

a good manure ; but in some places fifteen or twenty bushels per acre had been tried, and of course a complete failure had ensued.

Mr. Parkes replied, that gypsum was commonly used in Yorkshire, Mr. Parkes. and habit had dictated the proportions so well that it seemed to be the best manure the farmers possessed there.

Mr. Taylor recalled the conversation to the subject of the Paper Mr. Taylor. on Copper Sheathing; from which many curious facts might be drawn. The ancient specimens of copper sheets had endured longer than the modern: the former contained an alloy of $\frac{1}{80}$ th part of zinc. The "Muntz" metal, which is now being extensively used, contains alloy of the same material, but in a larger proportion. The inequality of manufactured copper had perplexed the chemist and the manufacturer for full forty years; and after all their researches and experiments, it would appear that the chemistry of the manufacture of copper and of iron was not understood. Mr. Taylor had been consulted by Sir John Henslowe on the subject, and he had recommended assaying the sheets instead of receiving them by the appearance of their surfaces, as was the usual mode. Dr. Faraday and Mr. Richard Phillips had made an extensive series of experiments for Mr. Vivian, and Mr. Farquhar had carefully analysed various specimens; but all these eminent men failed in discovering any chemical difference between the copper which had endured well and that which had been rapidly destroyed.

Sheets of copper rolled the same day, under apparently similar circumstances, differed materially in quality. In the process of "polling," which is carried on by stirring about the copper while in a fluid state with poles of green wood, producing ebullition, whether the operation is continued too long or too short a time, the metal becomes brittle and the quality cannot be recovered.

Less copper is now exported from Russia because the attention of the miners is directed to the gold mines. Mr. Taylor attributed the superiority of the quality of the foreign copper to the ore being smelted with charcoal; whereas English copper is smelted with bituminous coal, frequently containing sulphur.

February 22, 1842.

WILLIAM CUBITT, V. P., in the Chair.

"Holborn Hill, and the Plans for its Improvement." By John Turner.

This communication chiefly consists of an examination of the various plans which have been suggested for diminishing the acclivity
Improvements on
Holborn
Hill.

Traffic.

of that crowded thoroughfare. An idea of its thronged state is given from Mr. Whishaw's evidence before a Committee upon Metropolitan Improvements, in May, 1838, wherein he assumes the fair average annual amount of traffic between Fetter Lane and the Old Bailey at "20,000,000 pedestrians, 871,640 equestrians, 157,752 hackney coaches, 372,470 carts and waggons, 78,876 stages, 82,258 carriages, 135,842 omnibuses, 460,110 chaises and taxed carts, and 354,942 cabs."

The necessity for ameliorating this great thoroughfare has been generally acknowledged, and great changes have been made in the locality since the rivulet called the "Old Bourne" took its course down the hill into the Fleet river, which at that time had wharfs on either side for landing goods from the barges, which came up as far as Holborn Bridge. About the year 1733 the arching over of the channel of the Fleet was commenced, and subsequently was extended to the Thames, forming at present one of the main sewers, having its outlet at Blackfriars Bridge. On arching over the Fleet the ground at the bottom of the hill was raised as much as possible; indeed all that can be done by filling up (having reference to the surrounding levels), would appear to have been done at various intervals.

Mr. Taylor. The oldest plan mentioned by the author is that by Mr. T. F. Taylor, in 1828. He proposed to divide the hill at the corner of Hatton Garden into three parts, and to continue the same up Skinner Street nearly to the Saracen's Head Inn: between these points an iron suspension bridge, with a level roadway, was to be erected wide enough to admit of two carriages abreast, leaving the footpaths and nearly all the houses undisturbed. The estimate for this plan was about £23,000.

Mr. Turner.

In 1833 the author proposed to construct a bridge or viaduct, upon arches, along the south side of Holborn Hill and Skinner Street, from Thavies Inn to Sea-coal Lane. The arches would have been available for warehouses upon the level of that half of the street which preserved its original position. On this plan it would have been necessary to take down all the houses on the south side from Shoe Lane to Farrington Street; the others being modern, might have been raised. This plan was subsequently modified, and the width of the street increased to 70 feet, giving the viaduct 35 in breadth.

Mr. Moseley.

