

## The Infection of Rivers by Manufactories.

The continual discharge of the waste of manufacture into adjacent rivers, and consequent impurity of the water, its unfitness for domestic purposes, and its danger to hygiene, have been the subject of an investigation by an English commission, by which some interesting and important facts were brought out.

The little river of Irwel, which flows through Lancashire, is as clear and limpid as a crystal at its source. Two miles and a half from where it rises is Bacup. Before it reaches the latter place, it has already taken up the impurities of nineteen cotton mills, two dye-houses, a printing establishment, one saw and two flour mills. Now Bacup adds to its impurities, and immediately below it follow thirty cotton and woolen factories, six gum factories, tan yards, print works, clay works, saw mills, a porcelain and gas factory. No wonder that at Ramsbottom the river is "infected and black as Styx." At Manchester, however, the Irwel reaches nearly the maximum of impurity, holding 58.8 per cent of solid matter in suspension, and 9.43 per cent of chloride in solution. It has at that point received the waste of ten thousand different manufacturing establishments, besides the impurities of the cities and villages on its banks. "In view of such facts," says the report, "we have only one feeling and one word by which to express it—it is hideous." Of course this is one of the worst instances; but there are certainly many which are not much better.

From the conclusions of the English committee, we extract the following: Heretofore, it was believed that the sewage emptied into a river was oxidized at the expense of the oxygen inclosed in the water, and finally disappeared entirely. This would be a very convenient method of purification. Something similar was supposed to take place, as in the case where dirty water is poured on cultivated land, and filters through the soil. After this filtering it is free from impurities; the organic matter has been transformed into carbonic acid; but unfortunately, this theory does not hold true; a mass of impurity is not destroyed in running water, and we must cherish no illusions in this respect. There is only one effective method of meeting the danger; the sewage and waste, before being emptied into a river, must be subjected to a filtration which deprives them of their noxious germs and impurities; it is sufficient to pass them through some porous substance which retains the solid matter, and oxidizes the soluble substances.

The commission has, moreover, established the fact that the irrigation of a large extent of land with sewage water is not attended with any danger to the public health; after a few days the disinfection is complete. The conclusions of the English commission coincide entirely with the results obtained in France by experiments made near Asineres and Clichy, and may be taken as the basis of any regulations which, in due time it may become necessary to adopt in our own crowded manufacturing districts, for the preservation of the purity of our rivers.—*Manufacturers' Review.*

## Errors in the Treatment of the Horse.

In the midst of change, improvement, reform, says the Philadelphia *Leager* quite a number of questionable old notions continue to be followed, even now when the very erroneous character of some of them has been acknowledged. Of this character is the rigid adherence of a majority of drivers of horses to that useless and injurious relic of old times, the check-rein. Its use with draft horses is positively cruel. When a horse is drawing a heavy load, and particularly "up hill," he needs the utmost freedom of lungs and wind, and this he can never have with a tight check-rein. That the check rein prevents a horse from stumbling is more than doubtful; on the contrary, by elevating his eyes, it prevents him from seeing clearly where to place his foot. When a horse does stumble, he is far less likely to go down when his head is left free.

In England, where they are far ahead of us in everything pertaining to horses, the check-rein has been abolished; the last surrender being that of the artillery and commissariat trains of the British army, the change having been made by Sir George Burgoyne, the Commander-in-Chief, and he testifies to the beneficial effects attending it.

In New York city, thanks to Mr. Bergh, many of the finest equipages are driven without the check-rein, and a few humane people have thrown it out of use here. The old-fashioned "blinkers," or blind-halters, are also useless, if not positively injurious, by coming in contact and rubbing the lids of the horse's eyes; and many experienced horsemen long ago came to the conclusion that horses are more easily alarmed by what they hear and do not see, because, being intelligent animals, if they can fully see the objects, which when unseen or imperfectly seen, tend to frighten them, they are more readily calmed.

