SCIENTIFIC MUSEUM.

On the Choice of Spectacles.

Spectacles are usually manufactured of an oval form and small size to render them more elegant; but, as regards their utility, it is infinitely preferable that they should be large and round, covering not only the globe of the eye, but also a part of its vicinity. This is especially necessary for colored glasses employed to mitigate the impression of light, in the cases of photophobia, and congestion and chronic inflammation of the internal membranes. The border of such glasses should extend to the margin of the orbit; otherwise the light, especially that which is reflected from the ground, will strike upon the circumference of the globe, the centre only being protected by the darkened glass; and the impression thus produced is doubly injurious on account of the contrast.

Something similar is true of lenses, when they are oval and too small; refraction takes place only for objects placed in front of the eye, whilst those placed above, below, or laterally, especially during the movements of the organ, present their natural image. A very disagreeable confusion and inequality of vision, and sometimes diplopia, results from this. These effects are more marked when the glasses are bi-convex or bi-concave; for then their diminished curvature at the circumference causes vision to be less clear than in looking through the centre. To obviate this inconvenience periscopic glasses, that is to say, in the meniscus form, may be advantageously employed, convex-concave for the presbytic (with predominance of convexity,) and concave-convex for the myopic (with predominance of concavity.) As to the glasses of cylindrical surface, I have not yet been able to form a conclusive opinion in regard to them. In general, it has appeared to me that they have no appreciable advantages, and that, if they are to be used they should be chosen of a number a little more feeble than other glasses.

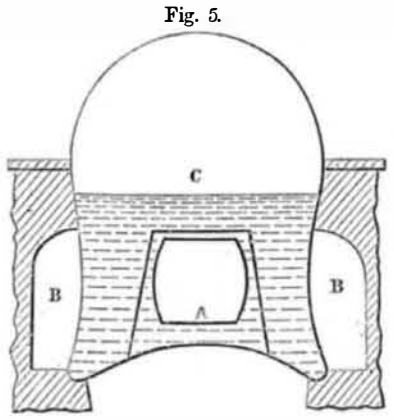
The frame-work of spectacles should be light and of proper dimensions. If it be too large and broad, their immobility is lost, and the eyes are fatigued by the vacillation of the image; if it be too narrow and heavy, the temples are compressed, pain and a feeling of uneasiness are produced in the parts near the eye, and secondarily in this organ, and the sight is thus affected. The glasses should be neither too near, nor too far from each other; if this consideration is not attended to, diplopia and other anomalies of vision may result.

In wearing spectacles, they should be carefully placed parallel, and not obliquely to the iris; for the oblique incidence of the rays impairs the clearness of the image. If brought too near the eye, they hinder the movements of the lids, or the transparence of the glasses is destroyed by the contact of the cilia, of tears, and of mucus. Equal care should be observed not to remove them too far, and place them more or less low upon the nose, which changes their mode of refraction, and gives them a different power from that which their number indicates. To speak generally, they should be placed as near the eye-lids as may be without causing them to come in contact with the cilia. In this respect, the conformation of the nose, of the eyes, and the edge of the orbit, may occasion difficulties which should be vanquished by the optician, in giving to the frames the particular form which the circumstances require.

Tears, transpiration, the vapor exhaled in the respiration, and that contained in the air, are deposited more or less upon the glasses of spectacles. They should, therefore, be occasionally taken off and carefully wiped with a piece of fine linen, or, what is better, fine wash-leather. When they are laid aside, the surface of the glasses should not be brought in contact with the objects on which they are placed, for, especially if convex, they are easily scratched by the contact of dust, foreign substances, and the inequalities of the surfaces with which they are brought in contact. They should be placed open, on their border; or folded with the branches placed underneath to protect the glasses. It is yet better to place them, each time they are laid aside, in their case, of which the cavity should be lined with a soft material, and should have such a form and such dimension that the glasses should not rub in entering. Before replacing them on the eyes, they should be wiped. If these particulars are neglected, the glasses are scratched, lose their polish, and become opaque in spots or striæ; and these defects, if not early perceived and remedied, alter and enfeeble the sight. The same result ensues if they are dim with dust, vapor, the impress of the fingers; or if the glasses were originally imperfect,—being scratched, of uneven surface, or containing bubbles of air, minute foreign substances, or other defects. The purity of the material of the glasses and the polish of their surfaces are essential; they should therefore be very carefully made from the hardest glass, or from crystal.—[Sichel.

