tween it and the larger girder throughout its whole length. From well-known hydrostatic laws it is evident that, wherever the weight may be placed upon the floating girder (which weight must, of course, be proportional to the amount of water displaced by the floating girder,) the pressure arising from such weight will be distributed over the whole of the lower girder. Another advantage of the new construction is the absence of that vibration caused by the passage of a heavy train which is so injurious to cast-iron structures. It may be observed that the principal of the Hydrostatic Girder is not limited to bridge building. It is well known that the repairs to the permanent way, which form so large an item in railway expenses, are rendered principally necessary by the transit of those heavy-laden springless Trucks of coal, which operate upon every inequality of the line in their rapid passage, with all the injurious effects of a steam hammer. By simple application of the hydrostatic principle, a cheap and yet efficacious spring might be provided, obviating in a great measure the damage caused to the permanent way. —*Building News.*

Preservation of Steam Boilers.

Engineers will appreciate the following information given in the *Mechanics' Magazine* by an English chemist, Mr. Blockly:—

"I have read with great interest your articles on this and its kindred subject, and feel that I only speak the sentiments of the manufacturing community in saying much gratitude is due for the able manner in which the matter has been treated by you. I trust you will allow me to state that the use of 'muriate of ammonia,' or 'sal ammonia,' or 'chloride of amonium,' is not new. The present state of chemistry is such that every known substance has several names. Seven years ago I found it was in use to prevent incrustations, and only for its expense would have been more largely used then. I found also a gentleman of no mean pretensions as a chemist had used a mixture of sulphate of ammonia and common salt, which answered the purpose admirably, forming in the boiler chloride of ammonium and sulphate of soda; the boilers once incrusted did not appear to be cleaned by its use, but incrustation was effectually prevented, only a sludgy, sandy sediment being formed—easily cleaned by blowing off.

"Some localities are furnished with water of a different character, and for a number of years past the use of alkaline preparations has been adopted. Some of these compositions are made by boiling soda ash and lime together in water until the preparation is stiff. Others separate the lime, and stiffen with farina. I can positively assert that the use of alkaline substances is very old. One firm I know of use caustic soda ash regularly, and find it to answer perfectly, and there is a large dyer in this town whose boiler is always free from solid incrustation—the water is of a peculiar character, and contains a large amount of caustic soda as one of its ingredients. The composition you allude to to-day seems to lay claim to novelty—if so, the novelty cannot be from its possessing an alkali as one of its constituents. I have no connection whatever with any firm using boiler power or selling composition, and I would suggest to all users of steam power to try the use of caustic soda ash, a far cheaper material than most of the compositions, which I happen to know are often sold under the recommendation of the foreman or engineer, who gets a 'per centage,' or some other consideration. If this simple remedy does not succeed, I would suggest an examination of the water, and any chemist would undertake to provide some means as effectual as any composition. No one preparation can be expected to, nor does, answer under all circumstances."

Practical Memoranda.

Quality of different kinds of Wood.

The celebrated experiments of Marcus Bull, of Philadelphia, many years ago, gave the following results, showing the amount required to throw out a given quantity of heat:

Hickory	4	cords.
White oak	4⅔	"
Hard maple	6⅔	"
Soft maple	7½	"
Pitch pine	9⅐	"
White pine	9½	"
Anthracite coal	4	tons.

From this it would appear that there is less difference between hard and soft maple than is generally supposed.

Strength of Materials.

It is a remarkable fact that one of the most abundant materials in nature—iron—is the strongest of all known substances. Made into best steel, a rod one-fourth of an inch in diameter will sustain 9,000 lbs. before breaking; soft steel, 7,000 pounds; iron wire, 6,000; bar-iron, 4,000; inferior bar-iron, 2,000; cast-iron, 1,000 to 3,000 pounds; copper wire, 3,000; silver, 2,000; gold, 2,500; tin, 300; cast zinc, 160; sheet zinc, 1,000; cast lead, 55; milled lead, 200. Of wood, box and locust, the same size, will hold 1,200 pounds; the toughest ash, 1,000; elm, 800; beech, cedar, white oak, pitch pine, 600; chestnut and soft maple, 650; poplar, 400. Wood which will bear a very heavy weight for a minute or two will break with two-thirds the force acting a long time. A rod of iron is about ten times as strong as a hemp cord. A rope an inch in diameter will bear about two and a half tuns, but in practice it is not safe to subject it to a strain of more than about one tun. Half an inch in diameter, the strength will be one-quarter as much; a quarter of an inch, one-sixteenth as much, and so on.—*American Artizan.*

Area of Roofing to Supply Tanks of Given Dimensions with Rain Water.

The *Scientific American* says:—"Our rain fall averages 25 inches per annum, being rather more than two cubical feet for every square foot of horizontal surfaces employed in catching it; or, say, 200 cubical feet of water to the square. Each foot contains 6¼ gallons of water. A tank,