Correspondence.

Taking Cold—A War Experience.

To the Editor of the Scientific American:

Your correspondent Van Bibber's army experience with "Taking Cold" was very much my own. I served with the 13th N. C. Regiment, and though considered a quite delicate young man, I went through with the rest much hardship and exposure. The severest cold I had in the war was when my company was "eating its wheat bread," in the winter of 1861, at Todd's Point, Va., where we had close, comfortable cabins and large roaring fires. There was too much comfort. I had suffered for years from severe attacks of tonsilitis and ulcerated sore throat, that every year confined me to bed for weeks. Yet as a private in infantry fifteen months, and an officer in line the rest of the war, doing hard service, marching through snow, sleet, rain, mud, often sleeping in mud and water, and occasionally waking in the morning covered with snow, I had but *one* attack the whole war, and that was in November, 1863, when we left newly built winter quarters near Orange C. H., Va. (the close, comfortable cabins again!) to go after Meade at Vadairsville. It was a cool night, we were on line of battle, ordered to charge the enemy at early dawn, and hence were allowed little or no fire. My servant had my overcoat and blanket, and was afraid to come to me on line, and I sat all the night over a few coals, green, smoking pine, my throat much swollen, and with a fever. In the morning Meade was gone. My throat was well in two days, I did not quit duty, and I have had but one attack of tonsilitis since, and that was soon after the war.

P. S.—While fully up with the great damage of an intemperate use of tobacco to the nervous system, I always felt more comfortable, and, somehow, as better proof against "taking cold," if in the cold and wet in the trenches, or roughing it on the open plains, I had the quid in my mouth. But it is a nerve destroyer. I am satisfied of that. T. C. EVANS.

Reidsville, N. C., February 2, 1887.

The Boiler Explosion.

To the Editor of the Scientific American:

Seeing the article in your paper of January 1, on "Remarkable Boiler Explosion," by Mark Bacuitt, also in your issue of January 22 by W. P. Woodward, I venture to make a few remarks, which I think, if carefully considered by practical men, will throw a little light on the mystery of boiler explosions.

Mr. Ames, the master mechanic, claims to see no reason for explosion, beyond the fact that the cock in the steam gauge pipe was partially turned off.

FIRST QUESTION.—What was the cock turned off for? ANSWER.—When the spring in a gauge gets weak, or sometimes when the parts are worn, or sometimes in an improperly constructed gauge, the hand of the gauge will vibrate when the locomotive is in motion; to remedy this, the cock in the gauge pipe is turned off until the hand stops vibrating.

SECOND QUESTION.—About how large is the hole left for steam to pass through the cock? ANSWER.—Gauges vary; sometimes, the cock has to be almost closed before the hand stops vibrating.

THIRD QUESTION.—Was this cock put in for this purpose? ANSWER.—No, it was intended to turn off the steam, so that the gauge might be taken off and repaired while there was steam in the boiler.

FOURTH QUESTION.—Is it advisable to turn off the steam from the gauge in any way? ANSWER.—No, repair or renew the gauge.

FIFTH QUESTION.—Is a gauge pipe more liable to plug up by being tested by cold water pressure than by steam? ANSWER.—Yes, especially after extensive repairs on inside of boiler, more or less light substance will be left on the inside of the boiler, which will float on top of the water, find its way to the highest places, one of which is the steam gauge pipe; being too large to pass through the almost closed cock, stick and swell. W. S. FOSTER.

Farnham, P. Q., January 23, 1887.

How Cut Glass is Made.

To the Editor of the Scientific American:

Referring to question 9, J. S. B. (who asks how cut glass is made), in issue of January 22, 1887, page 59, cut glass table ware is not common pressed glass cut over, etc.

In making cut glass, the articles are always blown, not pressed. Goblets, wineglasses, fingerbowls, etc., are made "off hand," that is, they are blown and shaped by hand, the only tools used being a blowpipe and the gaffer's tool. Oval and irregular shaped articles are blown into proper moulds having smooth surfaces, the moulds serving merely to give the shape, and not to impress any pattern. All articles leave the glass maker's hands with a smooth surface, and in this state they are called "blanks." The pattern or design is cut out of the smooth surface with iron wheels adapted to the work. Every line is then "smoothed" on stone wheels, and finally buffed and polished with crocus and rouge on leather and linen wheels. The essential difference in cost and appearance between cut and other varieties of table ware is that in the former the pattern or design is entirely cut out of the solid mass of the glass.

