PERMANENT COMMISSION OF THE NAVY DEPARTMENT.

We have received the following official communication, which defines with accuracy the objects for which the Permanent Commission of the Navy Department is instituted; also the correct names and titles of its members:—

"On the 11th of February, 1563, the Navy Department organized a Permanent Commission, to which all subjects of a scientific character, concerning which the Government might require information, could be referred. The fundamental rules governing this Commission are as follows:—

"'1st. There shall be constituted a Permanent Commission, consisting for the present of Commodore (now Rear Admiral) Davis, Professor Henry and Professor Bache, to which shall be referred questions of science and art, upon which the Department may require information.

"'2d. This Commission shall have authority to call in associates to aid in their investigations and inquiries.

"'3d. The members and associates of the Commission shall receive no compensation for their services.'

"Such matters as are presented to the Department, and come within the scope of this precept, are referred to the Commission for examination and report. Since the Commission was first created, it has been enlarged by adding to it Brigadier-general Barnard and Mr. Saxton; subjects are occasionally referred to it from the War Department. The present members of the Commission are also members of the National Academy of Sciences; and the Commission itself would probably never have been created if the Academy had been in existence at that time, since they both have the same objects, and are designed to perform similar duties; it is not impossible that the former may at some future time be resolved into a Committee of the latter.

"The following is a correct list of the members of the Permanent Commission of the Navy Department:—

"C. H. Davis, Rear Admiral and Chief of Bureau of Navigation.

"Professor A. D. Bache, Superintendent of the U. S. Coast Survey.

"Professor Joseph Henry, Secretary of the Smithsonian Institution.

"Brigadier-general J. G. Barnard, Lieutenant-colonel of Engineers.

"Joseph Saxton, Assistant Superintendent of Weights and Measures.

"The head-quarters of the Commission are in Washington; and all communications should be addressed to Hon. Gideon Welles, Secretary of the Navy."

THE WAY BOILER SCALE IS DEPOSITED.

Carbonate of lime is scarcely soluble at all in pure hot water, is a little soluble in pure cold water, and quite soluble in water containing carbonic acid. Cold water, exposed for a long time to the atmosphere, always absorbs its own bulk of carbonic acid ; and if, while thus mixed, it comes in contact with carbonate of lime, a portion of the stone will be dissolved. Hence the hard water of our springs and wells. If this water is placed in a boiler and heated, the first action of the heat is to drive off the carbonic acid; and this action, with the raising of the temperature, deprives the water of its power of holding the carbonate of lime in solution. The salt is consequently precipitated, and deposited as a hard scale in the boiler.

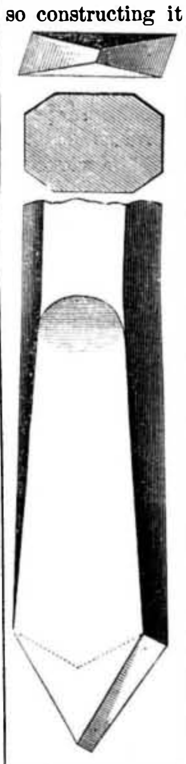
THE DRILL AND ITS OFFICE.

The office of the machinist's drill is to bore a true hole of a certain size in any metal. The conditions thus imposed upon the tool are sometimes fulfilled, but oftener not, and the reasons for this are to be found in a want of knowledge of the principle of a drill in those who made the tool, and sometimes from causes beyond the control of the mechanic; for good work cannot be made with bad materials. Three-sided holes, holes crooked in the length, holes small at the top and large at the bottom, and the reverse, ridgy holes, or those which appear to have been made with a coarse-threaded tap, oblong holes, nondescript holes, compounds of each and all the bad qualities previously mentioned, are made at times by poor workmen; and as there is no effect produced in the natural world without some cause, so also may the phenomena above mentioned be traced in mechanical operations to the omission of some important point in the construction of the drill which has been overlooked, and which is essential to its perfect operation.

To drill a straight, true hole in metal of any kind, excepting lead or copper perhaps, is just as easy as to make a wretched "apology" which runs in every direction but the right one, and is remarkable for nothing but its unworkmanlike appearance. Neither does it take more time to make a good hole, but on the contrary a properly made drill works much quicker and better than one badly constructed. We have no means of ascertaining whether drills of the present form were used by the ancients, for in all the hieroglyphics disclosed by the efforts of Layard at Nineveh, the tombs of the kings of Egypt, and in more modern discoveries at Herculaneum and Pompeii, we have seen nothing at all corresponding to the modern drill. There must have been some means at the command of these people for working metals in the manner mentioned, but their precise form is unknown to us, and their nature undisclosed. We imagine, however, that to the American mechanic of

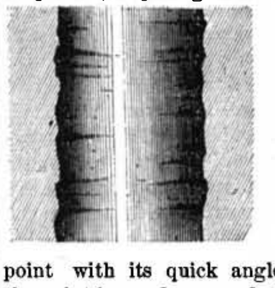
the present day it matters little whether the eye socket of a bronze pagan idol was drilled in, or cast "cored out;" and whether the nostrils of the Sphinx, which sits forever in the sands of the desert gazing steadfastly into the future, were chipped, cast or rimmed with a rose bit is not pertinent to this article. The work of the past in a majority of cases lies hidden; let it be the aim and object of the artisans of to-day to strain every effort for improvement.

