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Improved Turn-Table.

Our engravings illustrate an improvement in turn-tables which secures some important advantages.

The improvement is the direct combination of the ends of the centrally divided truss-beams in a turn-table, with each other as well as with the central supporting box upon which the table is balanced, in such a manner, that, when united, each beam shall be continuous, independently of the box, and be also more firmly secured thereto, and suspended thereby, than has hitherto been done.

The central box is thus relieved from the strain of the load, this strain being borne wholly by the truss-beams; accidental displacement of the connections of the beams by sudden and violent jars upon the turn-table is also obviated, while the table may as readily be taken apart and put together before and after transportation, as heretofore.

The letters, A, in Figs. 1 and 2, represent the truss sections alluded to. They are so formed that when brought together and secured, end to end, the under side of the continuous beam thus formed is an arc of a circle, of which the upper side is a chord.

Each section is a metallic plate with holes formed therein, as shown, to reduce weight, and each has a flange on each side, projecting all around its edge, except at the inner end.

The inner ends of the truss sections are faced to fit very closely, and exactly against each other, so as to form, when put together and secured, one continuous truss-beam. The two divisions are bound together at the top by broad-headed tie-straps and keys. At the lower side they are connected by a cross-tie bar, also held by keys or wedges, which not only operate to secure the cross-tie, but to draw together the faces of the joints.

Two truss-beams thus constructed are bolted centrally against or upon the ends of a hollow rectangular box, F, this box being cast in a single piece with an enlarged aperture in the bottom to fit over and receive the pintle, D, Fig. 2, upon which the table is pivoted.

The ends of this box fit snugly under the inner flanges of the edges of the beams, so that the latter overlap and embrace the ends of the box, and form a support for the beams. Projecting strips cast on the inner faces of the beams, parallel to the inner ends of each division also bear against the sides of the box.

A system of key wedges, having screw threads on their points, which project through apertures in the beam, and to which nuts are fitted, are used to tighten and clamp the beams upon the box, and also to level and nicely adjust the same with reference to the axis of the pintle, and the surface of the cap-plate, in the central box. This system of supports relieves the bolts in great measure from strains, consequent upon jars or pressure.

B, Fig. 2, is the central pier supporting the pintle, D, upon which the cap-plate, E, bears.

A friction box consisting of two circular plates (one being secured to the cap-plate, D, and the other to the upper side of a socket plate), between which are interposed conical steel rollers running in concentric grooves formed in the faces of the plates facilitate the rotation of the table. The upper end of the pintle is rounded as usual so that the table may tip or vibrate thereon as well as turn upon the rollers in the friction box.