On Boilers.---No. 4.

Fig. 5.



The "Boulton and Watt" Boiler.—It is very commonly stated that Boulton and Watt allowed 25 cubic ft. of space in their boilers for each horse power; but it is certain that Mr. Watt never left any opinion to that effect on record.

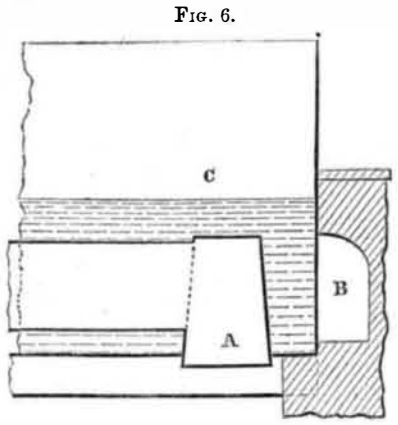
There is only one other way in which such an erroneous statement could have obtained currency, and that is by Boulton and Watt's 30 horse boilers being mistaken for 20 horse, owing to their ordinary practice, when erecting their engines in Lancashire, of putting down a 30 horse boiler to a 20 horse engine.

The annexed figure, 5, is a cross section of a "Boulton and Watt Boiler:"

A is an inside flue; B B are side flues; C is the boiler.

This boiler is 5½ feet wide by 7½ feet deep; but instead of 12 feet, it is 15 feet long, and contains an inside flue measuring 20 inches wide across the top. This, according to the rule for flued boilers formerly mentioned, is considered in Lancashire, England, equal to $\frac{(5{\cdot}5+1{\cdot}66)\times 15}{5}=21{\cdot}49$, or about 21½ horse-power; and if we calculate the cubic capacity of the boiler, including the flue tube, from the same dimensions, we shall find it to be about 18 3-4 cubic yards, or very little more than 500 cubic feet; and this, supposing it to be taken for a 20 horse boiler (which it actually is) instead of a 30, gives just 25 cubic feet per horse power, showing the same result as before.

Fig. 6.



This boiler was equal to driving a Boulton and Watt 20 horse engine with great ease, loaded to full 30 effective horse power, with less than 10 pounds of coal per horse power per hour, including making sufficient steam to warm a large factory, where it is yet at work in Manchester.

With respect to the effect which the propagation of the above assumed rule for boiler room has had on the practice of boiler making generally, there is no doubt but it has been beneficial; for makers and users of boilers have been naturally induced not to depart very far from what they considered Boulton and Watt's standard. We have, in consequence, a great number of boilers of various forms in use, ranging within a few feet above and below this proportion of 25 per horse power, from which a good average proportion can be obtained far more nearly correct than if the practice of engineers had varied at random, or to a greater extent on either side of this imaginary standard, which accidentally turns out to be very near the correct proportion.

Capacity of Water Chamber.—In fixing on the proper capacity of the water chamber of a steam engine boiler, there are not such peculiar difficulties as in the case of the steam chamber; and any one at a first view of the matter would say, as many do say without sufficient consideration, that there cannot be too little water, provided the boiler is filled to the proper height; for it is quite obvious the smaller the quantity of water, the less will be the expenditure of the fuel during the first getting up of the steam after each stoppage of the engine. It is, however, not the "getting up" the steam but the keeping it up, that ought to be considered of most consequence.

It is a prevailing opinion that, after the steam is once got up, there is no material difference between keeping a large quantity of water boiling, and a smaller quantity, provided the escape of heat is prevented by sufficiently clothing the boiler with non-conducting substances; but on this subject engineers differ, although why practical men should differ in opinion on so plain a matter is unaccountable. It appears to be very clear that a large quantity of water must require more heat, or heated surface, to keep it boiling, than a smaller quantity, even supposing the heat required to generate the steam to be equal in each case; for there must be a great deal of power expended in keeping the water in motion, and every practical mechanic knows that we never get power for nothing.

