A STRANGE INCONSISTENCY.

Toward the close of 1862, the Chief of the Bureau of Steam Engineering conducted a series of "dock races" with the machinery of the original monitor. His summation of the result is, that "the great cylinder condensation should be decisive against the use of this type of engine." This, he states, is due to the peculiar construction of the cylinders. His reasoning—the prelude to his condemnation of the engines—is so remarkable, and so totally at variance with well-established facts in relation to conduction and radiation of heat, that it has attracted much attention in our mechanical cotemporaries abroad. No less an authority than John Bourne has recently, in the *Engineer*, expressed his surprise at the absurdity of Mr. Isherwood's deductions. But the inconsistency of Mr. Isherwood with his own reasoning and deductions, seems to have escaped attention.

The following extract from Mr. Isherwood's work are so clear in illustration of this point that we give them below:

Extract from Mr. Isherwood's "Report on Erie Expansion Experiments" (see "Experimental Researches in Steam Engineering," Vol. 1, page 110.)

"The condensation in the cylinder due to the variable temperatures of its metal, caused by the alternate exposure of its interior surface to the different temperatures of the steam on the opposite sides of the piston, is too insignificant to be included in a practical estimate, even under the most favorable conditions. The surfaces in question are, of course, the sides, ends, and nozzles of the cylinder, the interior of the valves, and the disk of the piston. To understand how very small the condensation due to this cause must be, we will consider the conditions of the simplest case, namely, that which occurs when using the steam without expansion. For this purpose, let us suppose the piston to have just arrived at one end of its stroke, and the whole interior of the cylinder to be filled with steam of the boiler temperature, and its surfaces, to a certain depth, to have the same temperature. Now, let the exhaust valve be opened, and then this steam will be discharged into the condenser and replaced with vapor of the greatly less temperature of the back pressure. This vapor will, of course, absorb heat from the metal of the cylinder, but the maximum quantity can only be that which would raise the temperature of the cylinder full of back-pressure vapor to nearly that of the metal; and if we consider the extreme tenuity of this vapor, the trifling weight of a cylinder full, and the difficulty with which it absorbs heat, we shall appreciate how little will be taken up. In the practical operation of the steam engine, the cylinder full of back-pressure vapor is pushed out by each stroke of the piston into the condenser, and, of course, carries with it whatever heat it had obtained from the metal of the cylinder by contact and by radiation. That the quantity, however, is practically inappreciable, will appear from an examination of the experiment made with the steam cut off at eleven-twelfths of the stroke of the piston from the commencement, in which the whole difference between the weight of feed water pumped from the tank into the boilers, and the weight of steam accounted for by the indicator, is only 2·91 per cent of the former.

In this slight discrepancy is, of course, included the loss from every kind of leakage, and from the condensation by external refrigeration in the steam pipe, valve chests, and cylinder. Slight as the loss from this particular cause is seen to be when using the steam without expansion, it will be still less when the steam is used expansively, decreasing as the measure of expansion is increased; for as the temperature of the steam urging the piston will continue to fall from the point of cutting off, to the end of the stroke, whatever heat the steam of reducing temperature obtains from the metal of the cylinder, previously imparted by its higher temperature, before the point of cutting off, will be utilized in producing a dynamic effect upon the piston, and the temperature of the metal will, to that degree, be made lower for the back-pressure vapor to act on and which will, therefore, obtain less heat from it."

Extract from Mr. Isherwood's "Report on his Experiment with the Engines of the monitor. (See same Vol., page 339.)

"From the description of the monitors' engines, it will be perceived that the two cylinders occupy the same barrel, the separation being made by a simple partition of cast iron in the center. Further, that during a large portion of the time, the boiler steam occupies one end of one cylinder, while the adjacent end of the other cylinder is open to the condenser. There is, consequently, one end of one cylinder maintained at the temperature of the boiler steam, while the adjacent end of the other cylinder, separated only by a cast-iron partitio,n is exposed to the temperature of the condenser. This arrangement, immaterial as it appears, and is, in a mechanical point of view, powerfully affects the economic result by its great influence on the cylinder condensation. To appreciate it, it is only necessary to imagine the piston of the starboard engine, for example, to be near the outboard end of its stroke, in which case nearly the whole of the cylinder of that engine will be filled with steam. At this moment the piston of the port engine is near the center of its stroke, and about one-half of the port cylinder adjacent to the starboard cylinder will be open to the condenser, and exposed to its refrigerating influence; consequently, the boiler steam in the starboard cylinder has been exposed for about one-half of the stroke of its piston to this refrigerating influence from the port cylinder, transmitted through the iron partition of the two cylinders, which, as their diameter is great in proportion to the stroke of their piston, forms a large proportion of the surface in contact with the steam. Nor does the evil end here, for as the sides of both cylinders are the same piece of iron, those of the one being merely an extension of those of the other, the conduction of heat is very rapid from one cylinder to the other, and the heat imparted by the steam to the sides of the starboard cylinder, quickly passes along by conduction to the sides of the port cylinder, whose interior is in communication with the condenser, and whose exterior is exposed to the atmosphere; the inevitable result, it is manifest, must be a largely-increased steam condensation in cylinders of this type of engine over that in the cylinders of engines of the usual type; how much larger; is a question which experiment alone can answer."

