

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW, NEW YORK.

O. D. MUNN.

A. E. BEACH.

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VOL. XXXIX, No. 5. [NEW SERIES.] Thirty-third Year.

NEW YORK, SATURDAY, AUGUST 3, 1878.

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Price 10 cents. To be had at this office and of all newsdealers.

SMOKE AND SPARKS.

The recently published advertisement of the Metropolitan elevated railroad of New York city, for some device for preventing the escape of sparks from their locomotives, touches a matter interesting as well to all railroads, and one whose successful solution would be of more value than any other improvement now sought by them. It is well known that the "spark tax" in the shape of damages for destroying fences, crops, buildings, bridges, snow sheds, etc., is no light burden to many of our roads, though it may not be as well understood that these sparks are the product of such imperfect combustion that thereby a large percentage of the calorific value of the coal is lost.

It is surprising when one considers the importance of a remedy that its discovery has been so long delayed, and that it was left for a small city road to be the first to publicly advertise its necessity, notwithstanding the fact that there is scarcely a railroad in the country, or indeed any where, to which the remedy would not be of greater money value.

It can hardly be fear of direct pecuniary damage which may arise from escaping sparks that moves the Metropolitan Company to an attempt to subdue them, for loss in this way would never be excessive in a city with such a competent fire department as ours; it must be the force of concentrated public opinion alone—possible and efficient only in large communities—which, though it quietly endures time-honored nuisances (a cause of congratulation to the Boards of Health and Police), is now aroused and excited by the development of a new one.

Deflecting arches in the fire boxes, spark arresters in and on the smoke stacks, designs for wetting down, and designs for returning the sparks to the fire box, and grates of various kinds have all fallen short of the purpose in a greater or lesser degree, and still the search for something suitable goes on.

In his treatise on the steam engine Mr. Bourne, who has almost exhaustively studied, investigated, and experimented in the matter, says: "Nearly all the expedients hitherto introduced for burning smoke (this includes the fine cinders) in locomotives are adaptations of the devices heretofore in use for burning smoke in land engine furnaces. But the rapid combustion which a locomotive boiler requires renders the burning of smoke by any of these ancient devices a matter of very difficult achievement, and it seems to be indispensable that a method founded on a totally new principle should be introduced. It appears to us that the fuel and air must be fed in simultaneously, and the most feasible way of accomplishing this object seems to be in reducing the coal to dust and blowing it into a chamber lined with fire brick, so that the coal dust may be ignited by coming in contact with red hot surfaces after having been mingled with the quantity of air necessary for combustion. This, however, in common with other improvements upon the locomotive, requires to be worked out."

There is no question but the majority of the mechanical designs we have above enumerated are ingenious and useful, but they have not been evolved in recognition of the undoubtedly correct principle laid down by Bourne, and hence have failed to satisfy the conditions.

Doubtless the policy which many of the railroad corporations have of late years pursued toward inventors has had much to do with the continuance of this costly nuisance, for it is notorious that inventors, who are rarely shrewd men of business, fare worse in the hands of these companies than they do with any others with whom they have dealings. The acknowledged necessity of the Metropolitan road will naturally bring many devices before the public, as well as to the notice of the company, with more or less well founded claims to investigation; and it is to be hoped that our national ingenuity will not be taxed in vain; that to our inventors will belong the credit of a final settlement of the question.

Another objectionable feature, and the cause of well grounded complaint in addition to the smoke and flying cinders, is the offensive sulphurous odor from the burning coal. Suggestive, at least, of the solutions of these difficulties, if not fully satisfying all the required conditions, are two articles which we have given in recent numbers of this journal, the one entitled "Our Iron Industry," and the other "Preparation of Iron Fuels;" in these we called attention, among other matters, to some of the advantages arising from the use of pulverized fuel, and to the economical preparation of coal in a manner that would prevent smoke and sulphur fumes, and it seems highly probable that a combination of these devices, or some modification of them perhaps, may meet the present exigencies, and that their economies would more than compensate for the expense of application.

COSTS OF SILVER AMALGAMATION.

From several of the prominent Nevada silver mines we learn that the cost of the wear per ton of ordinary silver ore upon the amalgamating pans in general use varies from 60 to 65 cents, and that from 1 to 1½ pound of quicksilver per ton is lost in slimes and flouing, each pound carrying off with it about \$1 worth of silver. In some instances the pans are supplemented by inclined tables, covered with quicksilver-coated copper, which arrest a portion of the slimes.

