Correspondence.

Copper for Roofing.

To the Editor of the Scientific American:

At page 193 of your last issue I see a few words relating to copper for roofing.

In the year 1833, fifty-one years ago, I built a house near here for my mother, and I covered the roof with 18-oz. copper. It is still there, and good for another fifty years, more or less. Several years ago the roof was raised 4 or 5 feet, when some repairs were made. The only disadvantage of copper after the first cost is found in the water caught from that roof being slightly impregnated with the copper, so that it becomes in a slight degree green, and possibly might be injurious to health if used for drinking.

The conductors for the rain are of copper, so that I have never felt at all anxious in storms of thunder and lightning, as the copper roof is an excellent conductor.

R. B. FORBES.

Milton, Mass., Sept. 26, 1884.

An Effective and Easily Made Oil Filter.

To the Editor of the Scientific American:

In your issue of Sept. 20, Mr. Geo. Boxley gives a method of filtering oil such as is used for lubricating purposes, etc.; his method may answer the purpose very well, but I have a device, which I have used for a number of years, that I think very much superior to his. I use a shallow pan about three inches deep, and square in form and flaring, or wider at the top than at the bottom; this I locate in any convenient place where it may not be disturbed, so placed as to have one side a little the lowest, say about ¼ of inch; over this edge of the pan I place a piece of heavy woolen cloth of sufficient length to reach to the bottom of the pan, and to hang over the outside and extend a little below the bottom of the inner end; this wick forms a capillary siphon, and filters the oil in the most perfect manner. A piece of sheet zinc or tin with the corners turned up on one side as far as nearly to the center serves as a guide to the dropping oil into a vessel to receive it. The pan can easily be cleaned, and is on the whole better and cheaper than any method I have seen or heard of.

ALVIN LAWRENCE.

Lowell, Mass., Oct. 6, 1884.

Disinfectants.*

It has been proved by experience that the best means of checking the progress of cholera and other such diseases is by the proper use of disinfectants, and on that account a few words about them will not be inopportune.

The use of disinfectants has of late years greatly extended; few private houses are without them; in fact, none should be. Their value as a means of preventing the extension of infectious diseases is attested by the fact that the municipal authorities of many large towns made arrangements, when cholera was last threatening us, for distributing to every householder in the district a free supply of disinfectants if the disease should appear therein.

This plan was adopted in Bristol during the last outbreak of cholera, and was attended with most satisfactory results—results which were certainly no less due to the energy and promptitude of those whose duty it was to prevent the disease spreading than to the efficacy of the disinfectants. Indeed, by the free and proper use of disinfectants cholera has been reduced from the very terrible position it had attained in the eyes of our forefathers, to a much lower—to a reachable—level.

There are many kinds of disinfectants known, and sold to the public at varying prices, some valuable, others entirely worthless, as disinfectants. Every one is familiar with bleaching powder, which was formerly (and is still to a considerable extent) so much used. It is very effectual, owing to the chlorine gas which it freely gives off when exposed to the atmosphere, or moistened with dilute acids, such as vinegar. Charcoal, too, is well known as a disinfectant, and as a powerful deodorant. We may here remark that a deodorant simply disguises the bad smell without destroying the poison which it may contain, and in this respect differs from a true disinfectant. Of all known disinfectants, carbolic acid is now generally admitted to be the most efficacious, and it is the basis of most of the disinfecting agents now sold. The acid is too powerful to be used alone, and is therefore generally mixed with eighty or ninety per cent of some other substance not possessed of disinfecting properties. Sometimes the bisulphites of lime and magnesia are added, and these substances are themselves possessed of disinfecting properties; but more generally chalk or sand is used; or the acid is simply diluted with water. A small portion of the mixture sprinkled in water closets and other places where decomposing matter is allowed to remain will diminish, if not entirely remove, the chances of contagion, and sweeten and purify the atmosphere.

Although carbolic acid is so efficacious, there are some who object to its use. It smells rather strongly, and many persons are thereby prevented from using it. It is a pity on this account to be robbed of its advantages; and such persons would do well to try and educate themselves to the smell. Moreover, it is better to breathe an unpleasant and pure atmosphere than a pleasant but unhealthy and dangerous one. The smell of pure carbolic is much more easily borne than that of crude carbolic; and we would recommend the use of the purest carbolic procurable, diluted with eighty or ninety per cent of water, or mixed with the same percentage of precipitated chalk. It is difficult for the chemist, trained and accustomed to the offensive and unwholesome smells in the laboratory, to understand how any person can retain a strong dislike to the comparatively sweet smell of carbolic acid.