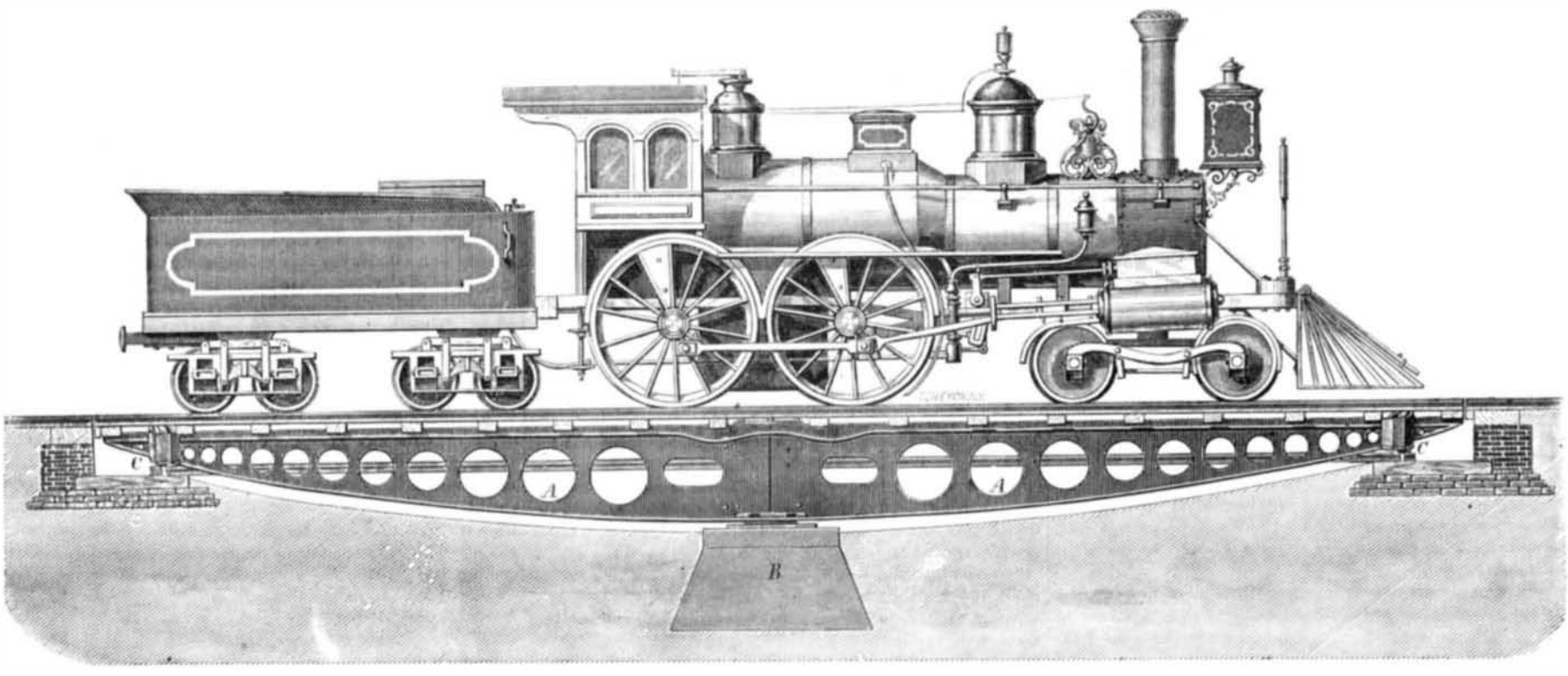
The outer ends of the beams are connected by cross-bars provided with rollers, C, which swing over a concentric track but do not touch except when the table is tipped out of its horizontal plane.

The inventor states that the friction is so reduced by this method of mounting the table that one weighing 25,000 lbs. may be turned with the point of a lead pencil without breaking the point.

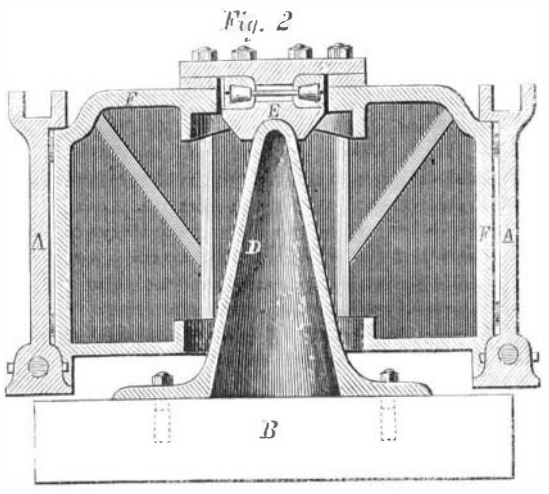
The plates and rollers are made of steel, and are very durable. They also, of course, turn with less power than the old cast-iron center. A table fifty feet in diameter, weighing 25,000 pounds, it is stated, turns with a weight of only 1½ pounds attached by a cord running over a pulley to one of the arms.

Testimonials, speaking in the highest terms of the good qualities of this table, have been shown us, from presidents and superintendents of several important Western railroads where they are in use.

Patented, February 8th, 1870, by Clements A. Greenleaf, of



GREENLEAF'S IMPROVED TURN-TABLE.



Indianapolis, Ind. These tables of various sizes, from 9 to 60 feet in diameter, are manufactured by the Greenleaf Machine Works, of the above place.

NEW BREAD.

Why is it that we must refrain from eating new bread, as if it were poison; unless, indeed, one happens to possess the stomach of an ostrich and the constitution of a rhinoceros?