It seems to us that something better than even this combination could be devised, which should cost less and be more effective and economical in its working—something partaking of the nature of each. Let us imagine, for instance, two

or more copper lined troughs, set side by side and connecting near the ends, each furnished with a copper bladed screw made to revolve therein close to the bottom; and that both the lining and blades be coated with mercury, a quantity of which shall also be placed in the bottom of the troughs. If the ore were reduced to a sufficient fineness and run into this amalgamator it would be pushed to and fro, throughout its length, again and again, until every particle had been repeatedly brought in contact with the revolving blades, the lining and the quicksilver lying in the bottom. No accumulation of slimes, no flouing could occur under these conditions, we think; nor would the wear on the machine or the power required to run it approach that of the present amalgamator.

Perhaps for this the ore should be more finely powdered than for the pans, which of themselves do a great deal of grinding; but as finer pulverization is coming more in vogue, and in most instances much to the advantage of the innovators, other styles of amalgamators to suit the new conditions must naturally make their appearance.

ADVERTISING FOR FOREIGN TRADE.

The course of trade of late years has pretty thoroughly established two things, namely, that American manufactures are well fitted to compete with those of other nations in the markets of the world, and that our future home prosperity must hinge very largely on our ability to extend our foreign trade. If we had to-day an assured foreign market for a large part of the products which our factories are capable of turning out, the home demand for the same goods would be straightway increased enormously. Many of our mills are idle not because they represent so much productive power beyond the national capacity to consume, but because a large proportion of our consumers are on short allowances, for lack of employment, or other reasons. The moment they are set to work their expenditures will increase; and many useful industries, now languishing for lack of a market, would revive and flourish on the increased home trade. It would appear, however, that the initiative must come from foreign orders. Accordingly it is at once a sound financial policy and a patriotic duty on the part of our great manufacturers to make their wares known in the widest manner possible. That many of them appreciate the policy is evident from the advertising pages of the numerous export trade journals that come to our table. That the same line of evidence is not overlooked abroad is plainly shown in the comments of the British *Ironmonger* on the vigor and determination with which our export trade journals have entered the fields of trade so long all but monopolized by the British. The *Ironmonger* notes also the well displayed and handsome advertisements by which our manufacturers make known their products. In the matter of engraved illustrations the American advertisements are immensely more attractive than those of the British, and already British agents abroad are sending home the complaint that better cuts and better printing must be employed by their superiors, or else it is useless to expect success in competition with American artisans and artists.

The American papers specially devoted to the advancement of foreign trade are the *New York Times*, Spanish edition; *Journal of Commerce*, Spanish and Portuguese edition; *Philadelphia North American*, Spanish edition; *Boston Journal of Commerce*, export edition; *Iron Age*, monthly; *El Espejo*, Spanish; the *American Mail*, the *American Exporter*, and, we may add, the *SCIENTIFIC AMERICAN* export edition.

To some this list may seem out of proportion to the amount of our foreign trade. We do not think so; it is certainly not out of proportion to the trade they will help to build up. The world is wide, and, as yet, comparatively few of its inhabitants have learned how many things America can supply to meet their various needs. As fast as the information is conveyed to them the demand for American products will increase, and trade will follow. That wide awake merchants and manufacturers appreciate these facts is clear from the promptness with which they avail themselves of the new opportunity to reach the outside world afforded in the *SCIENTIFIC AMERICAN* export edition. The second issue, published this week, carries out the advertisements of over one hundred of our leading houses. We may say also, without boasting, that no paper ever set out on a like errand so generously freighted with fresh, timely, and useful information.

Labor in France.

The Consul at Nice reports that the common labor of his district on roads, buildings, etc., is monopolized by the industrious and frugal Piedmontese, who earn from 30 to 38 cents a day. Agricultural laborers are few in number, and earn from 47 to 57 cents a day. The small farms are mostly tilled by the peasants, who own them or work them on shares. Mechanical labor is comparatively high. Plumbers, coopers, and upholsterers get from \$1.20 to \$1.56 a day; carpenters and smiths from 88 to 98 cents; journeyman tailors as high as \$1.56; compositors, shoemakers, and masons from 80 cents to \$1 per day. The cost of living to the ordinary laborer is from 30 to 38 cents daily. His food is Indian meal, bread, vegetables, and wine. Meat is seldom eaten. Meal costs 3 cents a pound, and wine 6 cents a bottle. Wages have not materially varied for skilled artisans in the last five years. The export trade of Nice is exclusively confined to oils, perfumery, fruit, and flowers, and is in a prosperous state, increasing rather than diminishing.