A pressed article, though it were smoothed and polished over, would not be properly called cut glass, nor would it look at all like a genuine cut piece. I will briefly give the reasons for its inferior appearance. In the first place, the glass always shows a "chill" where it was in contact with the iron of the mould.

This "chill" can be taken off the outside surface of any article by subsequently heating the surface to very nearly the melting point, but it cannot be removed from the inner surface of a goblet, for instance. This is one reason why a goblet first pressed and then polished over would not have the brilliancy of a cut goblet. In the second place, the pressure brought to bear on the soft glass when it is pressed greatly affects the refraction of light in the finished article. When the goods are sold as pressed ware, the refraction is again partly restored by reheating the surface, as before mentioned, after the pressure is removed, such reheating serving to take off the chill as well as to swell a thin skin of the glass into a state in which it seems to regain its refractive powers, in other words, its brilliancy.

In cutting over such a pressed article, this thin skin of refractive glass would be abraded, and the brilliancy of the whole article impaired.

The value of cut glass is in proportion to its purity of color and the brilliancy of the "metal," or glass; and it is a matter in the experience of every glass maker that a pressed article cut over is *not* as brilliant as the same piece not cut, and having the fire polished or reheated surface intact. Hence, though it is cheaper to press a piece first, and then cut over the pattern, such goods are so inferior that they would not bring as much as the merely pressed and fire polished article.

It can be considered a rule that the less pressure there is put on the glass while bringing it into shape, the more brilliant the final cutting will appear.

These remarks may be verified by a visit to the Dorflinger Flint Glass Co., White Mills, Pa., or to the Mt. Washington Glass Co., New Bedford, Mass., where the reader may make himself fully acquainted with all the details of the manufacture of cut glass proper. ANDREW GOTTSCHALK.

A New Method of Blasting.

Dr. Kosman proposes, in blasting in fiery mines, to substitute for gunpowder, dynamite, and other explosives requiring ignition, cartridges containing zinc dust (the mixture of finely divided zinc and zinc oxide that collects in the condensers of the zinc retorts) and diluted sulphuric acid. The cartridge case is a glass cylinder, 7 inches long and 1 inch in diameter, closed at the bottom, and divided into two parts, whose volumes are in the proportion of 1 to 4, by a choking or contraction, which reduces the bore at the junction of the two chambers three-tenths or four-tenths of an inch. The lower or larger division is filled with diluted sulphuric acid, and the contracted opening is stopped with a plug of cork, India rubber, or asbestos, in which state it is given to the miner.

When required for use, the upper part of the case is filled with zinc dust, and the shooting needle is passed through it into the plug closing the acid chamber. The shot hole is loaded and tamped in the ordinary way, first with tempered and then with dry clay or broken up shale. If the rock is porous or jointed, the hole should be carefully clayed, to prevent the gas escaping through the cracks. The shot is "fired" by one or more smart blows on the shooting needle, which drives in the plug and breaks the glass at the choked part, when the zinc dust mixes with the acid, and a rapid, although not instantaneous, evolution of hydrogen takes place, whose expansive power is sufficient to break down the rock. The following figures are given as a measure of the power available:

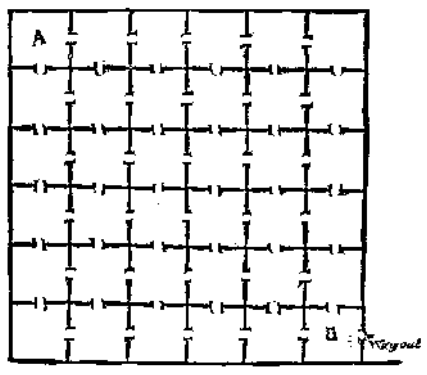
A cartridge of 25 millimeters in diameter and 180 millimeters long is approximately of the capacity of 90 cubic centimeters. The charge consists of 50 cubic centimeters of sulphuric acid and 12 grammes of zinc dust, which, according to its average commercial composition, will contain about 10 grammes of metallic zinc.