Every one knows how palatable is the steaming loaf fresh from the bake-house, and we can all remember with what eager eyes we regarded as school-boys the new loaf, as it stood in its unshapely modesty, wreathed in vapor, in the cupboard. Which of us, during his melancholy days of satchel and Latin-root-hood, has not eyed the forbidden morsel with an eager craving out of all proportion to its merits—a craving which seemed to develop and increase as our loved and venerated mother assured us that new bread was decidedly unwholesome for little boys? And when a crummy slice from a two days' old loaf was placed in our unwilling hands, smeared and diagramed as it usually was with molasses or other saccharine decoy, and we were told how good it was for us—but for the molasses how odious it seemed! Probably this repugnance was strengthened when we recollected how many other unpalatable circumstances were daily happening—all for our good. We were hurried to bed at the most objectionable hours; we were reminded in the morning of the sluggard, his complaining voice, and his unhappy end we were soaped, scrubbed, bolused, and birched—all for our good; so that, schoolboy-like, we sometimes longed to make a surreptitious trial of the bad, by way of a change. Nevertheless, as a rule, our watchful parents and maiden aunts almost invariably succeeded in defeating our cunningly contrived schemes, especially those having for their object the consumption of new bread.

Now, why is new bread unwholesome, or rather, how does it happen that its alleged unwholesomeness is only experienced here and in England? In Paris or Vienna even the most dyspeptic eat, with a feeling of perfect safety, the exquisite new bread, which is usually baked three times a day and served fresh with each meal. So far from the cry being raised, "Waiter, some stale bread," the *garcon* who dared, either accidentally, through hygienic belief, or from motives of economy, to fetch yesterday's rolls, would have to run the denunciatory gauntlet of the table, and make certain of retiring copperless at the hands of the diners, even if no worse fate overtook him. Can it be that our climate is inimical to the production of bread in the highest state of perfection; that our flour is inferior to, or our bakers less skillful than theirs? Something is evidently wrong, so it may be interesting to look into the chemistry of bread-making here, previously to describing how they manage the production of the staff of life in the south of sunny Spain.

When wheat is ground and sifted, it gets divided into bran and flour. The bran is the outer coating of the grain, which resists the crushing of the millstones longer than the interior, but when reduced sufficiently to pass through the sieves, so darkens the color of the whole as to render it inferior in market value, although really superior in nutritive qualities to the white flour alone. For the former reason it is generally sifted out, and sold for fattening farm stock. The flour consists of the interior. If pure flour be mingled with a sufficiency of water to moisten it, a little yeast and salt added, and the mass kneaded thoroughly together, then placed in a warm atmosphere, it ferments and increases in bulk. Carbonic acid gas is disengaged in the substance of the dough, which speedily becomes cellular. Placed in a hot oven, the swelling increases until the mass has nearly reached 212° Fah., when fermentation is arrested, the bread retaining the shape it has then assumed. This fermentation is the result of the chemical action which yeast exercises upon moist flour, in changing a portion of the starch into sugar, and then converting the latter into alcohol and carbonic acid. The dough being glutinous and highly elastic, the gas cannot escape, so the mass swells and increases until, the heat killing the yeast plant, further evolution of gas ceases, while the alcohol evaporates and is lost in the oven.

But flour contains other nitrogenous substances than gluten, and others non-nitrogenized, besides sugar. Such substances readily undergo transformation, acting in turn as ferments, converting the starch into dextrine and sugar, and occasionally into lactic acid. When dry flour has been, through any accident or carelessness, exposed to heat and moisture, the albumen it contains passes into this peculiar condition, and is incapable of yielding good bread; because, during the manufacture, the conversion of starch into dextrine and sugar, which always happens in a limited degree, then occurs on a large scale. The bread produced is sure to be saccharine and sodden, being destitute of lightness, porosity, or cellular division; besides having acquired a dark and objectionable color, owing to the presence of diastase, should there have been a slight admixture of bran. In order to counteract the injurious action of diastase alum is sometimes employed, which enables bakers who are unscrupulous to use many qualities of inferior flour, which, they excuse themselves by saying, would otherwise be wasted.

The dyspepsia so frequently complained of after eating some descriptions of bread, whether new or old, may easily be accounted for. A gentleman who was in the habit of visiting a certain town found himself invariably seized with pain in the stomach whenever he took his meals there. Suspecting the bread, he caused an analysis to be made, when sulphate of lime was detected in considerable quantity. The baker asserted his innocence, but a search of the miller's premises revealed a large quantity of plaster of Paris.