There are some reasonable objections to the use of carbolic acid as a disinfectant in a concentrated form. In the first place, it is a powerful poison, and if taken internally, is almost certainly fatal. The liquid carbolic acid varies in color, as the crudeness of the product increases, from pale straw to dark brown, approaching almost to black in the very impure kinds. This darkening is due to the presence of tarry substances, which add considerably to the offensiveness of the smell. This changing color renders it liable to be mistaken for other liquids, but in the form of powders the chances of such mistakes occurring are few, if any; and if kept in the diluted form the danger is very greatly diminished.

The smell of carbolic acid is very characteristic, and can be readily distinguished.

When it has been accidentally taken internally, castor oil and sweet oil should be freely administered, and a doctor obtained without delay.

It is very painful when externally applied, as it rapidly cauterizes the fleshy tissues. In the concentrated form it should be very cautiously handled. Oil or carbonate of soda rubbed on the parts are the best remedies for external injury and pain. Water may be applied externally, but should not be taken internally.

Another objection to the use of carbolic acid in the concentrated form is that it is apt to be wasted, for many persons are ignorant of or incredulous as to its powerfully destructive effects on animal life, and are sometimes so forgetful of principles of economy in this matter as to use carbolic acid in an undiluted form, and in quantities far in excess of what is required.

To prevent waste, the acid is used to form the basis of what are known as "carbolic disinfecting powders," which consist simply of chalk, or some other cheap substance, in a finely divided state, to which from ten to twenty per cent of carbolic acid has been added, and sometimes from five to twenty per cent of the bisulphites of lime and magnesia, together with some coloring matter, to give a pleasing effect to the eye.

Powders are an expensive form of disinfecting by carbolic acid; and a considerable saving might be effected by persons who use it largely if the mixing were done by themselves instead of by the manufacturers, and the same tins used over again, while the article so made would have many advantages. It could, in the first place, be made as strong as the necessities of any particular occasion might require, and in the next place, the pure acid may be used for house disinfection, and so lessen the disagreeableness of the smell, while the commoner kinds may be employed for yards, stables, fowl houses, etc. The method of making powders is very simple. About four ounces of the acid, by weight or measure, should be added to one pound of precipitated chalk, or fine sand, or mould, or any other harmless substance in a finely subdivided state, and thoroughly mixed in a large bowl. This powder will be suitable for all ordinary purposes, and will be far superior to many of the disinfecting powders sold at twice the cost.

Why, it may be asked, cannot our chemists discover some pleasant and non-poisonous disinfectant? Why are we under the necessity of substituting an intolerable smell for a bad one? The answer is that nothing but poisonous substances can be good general disinfectants, as the dangerous matter which it is the aim of disinfectants to destroy is chiefly organic, of which too, though of course in a far higher degree, the vital parts of the human being consist. Of disinfectants, charcoal is perhaps the least objectionable; it is neither dangerous nor mal-ordorous; but though extremely valuable as a deodorant, its usefulness as a disinfectant is very limited. A disinfectant must be capable of destroying the lower forms of organic life, some of which constitute disease; and the province of the chemist is to find out that substance which is most destructive to these lower organisms, and least dangerous and objectionable to man. Carbolic acid best answers these requirements, and on this account has recently come into extensive use.

*By an analytical chemist in *Cassell's Family Magazine.*

Progress in Dyeing.

A new pigment, to which the discoverer, O. Miller, has given the name canarine, is destined to replace many of the colors employed at present in dyeing and printing, being the only dye which like aniline black in dyeing silk can be applied without the intervention of a mordant to vegetable fiber. An alkaline solution of this color is used as dye bath. The tissues dyed with this color are neither affected by light nor by washing with soap. In view of the cheapness and simplicity of dyeing textile fiber, the importance of canarine in calico printing is equaled only by that of aniline black. The recipe used for the manufacture of this chromogene is the following:

One part of potassium sulphocyanate is dissolved in an equal weight of water, and 0·1 part of potassium chlorate and 1 part muriatic acid added; the mixture soon becomes hot, evolves gases, and deposits a colored substance. When the reaction has slackened, the vessel is placed in cold water, and another portion of 0·4 part potassium chlorate and 1 part muriatic acid is introduced; the orange colored subsidence is filtered, and exhausted with water. During the operation the temperature of the mixture should not fall below 80° C., as a lower temperature gives rise to the formation of by-products, which are inferior in purity and intensity of color. Pure canarine is obtained from the above precipitate on dissolving in a hot aqueous solution of potassium caustic, cooling down of the liquid to 40° C., and precipitating, on addition of 20 parts of alcohol, the potassium compound. It is strained after standing for 12 hours, thoroughly washed out, and dried at 100° C. The pigment represents a red-brown powder of high luster, and is dissolved by sulphuric acid into persulphocyanogen and sulphurous acid; it is soluble in ether, alcohol, and alkaline solutions.