To drill a simple straight hole in any metal we have the ordinary drill as herewith illustrated. This seems a very simple tool to make, but it is surprising to see what apologies and substitutes for it are to be found in almost every machine shop; below is the drill as usually and improperly made. In the first figure it will be seen that the tool is a thin flat steel bar for a proportionate distance, which should be so far as it is proposed to drill in the work; that the cutting edges are at right angles with each other or square, that the section shows the drill to be slightly rounded on its edges, and lastly, that the extreme point is as small and fine as it can be made consistent with strength. This is a plain, flat drill without "lips." Now the object and design of so constructing it is this; the drill should be made

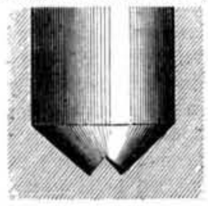


flat and straight, so that the borings may escape freely and not be crushed or broken in trying to get out; neither carried round and round for several revolutions without rising to the surface, for in doing so they impede the newly formed chips below from rising out of the hole. The point should be made thin so that it will always work true to the center, and not tend to run out, or make a crooked hole; and the cutting edges are square for the reason that with this angle they cut equally from point to corner and no part works faster than the other.

Let us take the badly-made drill, as shown in the second figure, and see what its defects are; these can readily be noticed where they depart from the well formed drill. This drill is not exaggerated in the engraving, being far short in reality of some specimens of handiwork we have seen kicking about on machine-shop floors. The dotted lines of the point and cutting edges show the various angles it is ground to, and the section and point in straight lines will now be noticed. This is a very bad drill—it is almost unnecessary to say that; it is stubbed and blunt, and could not drill an inch with decent feed without getting so hot as to draw the temper. The section is octagon, which is the worst possible form, because the chips catch at the angles and, not being able to get out, are ground to powder, requiring more power to turn the drill



than Fig. 1; the edges are sloped directly from the cutting edge to the back of the drill and the point is thick and square. With such a drill as this a hole like this one, at the left, would be made, and for these reasons: the thick point with its quick angles cuts unevenly; first the point bores down, and then the labor comes on



the edges, and the drill-point works loose, making a cone center in the hole like this diagram; the consequence is that the hole is untrue. The sharp edges sloping so quickly toward the back are also a disadvantage, because they afford no support to the cutting edges, which go astray in consequence.

(To be continued.)

Destruction of a United States Steamer by a Torpedo.

The sloop-of-war, *Housatonic*, one of the new vessels, was recently destroyed while on the blockade off the Southern coast. The circumstances of the disaster are these :—

"About 8:45 P. M., of the 17th ult., the officer of the deck, Acting Master J. K. Crosby, discovered something in the water, about 100 yards from the vessel, moving toward the ship. It had the appearance of a plank moving on the water, and came directly toward the ship. The time when it was first seen till it was close alongside was about two minutes. The torpedo struck the *Housatonic* forward of the mizzen-mast, on the starboard side, in a line with the magazine. The after-pivot gun being pivoted to port, they were unable to bring a gun to bear upon the torpedo. About one minute after she was close alongside the explosion took place; the *Housatonic's* sinking stern first keeling to port as she sunk. Most of the crew clung to the rigging, and a boat was despatched to the *Canandaigua*, which vessel gallantly came to their assistance and all were rescued but the following named officers and men : Ensign E. C. Hazeltine, Captain's Clerk C. O. Muzzy, Quartermaster John Williams, landsman Theodore Parker, second-class fireman Jno. Walsh, who are missing and supposed to be drowned."

The rapidity with which this torpedo approached the vessel would seem to indicate that it was propelled by some machinery. Vessels lying at anchor, on blockade duty, should be protected by rafts or booms projecting from the side, having lines rove through the ends all around the ship. In this way those incendiary machines would be prevented from doing much mischief. The arrangement could be made very simple and yet effective.

Delay in raising the Monitor "Aquila."

Our California exchanges are in tribulation over the delay in raising the sunken monitor; one correspondent writes as follows :—"The delay in raising the monitor by some one of the feasible plans before the public, because it cannot be determined which is the best, may subject the city to the fate recorded by the poet of an ancient worthy, to wit :

The great Bomfogus, who of old
Wore his legs bare, and died of cold.

Because he could not decide whether to put the right or left leg first into his breeches, and therefore went breeches-less, and met with the catastrophe recorded of him. The lady Bomfogus urged him by all feminine entreaties to put one leg or the other into his inexpressibles, no matter which. "But how can I," replied the great Bomfogus, 'when I have not yet decided which is the proper limb to take the precedence?' And so he died of cold. And so our fair city lies out in the cold, defenseless, while our Bumfogi are seeing which is the proper plan to raise the *Aquila*."