Another popular error, which bears hard on the horse, is the custom of making the axles of conveyances of all sorts of one uniform width. This custom is of ancient date, and it has caused great detriment to our public highways, both in town and country. It is not, perhaps, saying too much to assert that the uniform adherence to it has caused our Highway Department for the last fifty years hundreds of thousands of dollars. Had there been a latitude or play of from ten to twelve or fourteen inches in the tread of the wheels, especially in carts and wagons, it would have been impossible to have cut our pavements into the ruts we now see, and which renders hauling so difficult along our streets and roads. Like the Conestoga wagons of the last generation, with their broad tires, a difference in the width of our axles would have improved rather than damaged our highways, and we should not see them cut into alternating ridges and ruts, as so many of them are now

HOW TO UTILIZE A HEN ROOST.—A genius by the name of Jeremiah Cory, of Holden, Mo., has recently taken out a very novel patent. The invention consists in so combining and arranging a poultry roost with the gates of one or more beehives that the perching of the poultry upon the roost will serve to automatically close the hives. The object is to insure the closing of the hives at night, so as to exclude the bee-moth, and the opening of the same in the morning to permit the passage of the bees in and out during the day. The genius of our people is equal to all emergencies.

A CORRECTION.—A letter published in our issue of August 6th, accredits the building of the steamer *Robert E. Lee*, which lately figured in a race upon the Mississippi River, to Louisville, Ky. Mr. A. S. Roger, Jr., of New Albany, Ind., now writes us that this steamer was built at the latter place, he himself having built her cabin.

## Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address correspondents by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisements at \$1.00 a line, under the head of "Business and Personal." All references to book numbers should be by volume and page.

G. B., of Ind.—The following directions for soldering aluminum have been already published in this journal. However, for your benefit, and that of other new subscribers, we will reprint them here: "Mouray, of Paris, employs five different solders, which are composed as follows:

| No. 1. | No. 2. | No. 3. | No. 4. | No. 5.                   |
|--------|--------|--------|--------|--------------------------|
| 80     | 85     | 88     | 90     | 94                       |
| 8      | 6      | 5      | 4      | 3                        |
| 12     | 9      | 7      | 6      | 4                        |
|        |        |        |        |                          |
|        |        |        |        | parts in weight of zinc. |
|        |        |        |        | coppr.                   |
|        |        |        |        | aluminum.                |

"These ingredients are melted in a crucible. The copper is fused first, and the aluminum is then added in three or four portions. When the whole is liquefied, it is stirred with an iron rod. The crucible is then withdrawn, and the zinc introduced into the mass under constant stirring. It should be free from iron. The liquefied mass is poured in ingot-like molds, which have been wiped out with benzine. The selection of the solder depends upon the nature of the object. In order to quicken its fusion on the metal, a mixture of three parts of balsam of copaiba and one part of Venetian turpentine is made use of; otherwise the operation is performed in exactly the same manner as in the brazing of other metals. The aluminum solder is spread without delay on the previously heated surfaces to be fastened together. In heating, the blue gas flame or the turpentine blast lamp is employed. The more and oftener the solder is spread over the surface the better it is."

J. H. S., of —, asks whether in weighing a load on a wagon, by first driving on to the scale the fore wheels, weighing, and noting the result, then drawing off the fore wheels and drawing on the hind wheels, weighing, and noting the result, then discharging the load, weighing the wagon, and deducting its weight from the sum of the two previous weights, the correct weight of the load would be obtained.—If the wagon were constructed so that the fore and hind wheels sustained equal portions of its weight, and if the load were so placed that the fore and hind wheels sustained equal parts of its weight, and if the wheels were exactly level at the time of weighing, and if the half of the combined weight of load and wagon in each of the two first weightings rested upon the scale, the position of the wagon being so adjusted in each weighing that this precision could be secured, the correct weight could be ascertained in the manner specified. The chances that all these adjustments could be made under ordinary circumstances, are not one in a billion.

J. R., of Ohio.—We do not believe application of paint in the extreme heat of July or August, will materially aid the chemical changes, which take place ultimately in all paints which contain lead. Although neat facilitates most chemical reactions, the differences between the temperature of what are usually called hot days, and those called cool, in summer, is scarcely ever more than twenty degrees in the shade. The cracking off, and change of color in the mixture of white lead, red lead, and yellow ocher, of which you speak, is doubtless due to some defect in the vehicle, or adulteration in either or both vehicle and pigments.

H. B. G., of N. J.—We do not believe that wetting down the ashes in the ash-pit of your boiler, to preserve the grate, is so good a practice as to rake them out after firing the fire, though of course the cooler you keep the pit the longer the grate will last. Wetting down with the hose is a "mussy" operation, and helps to disintegrate the masonry. Cooling the pit in this way will not injure the draft, but we should think it would not be necessary with the depth and size of your ash-pit.