Without entering on the discussion of the question as to what the effects of the habitual use of alumed bread on the digestive organs may be, it is sufficient for our present purpose to note the fact that, as a rule, our bread has too much yeast introduced into it, undergoes too little kneading, and that, by the aid of a mineral substance, inferior, or even damaged flour may be made to do duty in bread-making as if it had been sound, and of prime quality.

About six miles from Seville is situated the pretty and highly picturesque village of Alcalâ de Guadaira, which supplies the City of Oranges with bread. Let us halt for a brief period at the house of our worthy friend Panaderos, and watch the preparation of that delightful compound, which every traveler in the south of Spain has remarked as being so pleasant to the eye, so agreeable to the taste, and nourishing to the system. His wife and daughters are seated on low benches in the porch, sorting the wheat, which they separate both carefully and with expedition, consigning every objectionable grain to a basket reserved for the purpose. Singing some musical old ballad, and laughing merrily as they continue their light and pleasant employment, their lustrous eyes, blushing cheeks, pearly teeth, neatly braided hair, scrupulously clean small hands, and bright, fanciful attire, remind one of the pretty little tea-pickers of China warbling their favorite Moh-li-Hwa or Jasmin Flower amidst their heaps of Congou.

When ready, the wheat is passed through a mill on the premises, driven by a blindfolded mule, having a string of bells attached to its neck, which keep up a monotonous tinkling so long as it paces its round; and when it stops to rest it is again set in motion by the cry, "Arre, mula." The whole arrangement is as primitive, simple, and unpretending as that in use, according to the delineations on Egyptian sculptures, two thousand years ago. The resulting flour is passed through three sieves of different degrees of fineness, the wires of the last being so close together that only the pure flour is sifted through.

Evening is the time for bread making at Alcala de Guadaira, when the female portion of the community may be seen in their own houses making dough, into which, in contradistinction to our method, only a minute quantity of leaven is introduced. "A little leaven leaveneth the whole lump," we are taught in Scripture; here it is practiced—whereas at home, in order to avoid the labor of kneading, which, it must be admitted, is very severe, many of our bakers, where carbonic acid machinery is not employed, use as much yeast for one batch of bread as those simple people consume in a week. The dough, being ready, is placed in bags, and conveyed on the backs of mules to the great village oven, which is conveniently situated so as to accommodate the thrifty housewives around. It is there divided into three-pound lumps, which are tossed on a long narrow table. These are immediately seized by a multitude of sturdy brown bakers, who knead each portion with all their strength for about four minutes, passing it on from one to another, until it has gone under the knuckles of all. Here again the process is similar to that of preparing tea, and reminds one strongly of the long rows of stalwart manipulators seen in the tea districts of China, making the fragrant leaf ready for market.

Such is the energy which those *panaderos* infuse into their work, that in course of time the palms of their hands, and the second joints of their fingers, bristle with corns; and the guttural "aha, aha," uttered by them as they thump and squeeze the yielding, gratefully smelling billows, is suggestive of the exclamations breathed by the hard-working tea-bearers among the mountain defiles of Hounan and Oopack, as they trot down with their precious burdens to the various shipping ports.

Immediately on leaving the kneading table, where the lumps have, as a final process, been shaped into loaves, they are transferred to the oven. It is heated with wood, mingled with twigs of sweet majoram and thyme, vast quantities of which cover the adjoining hill slopes, scenting the air with their rich perfume. There being no fire under the oven, the bread is never burned, the hottest period being when the loaves are introduced, which, being full of moisture, quickly acquire a crust that protects the crumb.

In this primitive Spanish village it is evident that an answer to our inquiries has been found in the simple words—pure flour, little yeast, much kneading.—*Good Health.*

Steam Cultivation.

England, with fewer land-owners than the State of New York, and with nearly all her farmers working leased land, has about eight hundred steam plows and cultivators in active use—cultivating not far from three hundred thousand acres; and the system of steam cultivation has there been an established success for a dozen years.

The story of the rise and progress of the improvement is really a wonderful one, and as I read of the impediments to its general adoption, through the long list of small fields, uneven surface, crooked fences, and crooked landlords, I long to see it gain a foothold on the prairies of our Western States, where every circumstance that could promote it's efficient application seems ready-made to its hand. Thence, I am sure, by a reversal of the old rule, the course of its empire would eastward wend its way.