Mr. Moseley's proposition in 1833 was to fill up the valley to the height of 12 feet at Holborn Bridge, altering some of the houses at the bottom. In 1840 he further proposed to take 18 inches off the

brow of Holborn Hill and 12 inches off Skinner Street, which, with raising the bottom, would bring the gradient of the acclivity to about 1 in 35.

Some interesting tables are given of the rates of acclivities of some Gradients. of the principal thoroughfares in London.

St. James's Street, at 660 feet from Piccadilly, is	1 in 27
Waterloo Place, ending at Piccadilly	1 „ 25
Haymarket, at 490 feet from ditto	1 „ 22
Strand, opposite Northumberland House. . . .	1 „ 33
Charing Cross, from ditto towards Whitehall	1 „ 37
Southampton Street, from the Strand	1 „ 19
Fleet Street, opposite Salisbury Court	1 „ 42½
Ludgate Hill, ending at St. Paul's Churchyard	1 „ 25
Holborn Hill, varies from 1 in 16½ to	1 „ 23
Skinner Street, varies from 1 „ 24 to	1 „ 29

Messrs. Barnard and Geary published a plan, in 1836, for carrying a viaduct along the north side of Holborn Hill, between Hatton Garden and the upper end of Snow Hill, removing the greater portion of the houses between those points. The estimate of the expense was £359,000. Messrs. Barnard and Geary.

In the Second Report of the Metropolitan Improvements Committee for 1838 appeared a plan by Mr. Pocock, consisting of a viaduct on the south side of the hill, between St. Andrew's Court and Sea-coal Lane. Mr. Pocock.

Mr. Galloway's plan, in 1841, was to erect in the centre of the present line of road a viaduct upon iron arches, between Hatton Garden and the Saracen's Head Inn; this viaduct was to be 30 feet wide, and used for horses and carriages only, leaving the street below as at present, only widening it where requisite. Mr. Galloway.

Mr. Moon's plan, in 1841, was nearly similar to Mr. Turner's, Mr. Moon. only insisting upon a greater width of road.

Several propositions were also made for forming a new street either on the north or south side of Holborn Hill; among them are mentioned the following plans:—

Mr. Davey's, in 1833, which was to commence at Fox Court, in Gray's Inn Lane, cross Saffron Hill, and proceed, in the form of a crescent, to meet Skinner Street above Snow Hill. Mr. Davey.

Mr. Whishaw's plan, in 1835, was to build a viaduct, commencing at the end of Fetter Lane, to the north of New Street Square, thence across Farringdon Market, which he proposed to render more convenient and airy, and to terminate at the top of the Old Bailey, the roadway throughout being perfectly level. Mr. Whishaw.

Mr. Ross. Mr. Ross's plan resembled Mr. Whishaw's, but was less comprehensive, and avoided Farringdon Market, the viaduct being still nearly level.

These latter plans were laid out with a view of avoiding the existing thoroughfare, and the valuable property on Holborn Hill and Skinner Street.

The plans were collected by the author for the purpose of showing their comparative merit and originality, and (as far as he was able) the dates.

The Communication was illustrated by a series of Drawings and Lithographs of almost all the schemes, with prospectuses of nearly all for reference.

March 1, 1842.

The PRESIDENT in the Chair.

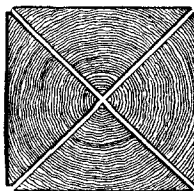
The following were balloted for and elected:—Robert Brunton, as a Member; Major Rohde Hawkins, Edward Dobson, Joseph Cowley, Captain Robert Foster, B.E., Lieutenant James Roger Western, B.E., Lieutenant John Rawdon Oldfield, B.E., David Bremner, William West, Charles Berwick Curtis, and Timothy Abraham Curtis, as Associates; and Thomas Edward Ainger, as a Graduate.

“Description of the Permanent Way of the South-Eastern Railway.”

By John Pope, Grad. Inst. C. E.

South-East-
ern Rail-
way.

This communication commences with a general description of the slopes of the cuttings and the embankments of the line, and explains the mode of ballasting and the quality of the materials employed. On either side of the bank of ballast, and below the level of its bed, there is an open drain, 3 feet in width, extending throughout the line, which ensures perfect drainage from beneath the sleepers. The different works connected with the laying of the rails are then successively noticed. The sleepers are placed transversely, and differ in shape from any hitherto employed. They are of Baltic fir, and are formed by a square balk being diagonally divided so as to cut out



Square balk divided to form four sleepers.