P. P. B., of N. Y.—We do not know of any way to make the mixture of gel and glycerin, used for printer's rollers, water proof. We do not think there is any way known. None of the chromates or bichromates, or tannin, though acting upon the glue, would, in our opinion, answer for this purpose. If any one knows of any means whereby this can be accomplished, we shall be glad to hear from him.

R. H., of Ohio. The words, belt, band, and strap, are equally appropriate, applied to flexible leather or rubber connectors of pulleys. In this country, belt and band are more commonly used. In English works we frequently meet the word strap used in this way. The word belt is one most in use among American mechanics.

D. L. B., of N. H.—You have, it seems, stumbled upon a well-known fact. If you will take another hardened steel rod, and hold it in the line of the magnetic dip, at your locality, and strike it as before with the hammer, you will develop magnetism in it also, and may count upon the same result, as often as the experiment is repeated.

G. H. M., of Va.—When the attraction and repulsion of the molecules of a mass are in equilibrio, the physical state of the mass is a liquid, and not a solid, as you assume. This error wholly vitiate your conclusions.

J. B., of N. Y.—Your question in regard to the tension of hollow shafts cannot be answered. You appear to be confounding horse power with static pressure.

G. F. M., of Mass.—We think a solid rubber or tanite emery wheel will answer your purpose for surfacing down pieces of plate steel much better than anything else.

H. C. P., of Mich.—We shall publish no more communications upon the subject of inertia at present. The question is one which we think does not generally interest our readers.

CAVEATS are desirable if an inventor is not fully prepared to apply for a patent. A Caveat affords protection for one year against the issue of a patent to another for the same invention. Patent Office fee on filing a Caveat, \$10. Agency charge for preparing and filing the documents from \$10 to \$12. Address MUNN & CO., 37 Park Row, New York.

CITY SUBSCRIBERS.—THE SCIENTIFIC AMERICAN will be delivered in every part of the city at \$3.50 a year. Single copies for sale at all the News Stands in this city, Brooklyn, Jersey City, and Williamsburgh, and by most of the News Dealers in the United States.

## Business and Personal.

The Charge for Insertion under this heading One Dollar a Line. If the Notices exceed Four Lines. One Dollar and a Half per line will be charged.

The paper that meets the eye of manufacturers throughout the United States—Boston Bulletin, \$4.00 a year. Advertisements 17c. a line. '507 Mechanical Movements.'—Over 18,000 copies of this book have been sold. This is by far the largest illustrated table of movements ever published. An invaluable aid to mechanics, inventors, etc. Price \$1. By mail, \$1.12. Address Theo. Tusch, 37 Park Row, New York

Best Boiler-tube cleaner—A. H. & M. Morse, Franklin, Mass

Peteler Portable R. R. Co., contractors, graders, excavators, and miners. See advertisement.

Manufacturers of Reapers and Mowers please send descriptive circulars to I. S. & H. R. Russell, New Market, Md.

Oil Cups for lubricating shafting and machinery. The best kinds are manufactured by H. Moore, 41 Center st., N.Y. Send for circular

Beware of Humbug Vinegar Advertisements.

The Best Self-closing and other Faucets, far superior to all others, are made by H. Moore, 41 Center st., New York.

A Good Machinist, with about \$3,000, can have an interest and entire charge of a paying manufacturing business. Address Machinist, Box 507, Baltimore, Md.

The Patent Right of Heyer's Pocket Sewing Machine for sale. Address W. D. Heyer, Box 102, Morrisania, N. Y.

Boiler Works Superintendent Wanted for a large Western city, capable of general management. Good position for competent man. Address "Works," P. O. Box 1, 173, New York.

Wanted—Special Partner in an old established Engineering business, now in successful operation, and controlling some valuable patents. Capital required from \$10,000 to \$15,000. Address Engineer P. Box 5669, New York.

Peck's patent drop press. For circulars, address the sole manufacturers, Milo Peck & Co., New Haven, Ct.

Millstone Dressing Diamond Machine—Simple, effective, durable. For description of the above see Scientific American, Nov. 27th, 1869. Also, Glazier's Diamonds. John Dickinson, 64 Nassau st., N. Y.

