

the hands of his servants. The plumber opened the offending drain, wrote down a list of the wonderful things he found there, at the request of the judge, and this was handed to the jury. Putting the point as mildly as possible, it appears that this list contained several solid articles which could not fairly be expected to be carried off by any closet exit pipe. This is by no means an exceptional case, though such cases of course find their way into court comparatively rarely. If people would exercise more care in the use of their drains, a large proportion of the complaints of ineffective drainage would vanish. As it is, it is well that the blame should rest upon the right shoulders and that the tenant should realize that he, as well as the landlord has a duty in the matter, and that he deserves to suffer for his own neglect.

THE long disputed question as to whether fish sleep, has been solved by Prof. E. Hösang of Berlin, from actual observation, in the affirmative. On page 53, we give an engraving from a drawing made by him in the Berlin Aquarium, which shows the fish enjoying that slumber which so many naturalists have hitherto denied to them.

Editor of *Scientific Canadian*.

Sir.—After all the patience and ingenuity applied by men of the highest education and talent to the tides there is still in the subject an uncertainty which should not be concerning the simple law of flowing liquids.

This uncertainty, more apparent in the Gulf of Georgia than, perhaps, elsewhere, brings the following thoughts about the received theory of the tides.

If the Newtonian theory is correct, modern discovery proves that tidal waves must travel four hundred feet per second; yet they do not deluge the land they rush against. By it we are required to believe the power which raises great oceans to be unable to raise small ponds; as if the Sun and Moon did their work with giant hands, too clumsy to grasp small articles, instead of attraction similar to gravitation. We are also taught to believe the tides to be confined to the vicinity of land, there being none in mid ocean. How the discoverer of the latter missed the real truth is strange; his faith in Sir Isaac must have blinded him. If we substitute for that theory one of a rise and fall of the earth's crust, so small per mile of the earth's quadrant as to be imperceptible except on the brink of the non-attractive sea, we do not require to slur over inconsistencies, and account for many phenomena now imperfectly explained. No impossible speed is required in waves, the absence of tides in enclosed and shallow waters is easily accounted for; as also the great tides on iron producing shores, the increase of wind with rising tides, refluxes of water amongst islands, and some earthquakes and elevation of shores. Many discrepancies in observations on the heavenly bodies and measurements of the earth's surface, now attributed to refraction, bad observing and imperfection of instruments will be found to be the result of change in the earth's contour.

Competent men can easily test the truth of the theory by observations in such places as the Bay of Fundy or Bristol Channel.

This is not mere theorizing but the conclusion of many years study, and observation.

Yours most respectfully,

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THE STEPHENSON CENTENARY.

The centenary of Stephenson's birth has been celebrated with fitting honours in every place which could claim the least connection with the great engineer; but all eyes naturally turned to Newcastle to see how the Tynesiders would keep the 100th birthday of the most distinguished of all Northumbrians. To say that Newcastle was *en fêre* would convey but a sorry idea of the enthusiasm which pervaded every class, for it is not too much to state that Tyneside witnessed such scenes on the 9th of June as it never witnessed before, and never will again. Merely to enumerate the meetings held, the exhibitions, the banquets, and the decorations would more than fill our space; suffice it to say that one and all vied with each other in doing honour to Stephenson. The little village of Wylam never before had so many men of mark in its streets, and the "cottage" had never such an assembly beneath its roof. The special train conveying the visitors stopped at North Wylam, where the vicar of Ovingham exhibited the registers recording the marriage of Robert Stephenson and Mabel Carr, and the baptism of George Stephenson, their second son. Having planted an oak behind the house, and witnessed the procession of sixteen modern locomotives sent by different railway companies, the mayor's party returned to Newcastle, and the formal proceedings were completed. The life of George Stephenson has been told so often that to readers of these columns it must be as familiar as household words; but the story bears repetition, and is full of encouragement for others to do what Stephenson did—persevere. According to Dr. Smiles, the births of none of the six children of Robert Stephenson are registered in the parish books, but there is a Family Bible, in which a "rechester" of the "Stephensons" has been kept, and that leaves little doubt that George was born on June 9, 1781. Robert was fireman of the old pumping-engine at Wylam Colliery, and had so much of a struggle to feed and clothe his children that nothing was left to pay for schooling; but old Robert in his way was a man of mark in the village, for he told good stories and had an intimate knowledge of the habits of many birds and animals, while his wife Mabel was, by common consent, a "rale canny body,"—high praise from Northumbrians. From his parents, then, we may fairly assume that Geordie inherited a retentive memory and the power of observation; for the rest he was indebted to his own exertions. The surroundings of his early life were not such as to favour any material advance in social position, and as a matter of fact it was not until half his life had been spent that George Stephenson rose above the rank and file, save that he was always a noted man wherever he lived. The house in which he was born was partitioned off into four apartments for labourers, and in one of these the family of the Stephensons made their "home." The first "duty" Geordie did was to see that his younger brothers and sisters kept out of the way of the waggons which were dragged by horses along the wooden tramway in front of the cottage door, so that his earliest recollections were in connection with what may be termed "railways." Eight years passed in the dull round of the life of a colliery village, and the family removing to Dewley, Geordie obtained his first appointment as a sort of cowherd at two-pence a day. Steam-engines and pumping-machines in those days were rather crude appliances; but Geordie and his playmate, Thirlwall, found their chief amusement in making clay models of the pumping and winding machinery. Blessed with a good constitution, the lad as he grew found his chief pastime in feats of physical strength, and when he had reached man's estate was possessed of a well developed frame, which had much to do with his after success. Stephenson's ambition grew with his growth; for although when appointed fireman and raised to 12s. a week, he declared he was a made man for life, he never sat down as if his career was settled. From fireman to engineman was but a step, and here he met with his first difficulty; for, continuing his early practice of modelling engines in clay, he was desirous of getting a drawing of some of those made by Boulton and Watt, which were then known by repute even in the colliery villages. But he could not read, and there was no engine of the make in the country, so, at the age of 19, George Stephenson went to school. Once past the rudiments, his progress was rapid, his fellow-students wondering at the facility with which he mastered "figuring"; the secret was perseverance, for Geordie tackled the sums in his spare time, and purposely took the "night shift" that he might have as much as possible. To earn extra money he made and mended shoes, and became an expert clock-cleaner,