On the other hand, when there is too small a quantity of water, it is difficult to keep the steam sufficiently steady. It is then quickly got up, but it is liable to get quickly down again.

The priming of the engine is, also, not altogether unaffected by the quantity of water the boiler may contain, irrespective of the height of the water surface, inasmuch as a smaller quantity of water becomes much sooner thickened. The daily accumulations of whatever dirt or impurities enter the boiler along with the supply water, either in solution or suspension, become sooner concentrated by boiling; consequently frequent cleaning of the boiler, by preventing priming, enable us to work with a smaller quantity of water; we cannot have too little water room; half a cubic yard of water room per horse power, says Armstrong, ought never to be exceeded.

It has been very commonly considered that 10 or 12 cubic feet of water per horse power is as little as ought to be allowed. Tredgold recommends not less than 10, in consideration of the feeding apparatus for water not acting with perfect uniformity, even if ever so delicately adjusted.

A Bear Captured by Chloroform

A paper published at Montauban, Spain, gives an account of the capture of a huge bear, by chloroform, which is somewhat amusing. His bearship had for a long time been the terror of the district, entirely defying all attempts at capture. Even the most daring hunters dared not approach him sufficiently near to give him a death wound, and so the bear was left to his glory, making predatory excursions continually among the sheep and cattle of the surrounding farms. At length a Dr. Pegot hit upon a plan for securing the monster by the use of chloroform. Early one morning he proceeded to the cave where the bear slept, accompanied by a party of peasants, and having made sure by the snow just fallen that the animal was within, the peasants ran and fastened up the entrance with iron bars, which prevented the bear from coming out. Over the bars they stretched blankets to prevent the ingress of air, and now, all being ready, the operation of putting monsieur le bear under the influence of chloroform commenced. The doctor took a large syringe, and having filled it with the somnolent liquid, discharged it through an aperture in the blanket, into the interior of the cave. This being several times repeated the bear soon fell into a deep sleep, when the doctor marched in and secured his prize in triumph. They bore the poor bear away tied limb and limb, keeping a cloth saturated with chloroform constantly at his nose, and took him to the village, where a cage having been prepared, the bear was permitted to awake. Great excitement followed all around as the capture of the wild beast became known, and crowds came to behold him, secured in his cage. In the evening the village was illuminated in rejoicing, while the praises of science and Dr. Pegot fell from every lip. This is the first instance of the capture of a wild animal by chloroform.

Curious Circumstance.

The Pacific News has an article describing the strange effect of the effluvia from the mud flats in the eastern portion of San Francisco harbor, which is at times almost intolerable. On the Saturday night previous to the sailing of the last steamer, from some unknown cause it was particularly intense. Its effects were perceptible on the signs and painted spouts of buildings on Sansome street next day. They appeared black and discolored, as if they had been exposed to a withering heat—the signs were nearly obliterated—polished metallic articles were so tarnished as to be rendered unsaleable, and persons sleeping in the neighborhood described the rush of a current of air at night into their rooms as almost suffocating. This evil is being rapidly remedied by filling up that section of the Bay with sand from the surrounding hills.

The Louisiana sugar crop, it is said, will show a remarkably fair average throughout the State.

LITERARY NOTICES.

The Carpet Bag.—This is one of the most spicy, interesting, and ably conducted papers in the States, and is rapidly gaining a wide circulation. Its chief merits are sterling brilliancy in wit, satire, and mirth-stirring fun. Each number contains several spirited illustrations, *a la* Punch, which are always well conceived and artistically executed. Messrs. Wilder, Pickard & Co., Boston, Mass., are the publishers, and we wish them much success. The Carpet Bag is published in quarto form, on fine paper, and makes a beautiful volume of 416 pages. Terms $2 per annum.

Saturday Evening Post.—The advertisement of this well conducted and admirable literary Weekly appears in another column, to which we invite attention. The editors and contributors are prominently and well known throughout the country.