Rawhide Carriage Washers are cheaper than leather, and run with less noise than any other. Darrow Manufacturing Co., Bristol, Conn., Scientific American.—Back Nos., Vols., and Sets for sale. Address Theo. Tusch, City Agent, Sci. Am., 37 Park Row, New York.

Tools and Machines for special uses built to order. Chas. N. Trump, Port Chester, N. Y.

For Sale or to Lease—A never-failing water-power at Ellenville, N. Y., ½ mile from depot of the Ellenville Branch N. Y. and O. Midland R. R., and only 80 miles from New York city, by rail. For full particulars address Blackwell, Shultis, Gross & Co., Kingston, N. Y.

Gatling Guns that fire 400 times per minute are now made at Colt's Armory, Hartford, Conn. Send for pamphlets.

Wardwell's Patent Saw Tables—best in use—for sale by Richardson, Merriam & Co., 107 Liberty st., New York.

Wanted—The address of all manufacturers of Sewing Machine Trimmings and Findings, of all kinds. T. Shanks' Patent Bobbin Winder Manufacturer and Sewing Machine Dealer and Repairer, Southwest cor. Lombard and Sharp sts., Baltimore, Md.

Pictures for the Library.—Prang's latest publications: "Wild Flowers," "Water Lilies," "Chas. Dickens." Sold in all Art Stores.

A New Waltham Watch, made especially for Railroad Men and Engineers, is fully described in Howard & Co.'s Price List of Waltham Watches. Every one interested should send for a copy, which will be mailed to any address free. Address Howard & Co., 785 Broadway, N. Y.

Our Windmill pumps water for railroads, country and city buildings, hotels, stock fields, drainage, and irrigation. Self-regulating, durable and well tested. Con. Windmill Co., 5 College Place, New York.

Japanese Paper Ware—Spitoons, wash basins, pails, milk pans, etc. Perfectly water-proof, and will not break or rust. Send for circulars. Jennings Brothers, 352 Pearl st., New York.

"Your \$50 Foot Lathes are worth \$75." Good news for all. At your door. Catalogues Free. N. H. Baldwin, Laconia, N. H.

The Best Hand Shears and Punches for metal work, as well as the latest improved lathes, and other machinists' tools, from entirely new patterns, are manufactured by L. W. Pond, Worcester, Mass. Office, 98 Liberty st., New York.

Wm. Roberts & Co., Designers and Engravers on Wood, 36 Beekman st., New York, would respectfully announce that they are now prepared to receive orders from Manufacturers, and others, for engraving of machinery, views of stores, factories, trade marks, etc., etc.

Machinists and others using Fine Tools, send for illustrated catalogue. Goodnow & Wightman, 23 Cornhill, Boston.

Tempered Steel Spiral Springs for machinists and manufacturers. John Chatillon, 91 and 93 Cliff st., New York.

One 60-Horse Locomotive Boiler, used 5 mos., \$1,200. Machinery from two 500-ton propellers, and two Martin boilers very low. Wm. D. Andrews & Bro., 414 Water st., New York.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

Keuffel & Esser, 116 Fulton st., N. Y., the best place to get 1st-class Drawing Materials, Swiss Instruments, and Rubber Triangles and Curves.

For tinmans' tools, presses, etc., apply to Mays & Bliss, Plymouth st., near Adams st., Brooklyn, N. Y.

Glynn's Anti-Incrustator for Steam Boiler—The only reliable preventative. No foaming, and does not attack metals of boiler. Liberal terms to Agents. C. D. Fredricks, 587 Broadway, New York.

Cold Rolled—Shafting, piston rods, pump rods, Collins pat. double compression couplings, manufactured by Jones & Laughlins, Pittsburgh, Pa.

For mining, wrecking, pumping, drainage, and irrigating machinery, see advertisement of Andrews' Patents in another column.

It saves its Cost every sixty days—Mitchell's Combination Cooking Stove. Send for circular. R. B. Mitchell, Chicago, Ill.

To ascertain where there will be a demand for new machinery or manufacturers' supplies read Boston Commercial Bulletin's manufacturing news of the United States. Terms \$4.00 a year.

Inventions Examined at the Patent Office.—Inventors can have a careful search made at the Patent Office into the novelty of their inventions, and receive a report in writing as to the probable success of the application. Send sketch and description by mail, inclosing fee of \$5. Address MUNN & CO., 37 Park Row New York