According to the formula, $Zn + H_2SO_4 = ZnSO_4 + 2H$, 10 grammes of zinc will liberate 0·3 gramme of hydrogen, or by volume 3·37 cubic meters (1 cubic meter of hydrogen at 760 millimeters barometer pressure weighs 0·089 gramme). This volume of gas being confined to 90 cubic centimeters, the resulting pressure will be $\frac{3{,}370{,}000}{90} = 37{,}000$ atmospheres in round numbers. This is computed at zero, but at higher temperatures, such as prevail in mines, the pressure will be notably greater. In blasting with gunpowder, the pressure developed is below 5,000 atmospheres. The production of the cartridge cases has been intrusted to a single firm, in order to obtain uniformity in the manufacture. The cost of a shot will vary with the caliber and weight of the charge, from about 1½d. to 2d.

The question whether danger might be apprehended from the sudden addition of a large volume of hydrogen to the air of mines already containing inflammable gas must, Dr. Kosman thinks, be answered in the negative, as hydrogen diffuses so rapidly in atmospheric air that the power of inflaming is soon dissipated. For instance, if zinc dust is covered with diluted sulphuric acid in an open dish of 500 cubic centimeters capacity the gas cannot be fired by a naked light at the edge of the dish, and the flame must be applied to the bubbles of hydrogen as they form to obtain a detonation. This rapidity of diffusion is likely, therefore, to prevent any danger by the addition of hydrogen to the air in mines which are well ventilated and worked with safety lamp. The heat developed by the action of the acid upon the zinc also causes a considerable development of steam, which, mixing with the gases, acts in diminution of the explosive power. These and other points can, however, only be settled by experiment on the large scale.

A PUZZLE.

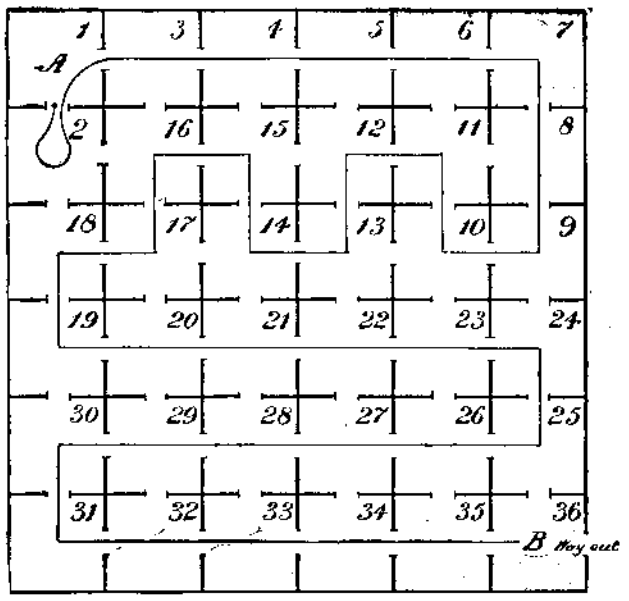
The following, I believe, has a solution, but what that solution may be I by no means promise to tell—for a most excellent reason.



The figure represents the plan of a prison with intercommunicating cells (bless the Latin!); a prisoner in A is offered his freedom if he can make his way to B, after passing once, and once only, through all the 36 cells. How is he to do it?—*Knowledge.*

The above is the puzzle as published in our number of January 15, page 36. We have received a large number of replies, some of which deny the possibility of its solution if the exact terms are complied with. Others find no difficulty in its solution in the manner stated as follows by one of our correspondents:

The prisoner says to the keeper: "Come, we will go



through room No. 2; now we will go through my room No. 1, then No. 3, and so on as per diagram. In this way we go through all the 36 rooms once, and once only." W. P. MURPHY.

Ridgway, Elk County, Pa.

Crown Jewels of France.

Since France has been under republican rule, the disposition of state treasures has been a subject of frequent discussion in her legislative halls. At one time the money obtained for the crown jewels was to be applied to the founding of trade schools, and the collection was exhibited once in the Tuileries in order to help the metal workers in setting up a special school for their apprentices. Now it is said that the products of the sale are to be turned into the treasury. The whole collection is not to be sold. Three objects are to go to the melting pot, viz., the Imperial crown, the glaive of Louis XVIII., and the glaive of the Dauphin. Several of the stones will be handed over to the Mineralogical Museum and the School of Mines, to be used henceforth as specimens. A few objects will be preserved as curiosities, viz., the military sword, the reliquary brooch, the Regent diamond, the Mazarin diamond, the watch presented by the Dey of Algiers, the large ruby, the dragon pearl, and the badge of the Little Elephant of Denmark. The remaining treasures will be treated as if they were seized for debt, and will be sold by auction in the Hotel Drouot.