Decay of Stone.

The dissolving power of atmospheric moisture seems to depend greatly upon the quantity of free carbonic acid gas it holds in solution; and though this quantity in any given volume of water be extremely minute, in course of time every substance which has an affinity for it will yield more or less to its action. The silicates of potash and soda, for instance, which are present in the igneous rocks—or, to dwell especially on the class of materials under our notice, in the Devonshire granites—are easily decomposed when rain water falls upon them, and, the feldspar being removed mechanically by any of the countless actions of nature, it leaves the other ingredients of the material exposed to the mechanical disintegration of changes of temperature. The simple carbonates of lime, again, sometimes absorb carbonic acid with much avidity, and pass into the state of the soluble bicarbonates; and thus, in proportion as the original face of the stone is removed, does the lower surface become exposed to the action of the rain. The rain water of such a town as London not only does contain large quantities of free carbonic acid, but it also contains sulphuric acid and ammonia, which are capable of exercising a very deleterious influence upon the carbonates of lime. In discussing, however, the effects of these agents upon building stones, it is essential to bear in mind the fact that the mechanical state of the elements of those materials greatly modifies their resistance. Those which are of a crystalline character do not yield so readily as those which are amorphous, and the crystallization produced by volcanic or plutonic influence appears to be even more permanent than that which takes place in the ordinary way. It follows from these considerations that the stones of an irregular, confused, earthy texture, which are able to absorb considerable quantities of moisture, and which contain silica in a soluble form, or the carbonate of lime, should never be employed in positions where rain water could lodge upon them, beat against them, or be taken up from external sources by capillary or other action. In positions exposed to any of the above dangers, none but non-absorbent and decidedly crystalline materials should be used, and as those qualities are almost exclusively possessed by dense stones, it may be considered that the mere specific gravity of a stone is a *prima facie* indication of its constructive value. But atmospheric moisture when absorbed into building stones acts upon them quite as much through the changes in its own volume, in passing from the liquid to the solid state at the time of frost, as it does by the chemical dissolution it produces. If the stone should be placed in such a manner as that water should accumulate in any perceptible quantities between its various layers, and if the position of those layers be such that the expansion of the water in freezing cannot take place freely, the respective layers containing the water will be violently detached from one another.

Now all stones, even the crystalline limestones and slates, have certain planes or directions of cleavage or of stratification, along which water flows more readily than in any other course. If the stones be placed in a building with those planes in a direction likely to retain rain falling upon, or absorbed through, the surface (which is the case when stones are placed "bed to weather"), disintegration must ensue unless the edges of the beds be left free, and even in that case there is danger of frost detaching one layer from another.—*G. R. Burnell, in the Architect.*

Torpedoes and Torpedo Boats.

Mr. Edward C. Peck has submitted to the English Government a proposal for a torpedo to be propelled by steam obtained from the boiler of a torpedo boat through a superheater. The outside skin of a torpedo is utilized as a surface condenser. It is claimed that such a torpedo, 14 ft. by 14 ft., and with an explosive charge of 100 pounds of gun-cotton, would weigh only about one-half of those in use, and would have a speed of over 30 knots and a range of about 2,500 yards. The cost would be reduced nearly one-half. M. Lisbonne, who was recently Director of Naval Constructions in France, has published in the *Genie Civil* a table of English, French, German, Italian, and Russian torpedo boats of all sorts and descriptions:

England...........	boats,	156;	tonnage,	23,912;	cost,	$7,317,000
France..............	"	143;	"	20,450;	"	6,267,400
Germany	"	156;	"	14,597;	"	4,467,600
Russia...............	"	115:	"	5,104:	"	1,560,600
Italy.................	"	89:	"	7,966;	"	2,437,600

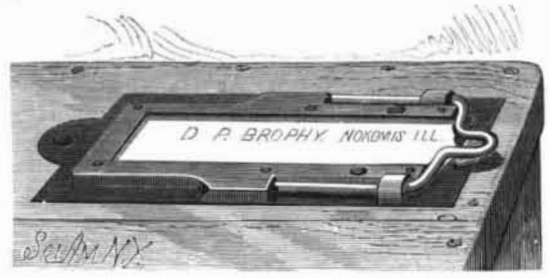
According to M. Lisbonne, where France is most behind England is in torpedo boats of a large size, of from 38 to 45 meters in length.