In the Journal of the Royal Agricultural Society for 1867, three hundred and thirty pages are devoted to the reports of the committees that had been detailed "to inquire into the results of steam cultivation" in use by one hundred and thirty-five farmers and stock companies of England. From the conclusions which they deduce from their investigation, I extract the following:

"In nearly all the cases reported, it will be seen that the expenses of cultivation are very much reduced, and yet that a larger amount of produce is said to have been realized.

"Not only are the operations themselves better done, quicker done, less expensively done, but all kindred and collateral movements have had imparted to them a speed and 'whirr' characteristic of steam; men acquire the habit of doing the day's work in the day, and of not leaving it for the morrow. The day's labor, too, on a steam farm, represents more work, with less distress to the physical power of the laborer, and better remuneration. Steam is working a revolution, slightly manifested as yet, so that we can speak only of tendencies in farm practice, and in the character of the rural population; they are being trained for the age of machinery in agriculture.

"Before steam can be as generally used for tillage as it is for thrashing, the fields below ten acres must be enlarged, and areas of thirty and forty acres become more the rule than the exception."

"In most cases, an increase of produce, in some instances as much as eight bushels per acre, has resulted from steam cultivation. We may state, as our general conclusion, that steam tackle, whether of Fowler, Howard, Smith, or other makers, is now so far perfected and settled in form and details, that it may be classed among old-established, standard farm machinery, and no longer among the novelties of the day."

"We find, as the result of experience, that which we already anticipated theoretically—namely, that the increased depth of surface, and the absence of pressure, greatly increase the absorbing powers of the soil, and consequently assist the action of the drains."

Mr. Clarke, a member of one of the committees, in a lecture on steam cultivation, delivered before the Central Farmers' Club, in December last, said (with reference to a trial of steam apparatus at the recent show of the R. A. Society):

"Now some persons may think it astounding to talk about from fifty to seventy acres a day being cultivated. I admit that it is very astounding; but I also assert that I saw the thing done—and there are other persons also who saw it done. I may tell you, too, that the apparatus was not in a perfect state; it was one of the earliest trials made of that particular arrangement. I have not the slightest doubt that the makers of steam plows are prepared, though I have not their authority to say so, to do, in answer to a challenge, an extent of land in a day which would astonish every one present. I have not the slightest doubt myself, that seventy acres—I should not stare particularly if one hundred acres could be cultivated, provided the work was tolerably light."

In a discussion by the members of the Royal Agricultural Society, it was declared that the advantage of steam cultivation amounted, on average soils, to at least eight bushels per acre in the increased produce of the grain crops; that arable culture is by means of it annually becoming cheaper and better; that the drainage of clay soils is facilitated; that even when coals are twenty shillings ($5) per tun, the power obtained from sixpence (12 cents) worth of them is equal to the day's labor of a horse—and that the system, wherever it is adopted, is improving all the classes interested in agriculture.—*Handy-Book of Husbandry.*

The French "Mitrailleuse."