A dye solution of this color is prepared in the following manner: 1 part canarine is mixed with 20 parts of water, the mixture is heated to ebullition and kept boiling for some time, and 1 part potassium caustic added; after the color is dissolved and the liquid appears brown, a quantity of 7 to 10 per cent of soap is introduced, and the liquid allowed to cool. Potassium caustic cannot be replaced by caustic soda, as the sodium derivatives of the pigment are insoluble in cold water; lime and magnesia salts also precipitate the color from its solution. The color suffers by boiling with caustic potash decomposition; its solution therefore is to be effected within the shortest time.

The dye-beck employed for working consists of 60 liters canarine solution and 80 liters of water; it is worked cold, and dyes 800 yards of woven tissue; when partly exhausted, it serves for dyeing of light shades. This process has been modified by Koechling, who dissolves 100 grammes of canarine and 100 grammes borax in 1 liter water, heats the mixture to ebullition, and then employs the hot solution for dyeing; the temperature of the dye bath is maintained by the application of the method employed in dyeing with alizarine. Schmid has shown that canarine can be used as mordant for aniline colors, the shades which it produces with methyl blue, malachite green, and Poirrier's violet resist the action of a hot soap solution. The alkaline solution of canarine, being of a yellowish or orange-brown color, according to concentration, dyes calico without the application of a mordant. Canarine has been produced upon the fiber by printing on to the tissue a mixture of aluminum sulphocyanate and aluminum chlorate, with traces of vanadium; the fabric being stretched on a frame, was submitted for one day at a temperature of 28° to 30° C. to oxidation. When potassium sulphocyanate is used for the respective aluminum salt in printing, the mixture absorbs with avidity aniline vapors and assumes an emerald color, which is gradually changed to black. In dyeing yarn a bath is prepared by dissolving potassium sulphocyanate, potassium chlorate, and muriatic acid in an adequate measure of water; the fiber is passed through this solution, and then further treated according to known methods.—*Erfindungen.*

Prevention of Hydrophobia.

French science may indeed claim a new title to the gratitude of humanity. While granting this, we do not wish to rush to the hasty conclusion that hydrophobia is to be banished from our midst; only, if we can believe our eyes and ears, it seems that we are within measurable distance of this glad state. What has Pasteur done? He has—if our information be accurate, and we have no reason to doubt it—done something to twenty-three dogs, thereby rendering them, at any rate for a time, incapable of suffering from rabies. Side by side with the free animals he has placed others which may be regarded as servile to the yoke of hydrophobia. Of the latter series, six were bitten by mad dogs, three of them becoming mad; eight were subjected to intravenous inoculation, all becoming mad; and five to inoculation by trepanning, all likewise becoming mad. On this showing, sixteen out of nineteen dogs died when a dose of the virus of rabies was sown in them; whereas, of twenty-three protected dogs, none succumbed, although the virus was brought in the most effectual manner into the tissues of each animal. It is a well known fact that many more persons are bitten by rabid animals than suffer from hydrophobia. What the exact proportion may be is not satisfactorily known, but in dogs it would appear that about half the number bitten become rabid. There are two explanations of the escape. The first is expressed by saying that no virus gets into the tissues of the body. The second suggestion, though possible, is less plain. It is to the effect that some organisms are unsuitable for the development of the rabid poison. There is analogy for this contention. Some individuals are believed to be insusceptible to the poison of scarlet fever, and this statement also applies to other acute specific diseases. The questioner of nature may ask how these facts are to be explained? And although we are on very unsafe ground, still science does afford some clew to a possible explanation. If we remember rightly, Sir James Paget has asserted his belief that a severe attack of typhoid fever may do away with the protection afforded by a previous attack of smallpox. Typhoid fever so modifies the constitution that the protoplasmic organism once again becomes favorable to the growth and development of the germs of smallpox. Inoculation with the attenuated virus of hydrophobia gives a dog immunity from the disease, just as similar treatment preserves a sheep from charbon; in other words, the physical basis of the canine organism is so altered that it no longer affords nourishment for the evolution of the poison of rabies.—*Lancet.*