whole of the American foot passengers bridge, in the new works at Ostend, of creosoted red fir. A report of Mr. Moir, with respect to the piles and other timber, in the pier at Leith Harbor, creosoted by Mr. Bethell, is equally satisfactory.

Illumination of Lecture Rooms by Electric Light.

From the London Chemical News, No. 243.

The good and learned Abbé Moigno deserves the thanks of his numerous friends in this city for having introduced an innovation at his last lecture on the Progress of Science during the month, in the hall of the Société d'Encouragement, which cannot fail to be adopted, in hot weather at least, by all *entrepreneurs* of public meetings or entertainments. Instead of being illuminated by the innumerable jets of gas with which the hall is provided, a single electric light, placed in a central position, lit the room in the most perfect manner. The consequence was that, although the thermometer was above 100° out of doors, no one was inconvenienced by the heat, and although there were nearly 500 persons present, hardly a single pocket handkerchief was used as a *sudarium* during the meeting. While enjoying the comparative coolness, one could not help thinking of the summer evening meetings of the London Chemical Society, held in the hottest and worst ventilated meeting-room it was ever my ill luck to enter.

The heat here during the last week has been positively frightful, and forms the only subject of conversation everywhere.

On some of the Strains of Ships. By W. J. MACQUORN RANKINE, C.E., LL.D., F.R.S.

From the Lond. Civ. Eng. and Arch. Journal, Oct., 1864.

Read before the British Association.

In previous scientific investigations respecting the strains which ships have to bear, it has been usual to suppose the ship balanced on a point of rock, or supported at the ends on two rocks. The strains which would thus be produced are far more severe than any which have to be born by a ship afloat. The author computes the most severe straining action which can act on a ship afloat—viz: that which takes place when she is supported amidships on a wave-crest, and dry at the ends; and he finds that the bending action cannot exceed that due to the weight of the ship with a leverage of one-twentieth of her length, and that the racking action cannot exceed about $\frac{1}{100}$ ths of her weight. Applying those results to two remarkably good examples of ships of 2680 tons displacement, one of iron and the other of wood, described by Mr. John Vernon in a paper read to the Institution of Mechanical Engineers, in 1863, he finds the following values of the greatest stress of different kinds exerted on the material of the ship:—

In the iron ship, tension	3.98 tons per square inch.
“ “ thrust	2.35 “ “
“ “ racking stress	0.975 “ “

It follows that in the iron ship the factor of safety against bending is between 5 and 6, agreeing exactly with the best practice of engineers; and that there is a great surplus of strength against racking.

In the wooden ship, tension 0 375 ton per square inch.
 “ “ thrust 0.293 “ “

Here the factor of safety is between 10 and 15, which is also agreeable to good practice in carpentry. As for the racking action, the iron diagonal braces required by Lloyd's rules would be sufficient to bear one-third of it only, leaving the rest to be borne by the friction and adhesion at the seams of the planking.

Consumption of Water.

From the London Artizan, Sept., 1864.

A man is generally supposed to require about $\frac{1}{2}$ gallon of water per day for drinking, cooking, &c., and about 4 gallons more for washing, bathing, and other purposes; a family of 5 heads will require about 9 gallons per day. In Paris, the consumption of this liquid is officially stated to be

$4\frac{1}{2}$	gallons for every man per day.
$16\frac{1}{2}$	“ “ horse “
9	“ for a two-wheeled carriage per day.
$16\frac{1}{2}$	“ four “ “ “
92	“ for every square yard of garden per annum.
66	“ for a bath per day.
$\frac{1}{8}$	“ for every square yard of public road per day.

The consumption in Madrid, according to the report of the directors of the Canal de Isabella II. Company, is

$5\frac{3}{4}$	gallons for every man per diem.
$21\frac{1}{2}$	“ “ horse “
$14\frac{1}{2}$	“ “ two-wheeled carriage per diem.
$21\frac{1}{2}$	“ “ four “ “
12	“ “ square yard of garden “

The following is the consumption in gallons, of water, per day and individual, in the chief towns of Europe and America:—Rome, 243; New York, 125; Marseilles, $103\frac{1}{2}$; Besancon, 54; Dijon, 44; Bordeaux, $37\frac{1}{2}$; Hamburg, 28; Genoa, $26\frac{1}{2}$; Madrid, 26; Glasgow, 25; London, 24; Certe, 23; Lyons, 19; Manchester, $18\frac{1}{2}$; Brussels, $17\frac{1}{2}$; Monaco, 17; Toulouse, $16\frac{1}{2}$; Geneva, $16\frac{1}{4}$; Narbonne, 16; Philadelphia, $15\frac{1}{2}$; Paris, 15; Grenoble, $14\frac{1}{2}$; Montpellier, 13; Nantes, 13; Voiron, 12; Clermont, 12; Edinburgh, 11; Havre 10; Angouleme, 9; Liverpool, 6; Metz, $5\frac{1}{2}$; St. Etienne, $5\frac{1}{2}$; Altona $5\frac{1}{2}$; Constantino ple, $4\frac{1}{2}$; Rio de Janeiro, 2. This statement only comprises the quantities of water supplied by aqueducts; those yielded by wells and other means are not easy to ascertain.