In the matter of design, it is fully acknowledged that the English workman is behind is *confrères* abroad. The influence of design on workmanship is to make the workman think before he applies his technical skill ; but it is owing to the piecemeal way we carry out work, the putting him behind the contractor, in not recognising his talents, that we have lost our position as designers in the special trades. Till design again assumes its rightful function among our artificers over construction and technical skill, craftsmen must perforce occupy inferior positions in the production of architecture.—*Building News.*

SOME FACTS ABOUT ENGLISH MARINE ENGINEERING.

Every sea-going engineer denounces the extra heat of the high-pressure cylinder end of the engine-room—they do not grumble without reason.

But the difficulties and troubles in the engine-room are insignificant beside those in the fire rooms. To pass between the boilers is to face a temperature positively frightful ; it is almost impossible to get a draught of air through this space, but in many ships coal has to be barrowed through it by the trimmers. When forced draught is used the heat in fire rooms rises sometimes in deep ships to as much as 150 deg. The only consideration is to get air to the fires. If this is done it is assumed that the men will be all right. There never was a more unwise policy. It is almost impossible to get furnaces properly worked under such conditions. It is no longer the most skilful fireman who can be employed. It is the strongest man ; the man who has the greatest physical powers of endurance. The engineers are often driven to their wits' end to keep the men up to their work. What, it will be said, has high pressure to do with *this*? A great deal. Boilers carrying steam at 160 lbs. radiates more heat than those working at 100 lbs. "The actual difference is but 40 or 50 deg.," it is urged. It is the old story of the straw and the camel's back. Between bad firing and good firing there is much more than 10 per cent, difference, and good firing is next to impossible while "a man can hardly tell the stokehole from the furnace." We are putting on one side the question of humanity ; we are considering solely what seems to be the best course to adopt in order to get the utmost possible speed out of a ship, and only those who have tried it, only those who have had actual sea experience will fully appreciate what we have said.

Everyone who is familiar with the matter is agreed that as a rule, the heat in engine and boiler-rooms has augmented with the pressure, and we may add that it does not appear to us that adequate precautions are taken to keep these places cool and well ventilated. It is reasonable to suppose that the best is done that can be done. Further experience is required. It is none the less certain that of two ships equally good in other respects, and equally well manned, that ship will win in an ocean race which has the coolest engine and boiler-rooms. It is all a matter now of a few hours one way or another, and he who wishes to win must not throw away a chance. Bearing in mind the extra risks incurred and the extra trouble involved, and the additional tax on the endurance of firemen and engineers, we repeat that we are by no means certain that triple expansion engines working at 160 lb. are as good for Atlantic racing as three-cylinder compound engines, working at 90 lb. or 100 lb. pressure, and the success of the Etruria goes a long way to support our opinions.—*American Engineer.*

SEEING TO A DISTANCE BY ELECTRICITY.

A correspondent to *La Lumière Electrique* thus comments upon M. L. Weiller's paper which appears in *Le Génie Civil*, vol. xv., p. 570 :—

The writer endeavours to solve the important question of vision to a distance by electricity by means of a combination consisting of selenium cell, a gas telephone and revolving mirrors, forming a special apparatus which he designates a phoroscope, and which we will briefly discuss.

The question of vision to a distance by electricity is governed by the two following fundamental principles. In order to get the impression of the form, outlines or details of one or several objects, it is not necessary—1. That the eye should receive all the rays proceeding from it. 2. That it should receive, at the same time, the luminous rays necessary for vision.

Some very simple examples will demonstrate the first principle. We can see an object very clearly through wire gauze, and the image is perfect if the interstices are large and the wire fine. Carpets and mosaic seen at a certain distance do not seem to be formed of a number of parallel lines, or by the juxtaposition of little stones. An engraving, a picture, and especially a chromo-lithograph, show at a distance no discontinuity in the work, although the engraving is composed of lines and the chromo-lithograph of separate little dots.

We see thus that it is possible to have a sufficiently clear perception of an object by the vision of a system of more or less luminous lines forming a kind of pattern.

The second principle is quite as well-known and as deduced, from the duration of the luminous impressions upon the retina a period of about $\frac{1}{10}$th of a second.

A series of impressions succeeding one another in a very short time produces the effect of simultaneous impressions, and it follows that in order to perceive the image which we have called the pattern, it is sufficient to receive the luminous impressions of the different lines that constitute it in an interval of less time than $\frac{1}{10}$th of a second.

It was by taking this principle as a basis that Lissajous studied from an optical point of view the vibratory movements of bodies. His experiments are so well known that we need not enter into them here. Lissajous' curves are produced in a retangular portion of a picture. If, on the other hand, this object possesses the power of lighting, all the rays proceeding from the space occupied by the curve will, in an excessively short space of time, converge at one point after having been subjected to a double reflection on the mirrors of the two tuning forks that were employed for this experiment.

We may substitute for these forks any movable system whatever, bearing a series of mirrors arranged in such a manner that the displacement of each of them brings upon the same straight line all the rays projected from a portion of an illuminated object. Let us suppose the mirrors to be placed on a circle turning upon an axis perpendicular to its plane, and each of them making a different angle near 90° with this plane. To each mirror there will be a corresponding series of parallel lines in the picture, and if the rotation is sufficiently rapid all the rays proceeding from the object represented in the picture will meet at the same time, in as short an interval of time as required. It is thus possible to bring to one point all the luminous rays proceeding from a pattern, and each portion of the image thus producing its impression upon the retina in succession, it is sufficient that the interval in which these impressions succeed one another, should be sufficiently short for them to be rendered simultaneous.

The transformation of the luminous waves into electric cur-