It is stated that the Italian Government has ordered from the firm of Schwartzkopf torpedoes to the value of 6,000,000 marks.

THE great value of isochromatic plates in microphotography has been demonstrated by Dr. Crookshank, who exhibited to the Royal Microscopical Society of London micro-photographs of bacteria obtained without staining the objects with aniline, as in Koch's process, and he has still more recently exhibited a photograph showing the flagella of a vibrio.

IMPROVED LABEL HOLDER.

The case of this simple and efficient label holder consists of an inner plate and a somewhat smaller outer plate, which are riveted together. The inner plate is made solid, and is provided with holes through which screws or nails may be driven, to attach the holder to a trunk or other receptacle for holding goods of any kind. The outer plate is a narrow U-shaped strip formed all around its inner margin with



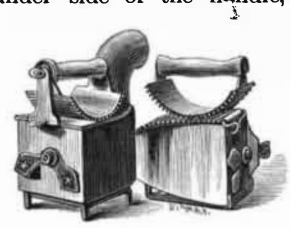
BROPHY'S IMPROVED LABEL HOLDER.

a rabbet to receive the label, which extends a little beyond the other end of the plate. A spring is connected at the opposite extremities of its side arms to the case. The arms extend forward to the ends of the outer plate, where they join the cross bar of the spring. The center of the bar is bent to form a loop, to the under side of which is fixed a lug formed with a square inner shoulder, which normally stands in front of the outer end of the label, while the cross bar of the spring presses down on top of the label, which is thus held securely in the case. Loops fixed to the case hold the spring in proper position edgewise of the case, and also limit the upward movement of the spring when it is lifted away from the face of the label. To place a label in the case, it is only necessary to slip the end of the label between the raised latch lug and the inner plate, and then push it inward until the lug springs down behind its outer end.

This invention has been patented by Mr. Dennis P. Brophy, of Nokomis, Ill.

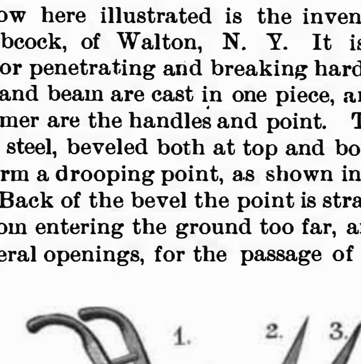
THE MULTUM-IN-PARVO IRON.

The sadiron herewith illustrated is the invention of Mr. H. S. Pease, of Peoria, Ill. It is a miniature stove, with polished surface, and is used in the same manner, and is as convenient, as the common flatiron. Upon the under side of the handle, which is detachable, is a curved fluting iron, corresponding with a fluted piece fixed to the side of the main iron, as shown in the right hand view. The iron is heated with charcoal, but live coals from a common wood fire are equal to the very best charcoal, if made of good, solid wood. This iron does the work of an entire set of ordinary irons, as the heat can be so regulated, by means of the dampers at the heel, as to keep the iron at a uniform temperature. As the iron does not come in contact with a range, it is always clean and nicely nickel plated. The many advantages to be derived from a fluting, polishing, and smoothing iron which is self-heating and extremely simple in construction are apparent.



IMPROVED PLOW.

The plow here illustrated is the invention of Mr. John Babcock, of Walton, N. Y. It is especially adapted for penetrating and breaking hard earth. The standard and beam are cast in one piece, and attached to the former are the handles and point. The point is a plate of steel, beveled both at top and bottom, at one end, to form a drooping point, as shown in the several figures. Back of the bevel the point is straight, to prevent it from entering the ground too far, and through it are several openings, for the passage of bolts for se-



BABCOCK'S IMPROVED PLOW.

curing the point to the standard. In some cases these openings are made in the form of vertical slots, so that the whole point may be set at an angle on the standard, and in other cases, when these slots are used, the entire lower edge of the point is made straight, as shown in Fig. 2. In Fig. 4 the beveled edge is upset to form side flanges for spreading the dirt.

