tain's chronometer was very materially affected; it usually crosses the Atlantic without varying three seconds, it has now proved to be out of time as many degrees! Curious as are these effects, they are still more interesting in a scientific point of view. Such facts, carefully noted down at the time, afford useful data in the cause of experimental philosophy. Thus collected, they are at our disposal. When it is considered that not one vessel in fifty is prepared with a conductor, cases of this kind ought to admonish ship owners of their utility. Capt. Bennett is determined to go well armed with them in future. It would be well to have one ready to be raised at each mast, in case of emergency; and for the safety of the chain, it ought to be half an inch in diameter.

'We have visited,' says the editor of the *Liverpool Chronicle*, 'the ship since her arrival, and the traces which remain of the operation of the first shock, together with the concurrent testimony of Captain Bennett and his mates, and the state of the iron rod, and such portions of the chain conductor as have been preserved, which, for the present, may be seen at our office, have served to convince us of the general truth of the foregoing letter, and of the singular good fortune attending the timely application of this simple, but philosophical invention of the admirable Franklin, which no ship should be without. Many additional particulars were recounted to us by Capt. Bennett, which the pressure of other matter, and the shortness of the time remaining to us, prevent us, at present, from repeating. The following circumstance, however, communicated to us by Roskell and Son, chronometer makers, of Church street, Liverpool, are too interesting to be passed over. Captain Bennett's chronometer, after preserving for a considerable length of time, a uniform rate of 7-10ths of a second gaining, and, being nine minutes, forty-two seconds slow of Greenwich time, when the vessel left New York; was found, when compared in Liverpool, to be 24 minutes, 33 seconds fast of Greenwich; and three lever gold watches, belonging to three gentlemen, passengers by the ship, contracted the magnetic power to such a degree, as actually to require the principal part of the steel work to be renewed.'

'Such is the effect,' observes a correspondent, who has transmitted us the above account, 'produced on the steel work in the watches, that they have the power of the magnet, so far as to act the same as the loadstone.'

On an Unfinished Time-Piece, of the late celebrated Mr. HARRISON, in the possession of JOHN BARTON, Esq. of the Royal Mint. By THOMAS GILL, Esq.

HAVING been recently favoured with a sight of this time-keeper, which, as above mentioned, was left unfinished by Mr. Harrison, at the time of his death, we think it cannot but be gratifying to our readers, to be furnished with some particulars respecting it.

In the first place, Mr. Harrison has been careful to avoid the em-

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ployment of either *iron*, or *steel*, in the construction of the several parts composing it; possibly, from having experienced the liability of those metals to become injured by rust; and therefore he has substituted either brass, gun-metal, tutenague, bell-metal, or even hard wood, in place thereof.*

The arbors are, some of them, made of a composition resembling tutenague, or fine bell-metal, and others are made of gun-metal. The wheels, and frame-plates, are made of fine Flemish brass; and the pallets of the escapement are made of *hard wood*.

The wheels are of a considerable diameter, but made exceedingly thin and slender, so as to press with as little weight as possible upon their necks or pivots, and which pivots are also reduced in thickness as much as possible. The strong pivots of the great arbor are, however, each surrounded with rings of four friction rollers, turning in larger cylindrical holes, made in the frame-plates, of the time-piece, and connected together by flat circular rings, which keep the rollers at a proper distance apart, and revolve with them; in fact, *they are of the very same construction as Garnet's patent friction wheels*; which, however, were patented long after these of Mr. Harrison's were made. The slender pivots of the arbors of the other wheels, each rest, and turn, upon the peripheries of two large, and light, friction wheels.

The slender teeth of the wheels are merely formed in radii lines, with rounded tops; and for pinions, lanterns or rundles, are substituted, with wooden rollers, or cylinders, around them, the rollers having small holes in their centres, which turn upon slender pins of brass, fitted into holes made in the two circular plates, which constitute the frame of each lantern. In the time-pieces at the Royal Observatory at Greenwich, for which Mr. Harrison was rewarded by government, and in several clocks made by him, these wooden cylinders turned upon steel conical points.

The hard wood pallets of the escapement are mounted upon an arbor, having knife-edges at each end of it, resting upon agate bearings; and the pendulum spring was hung between adjusting cycloidal cheeks.

Mr. Barton, we understand, is constructing a grid-iron pendulum for this time-piece; and, when finished, we shall see the result of all this extraordinary provision of Mr. Harrison to obviate friction, and to avoid oxidation.

It certainly furnishes a remarkable instance of the excellence of workmanship, and the care bestowed by Mr. Harrison upon his time-pieces; and we are glad that it fell into Mr. Barton's possession, who has preserved it in perfect order, and has put it into Mr. Wm. Hardy's hands to complete it, and fit it for performing.

[*Technical Repository.*]

* The tendency to rust, is not the only objection to the employment of steel in the construction of time-pieces: the permanent magnetism which this metal acquires, is, in chronometers, and other delicate instruments, a troublesome source of error; and although in the larger time-keepers a substitute may be found, we are almost forbidden to hope for it in the smaller — *ENTON.*