From the above extracts it has been seen that Mr. Isherwood has stultified himself, and that, too, in the same book. Was this because he had certain theoretical views to sustain, which are inconsistent with the results of his final experiment? It seems that the object in the latter experiment, was to condemn a certain style of screw engine.

A comparison of the extracts we have given, not only casts a strong suspicion on the honesty of Mr. Isherwood's reasoning, but of far greater importance, it suggests a grave doubt with respect to the truthfulness of the numerous experiments in the two official volumes alluded to. We make these remarks with great regret that they are called for by the premises. But when it is remembered that these coal-burning experiments have cost thousands upon thousands of dollars of the public money, it is very unfortunate that their accuracy should be questioned, or that any should say they were made to establish certain theories. The bare suggestion is enough to seriously impair—if not to destroy—any value which it is possible they might otherwise possess.

Still further, the Chief of the Steam Bureau, it seems, was so anxious to condemn the successful engines of the *Monitor*, that he did not even scrutinize them sufficiently to ascertain how they were made. He asserted, for example, that the two cylinders "have but one bottom in common." On the contrary, they have a separate bottom to each, with a space between them. As the two bottoms are in juxtaposition, of course, radiation is effectually prevented. A great deal more, and to the point, could be said on this subject, but we leave it as it stands, for the present. PER SE.

Silicated Whitewash.

M. Ch. Guerin called the attention of the French Academy to a new method of obtaining, by a cold process, a silicate completely insoluble, which can be applied either as an external coating, as in the case of glass or iron, or made to penetrate through the interior of the substance, as for the preservation of wood and other vegetable matters. The process is very simple: a thin coating of slaked lime made into a paste with water, or whitewash, is laid on the object to be silicatized, and when this has been allowed to dry, silicate of potash is applied over the coating; the effect, it is asserted, being that all the portions touched by the solution of potash become completely insoluble. and of very great adherence. In order to obtain an insoluble silicate in the interior of a substance, all that is necessary is to impregnate it by immersing it in whitewash, or lime water, and when it is dry to steep it in a solution of the silicate of potash.

By this means it is proposed to prevent the decomposition of vegetable substances by petrifying them; also to protect porous building stones and brick against air and damp; iron, by a coating of paper, pulp or other finely-divided woody matter mixed with slaked lime.

Again, letters, characters, or any other device can be traced with the silicate on any surface spread with lime, and those portions touched by the silicate will alone adhere and become insoluble. Or, if they be traced with a solution of gum arabic, and the whole be washed over with the silicate, the parts protected by the gum can be washed off, the rest remaining in relief, as the letters, etc., do in the first place.

The process seems to be substantially the same as the English process, known as Ransome's.

Useful Recipes.

PURE, inodorous glycerin will completely absorb the odors of flowers, if you submit them to a digestion for several weeks in a well-closed jar, and in a moderately warm place. The flowers should be covered by the glycerin.

CHLOROFORM removes stains from paints, varnishes, and oils. Another very effective fluid for the same purpose, is a mixture of six parts of strong alcohol, three parts of liquor ammonia, and a quarter part of benzole.

A GOOD white enamel for earthenware may be prepared as follows:—Melt and oxidize 60 lbs. of pure lead, and 40 lbs. of pure tin; 100 lbs. of this oxidized metallic compound should be melted with 50 lbs. of fine white sand (free from iron), 50 lbs. of common salt, 20 lbs. of powdered feldspar, 6 lbs. of nitrate of potash, and 6 lbs. of litharge. Grind the melted enamel finely in a mill and apply it to the ware.

FOR filling cracks in wooden furniture try the following cement:—Moisten a piece of recently burnt lime with enough water to make it fall into powder; mix one part of the slaked lime with two parts of rye flour, and a sufficient quantity of boiled linseed oil to form it into a thick plastic mass.

THE following receipe for a transparent pomade we copy from a foreign periodical:—Dissolve ten grains of Chinese gelatin by boiling in one ounce of distilled water, and remove the impurities swimming on the surface; mix this solution with four ounces of warm glycerin perfumed by five drops of oil of bergamot, or three drops of oil of roses, and colored by extract of rhatany. The mixture, when cold, should be tried by rubbing between the hands whether it will melt or not. If it should be too stiff, then warm it up in a water bath, and add to the fluid compound a small quantity of glycerin and let it cool; but if it proves to be too soft, add one to two grains of gelatin, previously dissolved in water. Heat the pomade to a temperature of 40 deg. Cent., and pour it into glass vials, where it will become stiff and transparent.

BEDBUG POISON.—In a pint of strong decoction of quassia, dissolve 60 grains of corrosive sublimate, and two drachms of muriate of ammonia. Label accordingly.—*The Druggists' Circular.*

LIQUID BLACKING.—Boil one ounce each of powdered galls, starch, and copperas, and two ounces of white Castile soap with two quarts of water, then strain and mix with three ounces of fine ivory black, and six ounces of molasses.

SOLVENT FOR OLD PUTTY AND PAINT.—Soft soap mixed with a solution of potash or caustic soda; or pearlash and slaked lime mixed with sufficient water to form a paste. Either may be laid on with a brush or rag, and when left for some hours will render its removal easy.