Steno-Telegraphy.

Mr. G. A. Cassagnes, editor of the *Chronique Industrielle*, has recently described before the French Academy a method of transmitting telegrams which he calls "steno-telegraphy," and which is a combination of mechanical stenography with telegraphy.

The apparatus are as follows: At the transmitting station: a keyboard perforator, an automatic transmitter, and a distributer. At the receiving station: a distributer, polarized relays equal in number to the keys of the keyboard of the perforator, and a printing apparatus.

At the transmitting station, the keyboard of the perforator, maneuvered by one stenographer only, perforates in a band of paper a series of apertures arranged in horizontal lines, and each of which represents at least one syllable. The perforating is done at the rate of two hundred or more words per minute.

Through the very position assigned to it by the maneuvering of the keyboard, each aperture corresponds to a definite stenographic sign, which is to be printed upon the stenographic band of paper at the other station.

The perforated band is placed under the transmitter, where it remains immovable, as does also the band that is to receive the impression at the receiving station. If, through one of the apertures, the transmitter then automatically emits a current that passes into the line wire through the brush of the transmitting distributer, this current, on reaching the other end of the line, will be received by the brush of the receiver, which will keep up a continuous motion synchronous with that of the brush of the other station, and will actuate a polarized relay that closes a local circuit designed to print the sign corresponding to the current emitted at the transmitting station.

Since, in consequence of the very revolution of the distributing brush at the transmitting station, the same operation is repeated for each of the apertures in succession (which form a small, perforated, horizontal line), and since the paper at the two stations remains always immovable, a horizontal line is printed, and the line of apertures of the transmitting station is thus converted into a line of signs, representing at least one syllable, at the other station.

The bands then move forward by the space of one interline at both stations, and everything is in readiness for the printing of another line, and so on.

The number of syllables that may be thus printed during one revolution of the brushes depends, then, solely upon the number of contacts into which the distributer and receiver of the two stations can be divided, and such number itself depends upon the possible duration of the emissions, that is to say, upon the length and state of the telegraph wire.

Numerous experiments made upon the French lines have given the following speeds of transmission with a single line wire:

1. As far as 210 miles, 400 words per minute; and with two keyboards, 24,000 words per hour.

2. As far as 390 miles, 280 words per minute; and with two keyboards, from 16,000 to 17,000 words per hour.

3. As far as 540 miles, 200 words per minute; and with a single keyboard, 12,000 words per hour.

The transmitting, moreover, may be done either entirely in one direction or the other, or simultaneously, partly in one direction and partly in the other, according to requirements.

Steno-telegraphy, then, affords a means of greatly increasing the number of words transmitted by the same conductor. It may consequently be employed to great advantage in telegraphy, since it prevents the encumbering of the wires, by utilizing each of them more perfectly than has been done in the past.

Again, it permits of stenographing a discourse while it is being delivered, and of transmitting it at the same time to distant points. In this way, the first sentences of a discourse begun at Paris at two o'clock might be put in type ten minutes afterward in a printing office at Marseilles; and as the keyboard and electric transmission (without relays and through a single wire) never cease to follow the orator, the latter's discourse might be distributed simultaneously in the two cities, which, as well known, are 578 miles apart.—*Revue Internat. de l'Electricite.*

Effect of Fog on the Electric Light.

It was recently announced that the electric light on May Island, at the mouth of the Firth of Forth, had been sighted in clear weather from a distance of forty-six miles at sea, by the master of the Swedish steamer Frithiof. The same steamer arrived at Granton recently, and the master of the vessel reports that early in the morning, when there was a very dense fog prevailing, he had got within three miles of the May Island before the very powerful electric light recently placed in the lighthouse could be observed, and that it then only resembled a dim light from a single candle. These two facts afford a very marked contrast in regard to the penetrative power of the electric light in clear weather and in a dense fog. It is well that such data should be put on record and accumulated for future reference.