To destroy your enemy in the shortest time, in the easiest manner, and at the least possible expense, is the first maxim of war. The stone that whistled from David's sling, the bullet of the "zundnadelgewehr," and the volley of the "machine gun" had all the same object. Since the days of Roger Bacon the aim of all improvements in fire-arms has been to carry the greatest possible number of deaths to the greatest possible distance. Grape, canister or case, and shrapnel all contain bullets, and are all means for multiplying deaths. The field gun mows down its hundreds by showers of case at close quarters, or at longer distances rains bullets from the bursting shrapnel. The mitrailleuse, or machine gun, on the contrary, sends a large number of small projectiles independently, and with precision, to a considerable distance. We may divide arms on the latter principle into two classes, first, those which discharge their bullets from a single barrel, fed by a many-chambered breech; and, secondly, those in which each cartridge has its corresponding barrel, the charging and discharging of which is direct and more or less simple. It is obvious that for rough usage and continuous firing it is better that a large number of rounds should be fired from a considerable number of barrels so placed as to support each other, and add strength to the whole machine. The French mitrailleuse, as well as the Belgian Montigny, belongs to the second class, and the following brief description is equally applicable to both arms: The machine gun consists of a cluster of barrels either bound together or bored out of the solid, and mounted on the same principle as an ordinary field gun. At a few hundred yards, indeed, it would be difficult to distinguish between these weapons, so far as outward appearance goes. To the barrel is attached a massive breech action capable of being opened and closed by a lever. In the Montigny arm the cartridges are carried in steel plates perforated with holes corresponding in number and position to the holes in the barrel. This steel plate, in fact, forms the "vent piece" of the system. The central fire cartridges being dropped into the holes in the steel plate, stand out at right angles from it, and the plates, thus ready charged, are so carried in limber and axletree boxes specially fitted for their reception. When the gun comes into action the breech is drawn back, a steel plate full of cartridges is dropped into its corresponding slot, and the breech block thrust forward and secured. The gun is now on full cock, and contains from thirty to forty cartridges, which are fired by a "barrel organ" handle, either one by one as the handle works round click-click, or in a volley by a rapid turn of the wrist. When the gun is empty the breech block is again withdrawn, the steel plate carrying the empty cartridge cases lifted out, and a fresh plate dropped in, if necessary. The advantage possessed by the machine gun over infantry fire is that it is never in a funk. Bullets may rain around, bursting shells may fill the air, still the thirty seven barrels of the mitrailleuse shoot like one man, and at 800 or 1,000 yards will pour volley after volley of deadly concentrated fire into a circle of from ten feet to twelve feet in diameter. No boring or fixing of fuses is required, and the whole operation is performed so rapidly that two steady, cool men could maintain a fire of ten discharges per minute. On the other hand, the mitrailleuse could not well compete with the field gun, and it is with this weapon it will assuredly be met. Its bullets would have comparatively slight effect at the ranges at which field artillery projectiles are perhaps most effective, while its size would offer a very fair mark to the gunner. The foreign press are welcome to write *fanfaronnades* about the sudden death of wretched horses at incredible distances. This is peace practice. The horses came from the knacker's yard, not from the banks of the Elbe, and there were no Uhlans sitting on them. We are also tempted on such occasions to take the square root of the reported distance as the actual range. The future of the mitrailleuse, however, depends on coming facts. The day's experiments are over; there are hundreds of machine guns trundling toward the Rhine. The drum-like roll of their volleys may ere long be heard in the vineyard of Rudesheim or on the edge of the Black Forest; and the "thud" of the bullet may come from something softer than a wooden target. Yes, the machine gun is *en route* for the Rhine; the experiments will now be on a gigantic scale; and Mr. Cardwell may adjourn his special committee until after Christmas, at any rate. By that time the voice of war will have given the verdict; by that time the Chassepot, the Zundnadelgewehr, the shrapnel, and the volley gun will each be credited with a ghastly account, and we shall each know which engine destroys human life in the shortest time, the easiest manner, and at the least possible expense.—*London Globe.*

Opening of the Thames Embankment.

The London papers teem with descriptions of the formal opening of the Thames embankment, a great engineering work that has been in process of construction for several years. It consists of an immense water wall laid along the edge of the Thames river, in the heart of London. The back of the wall has been filled with earth, forming a noble avenue, some portions of which are widened into the form of parks and adorned with trees. The work was designed and constructed by Mr. Bazalgette.

The wall of the embankment is a work of extraordinary magnitude and solidity. It is carried down to a depth of 32 and a half feet below Trinity high-water mark, and 14 feet below low water; and the level of the roadway is generally 4 feet above high water, rising at the extremities to 20 feet. The rising ground at each extremity is retained by the increased hight of the wall, which is built throughout of brick, faced with granite, and founded in Portland cement concrete. The river front presents a slightly concave surface, which is plain from the base to mean high water level, and is ornamented above that level by moldings, stopped at intervals of about 70 feet by plain blocks of granite, intended to bear lamp-standards of cast iron, and relieved on the river face by bronze lions' heads, carrying mooring rings. The uniformity of line is broken at intervals by massive piers of granite, which flank recesses for steamboat landing stages; and at other places by stairs projecting into the river, and intended as landing places for small craft. The steamboat piers occur at Westminster, Charing-Cross, and Waterloo bridges, and both are united opposite Essex street. It is intended eventually to surmount the several blocks and pedestals with groups of statuary.

THE violet ink sold by stationers has a pretty color and flows freely. But in respect to permanency it is worthless. Writing done with violet ink, if exposed to sun light soon fades.