THE BATH.

Water (soft)..... 1 gallon.
Cyanide of potassium (pure) 8 ounces.
Nitrate of silver..... 5¼ "

Dissolve the nitrate of silver in a sufficient quantity of pure water (soft), and add to it gradually, with constant stirring, hydrocyanic (Prussic) acid until all the silver has been precipitated as cyanide, which may be known by the formation of no cloud in a portion of the clear liquid when a drop of the acid is added to it—avoid adding an excess of the acid. Throw the precipitate upon a fine cotton cloth filter, and as the liquid runs through, wash the precititate on the cloth several times with pure water. Dissolve the cyanide of potassium in the water, and stir in the cyanide of silver carefully removed from the cloth. If it does not dissolve in the liquid entirely, add more cyanide of potassium until it does, stirring continually. Let the impurities settle, and the bath is ready for use. Many electroplaters use a preliminary or silver "whitening" bath, which is the same composition, but contains less silver, more cyanide, and is worked with a somewhat stronger current. The cleaned article in some cases is first dipped for a few moments in a solution of nitrate of of mercury, one ounce in one gallon of water, and then in the whitening bath for a few minutes, and after brushing is transferred to the silver bath proper.

The vessels containing the cold bath are sufficiently high to allow about four inches of liquid above the immersed objects, whose distance from the bottom and sides should be nearly the same to give a regular deposit of metal at both ends of the object. The upper ledge of the trough carries two brass rods all around, which do not touch one another, one above the other, so that other metallic rods placed transversely will rest upon the higher or lower series of rods only. The upper rods are connected with the zinc, the lower with the carbon or copper end of the battery, or with the corresponding poles of the dynamo-electric machine. The transverse rods resting upon the lower set support the silver anodes; those resting on the upper set, the work. The work suspended from an upper transverse is placed so as to face two anodes suspended from two lower transverse rods. As the lower layers of the bath are apt to become denser (richer) than the upper, it is often necessary to reverse the articles during the operation to obtain a perfectly uniform thickness of deposit. For the same purpose small articles should be kept in motion as much as possible. The deposit is finer and denser if obtained with a weak battery and long exposure than if a strong current is employed. A sufficient quantity of silver may be deposited in three or four hours, but it will be of much finer quality and more easily burnished if the work is left in the bath for twelve or fifteen hours with a few cells of battery. When the articles, especially coppered iron, etc., have acquired a coherent film of silver, they are sometimes re-brushed, cleansed in alcohol, or preferably in a hot silvering bath, thence again passed through the mercurial solution and finished in the cold plating bath. The first scratch-brushing, which is not always necessary, obviates the tendency of certain alloys to assume a crystalline appearance and corrects the imperfectione of the cleansing in process. Should the anodes become black during the passage of the current the solution contains too little cyanide. In this the deposit is adherent, but too slow; and the bath loses more silver than it can gain from the anodes. If the anodes remain white during the passage of the current the bath contains an excess of cyanide, and the deposit does not properly adhere; correct by adding cyanide of silver until it dissolves with difficulty. When in good working order the anodes present a grey appearance while the current is passing, becoming white when circuit is broken.

The specific gravity of the bath may vary from 5° to 15° Baumé's hydrometer and still furnish good results.

Electro-silvering baths do not generally work so well when freshly prepared. If properly used and cared for they improve by age. At first the deposit is often granulate, bluish or yellowish.

It is customary to mix portions of an old bath with a freshly prepared one. Some platers introduce small quantities of ammonia instead to age the liquid.

Bisulphide of carbon in small quantities imparts a bright lustre to plated articles. An ounce of the bisulphide is put into a pint bottle filled with a strong solution of the cyanide of potassium and silver, briskly shaken, and a few drops of this liquid poured into the bath occasionally until the work appears sufficiently bright. An excess of bisulphide must, however, be avoided, as it will spoil the bath.—*Scientific American.*

Scientific Items.

PERAZOTIC ACID.

The discovery of a new compound of oxygen and nitrogen has been announced by MM. Hautefeuille and Chapuis. It contains more oxygen than azotic acid, and has been named by the French chemists perazotic acid. It is well known that on passing an electric current through oxygen a portion of the oxygen is transformed into ozone. If the ozone be mixed with nitrogen, the spectrum indicates the presence of a body characterized by black bands. The bands disappear when the gaseous compound is mixed with water, and the latter is acidified. The application of red heat to the gaseous mixture also causes the black bands to disappear. The experimenters are now endeavoring to isolate the new acid in order to study its properties. M. Berthelot some time since suspected the existence of the body in question during some experiments which he has not published. Its presence was indicated to him, however, merely by phenomena of coloration which appeared and disappeared during the passage of an electric current through a mixture of hypoazotic acid. His observations were communicated to Messrs. Hautefeuille and Chapuis, who, by obtaining the spectrum, have placed the existence of the new acid beyond doubt. The discovery is the more surprising, as oxygen and nitrogen, being constituents of the atmosphere, have so long been the objects of what might have been considered exhaustive study.—*Design and Work.*

COLLODION FILMS.

According to M. E. Gripon, if a layer of collodion, such as is used by photographers and surgeons, be poured upon a plate of very clean glass, it will be found, after the layer has dried, that an extremely thin and transparent film is formed, which, with a certain amount of care, can be separated from the glass, and may then be stretched upon a frame. This film, so placed, is seen to have some curious physical properties, which the author just named describes as follows: In the first place he finds that this delicate thin membrane reflects light exactly as glass does, and polarizes it both by reflection and by transmission of the rays of light through its substance.

Mr. Gripon has also found that films obtained in this manner may be procured as thin as 0·01 of a millimeter, and that when no thicker than this they transmit a very large proportion of radiant heat. Polarizing piles, he tells us, may be formed of these layers of collodion film, which are much more transparent than the piles of mica usually employed by physicists for this purpose, and necessary in studying the properties of heat; and although they are, of course, much more fragile, and require more careful handling than mica piles, they are also more easily replaced than the latter when destroyed.

SPIDERS AND TUNING-FORKS.—In a recent number of *Nature*, some curious observations concerning the behaviour of spiders towards the vibrations of a tuning-fork are given. It appears that when a fork is made to touch lightly a leaf or any support of a spider's web, the insect will immediately face the fork, and feel with its fore feet which radial thread of its web has been touched. If the fork is held near the web, the spider will seize it and embracing it run along the legs of the fork as often as it is struck, seeming to recognize in its buzzing its natural food. Strange to say, by means of a tuning-fork a spider can be made to eat things which it would otherwise avoid; thus, for instance, by fixing its attention by the constant vibration of the fork, he consumed a fly dipped in paraffine.

A remarkable nugget of platinum found on land near Plattsburg, New York, has been described by Mr. Collier. It was found to be composed entirely of native platinum and chromite disseminated through it, the chromite being 54 per cent. by weight, and the platinum 46 per cent. The dimensions were, length 4ctm., width 3ctm., thickness 2½ctm. The weight was 104·4 grammes, and the specific gravity of the whole 10·446. The nugget was found in an extensive drift deposit, and platinum was not previously known to exist in the locality.

A telephone arrangement has been recently fitted up at St. James's-place U. P. church, Edinburgh, so that an elder who has been unable to attend for many years, might hear the services. "Sounding-chambers" are placed on each side of the pulpit and one in the gallery, and it is said that the words of the preacher, and the sounds of the singing are heard with distinctness.