in contact with the axles of the carriage wheels ; the smaller pump is then worked, until the flanges of the carriage wheels are clear of the rails. The whole apparatus, with the carriage suspended upon it, is then easily transported to any of the lines of rails, and by unscrewing the stopper, which allows the water to flow back from the presses

into the cistern, the carriage is lowered on to the rails; it is then pushed back, and the apparatus is rolled over, ready for re-commencing the operation, the whole transit not having occupied more than a minute and a half.

The communication is accompanied by three drawings (Nos. 3365 to 3367), giving a general view of the traversing frame, with the attached pumps, details of the construction of the pumps, with their framework, and a view of the machine raising a first-class carriage.

Mr. Dodson stated, in answer to questions from the President, that Mr. Dodson's hydraulic traversing frame had cost about £220; that it was the ^{son} only one of the kind at present in use on the Great Western Railway, but that in consequence of its action being so much approved, several others were expected to be erected.

Mr. Brunel said, that the machine in question was made by Mr. A. Napier;* it was extremely well constructed, and he intended using others of the same kind. He expected they would be less expensive than the one described, which was the first that had been made. Mr. I. K. Brunel.

No. 641. "Account of the land-slip in Ashley Cutting, on the line of the Great Western Railway." By John Geale Thomson, Grad. Inst. C. E.

The object of the author of this paper is to show, that the land-slip which he describes, had its origin in a peculiarity of the geological position, and not in the nature of the ground in which it occurred. Land-slip in Ashley Cutting.

To explain this view, the formation of the oolitic district, so far as it relates to engineering purposes, is described generally, and a more particular account is given of the valley of the Box brook, in which this slip took place.

The Ashley cutting is situated about 5 miles on the London side of Bath, at the base of Kingsdown hill, the level of the rails being about 23 feet above the level of the Box brook.

In Mr. Lonsdale's account of the oolitic district of Bath,† the valley of the Box brook is styled, a denuded valley of the lias, or in other words, that the action of denudation has ploughed into, but not through, the lias, whereas it has completely eroded the superjacent strata. The valley is one of the two plains, which separate the

* Mr. A. Napier, York Road, Lambeth.

† Vide Trans. Geol. Soc., vol. iii., part 2.