Correspondence.

Ice Forming under Water.

To the Editor of the Scientific American:

Your answer to query No. 2,719 leads me to ask: What makes ice form on the bottom of rivers sometimes more than others? I have often observed it adhering to the smooth stones on the bottom of quite large streams, as if it was frozen there, which at other times will not be seen, although the anchor ice may be running plentifully, and the atmosphere quite as cold. No apparent change in the water, it being as clear as ever; nor is the ice charged with sediment or anything to make it heavier. It has the appearance of having formed there, though perhaps several feet below the surface of the water. I saw it once during the present month in the Kalamazoo River. G. W. GRIGSBY.

Allegan, Mich., Jan. 24, 1891.

[It is well known that running water will cool to several degrees below the freezing point without freezing on the surface. At this temperature the stones on the bottom will also be cooled down to a like temperature, when the film of water next the surface of the stones will freeze to the surface because it becomes quiet by contact with the surface. Thus the stones will continue to gather by surface freezing to considerable thickness, and ice so formed may remain until a change of weather or until the surface freezes over, when the temperature of the running water will rise and melt the anchor ice by heat from the earth. The floating ice is not anchor ice.—ED.]

Deterioration of Water in Reservoirs and Conduits.

At a recent meeting of the New Jersey Sanitary Association, Mr. C. B. Brush dealt with the above subject in a paper. He remarked that all water supplies are better at certain periods of the year than at others. In the hot, dry days the water becomes dead and lifeless; and if allowed to remain at rest for any considerable length of time, algæ formations appear on the surface. These, however, are destroyed and disappear as soon as the water is put in motion. If allowed to remain, the water cures itself—the algæ disappearing after a few weeks, and leaving the water again in its normal condition. The algæ show themselves more quickly on water that has been filtered, either naturally or artificially. The author also stated that water is delivered in its best condition when taken from a running stream and supplied directly to consumers without coming to rest during its passage. Water discolored by sediment is very often in its best condition, because the sediment is due to the fact that an abnormal volume of water is blow off from the watersheds, and any pollution there may be is so diluted as to be incapable of harm. But there is such a demand for clear water that reservoirs are necessitated, with their attending evils. Water that is stored for twenty or thirty days commences to deteriorate. This is due to stagnation; and the stagnation begins to manifest itself as soon as the oxygen in solution in the water becomes less than 0·3 per cent. The best means of preventing stagnation consists in keeping the water in motion; and there is no better way than by forcing air into the bottom of the reservoir, and keeping the water aerated. Mr. Brush gave an interesting account of his experience with a number of reservoirs where the water had become tainted in consequence of lying stagnant; and in every instance he obviated the difficulty by forcing air into the reservoir or the mains.

Composition of Talcum.

Talcum, or soapstone, also known as steatite, is a silicate of magnesium containing generally iron and other impurities.

F. W. Clarke and E. A. Schneider have recently examined some talcum with the following results. The sample of talc with which the experiments were carried out came from Hunter's Mill, Virginia, and when dried in air gave the following analysis:

	Per cent.
Silica	62·27
Alumina	0·15
Ferric oxide	0·95
Magnesia	30·95
Ferrous oxide	0·85
Manganous oxide	Trace
Water (loss at 105°)	0·07
Loss on ignition	4·84
	100·08

These figures agree closely with the empirical formula $H_2Mg_3Si_4O_{12}$.

Standing Bareheaded at Funerals.

The London *Lancet* deprecates the practice of remaining bareheaded at funerals. It commends the propriety of cutting short the burial services in cold and inclement weather, and suggests that the hats should be kept on the heads of those in attendance. These suggestions should certainly be approved of, for a funeral ceremony, as at present carried on, involves much risk of contracting grave inflammation of the respiratory organs.

The Telephone Patents.

In December the fundamental patent on the speaking telephone granted in England to Alexander Graham Bell expired, and our British cousins are congratulating themselves on relief from a monopoly that has made itself somewhat obnoxious to them. Competition has already sprung up and telephone rates have been reduced. In view of these facts it may be worth while briefly to review the principal patents that have enabled the Bell Telephone Company to hold its own against any and every attempt at competition, and to note in what state their successive expirations will leave the art of telephony. The fundamental patent was granted on the 7th of March, 1876, just 21 days after the filing of the application. Its principal feature is the enormously sweeping fifth claim for transmitting vocal sound by electrical undulations, that has successfully held its own against every inventor. As is now well known, the patent was entitled "An Improvement in Telegraphy," and the other claims are comparatively unimportant, as the transmission of speech is not mentioned in them. The armature of the rudimentary form of telephone, shown in the drawings, is supported at a single point and actuated mechanically by a flexible diaphragm. This patent will expire on March 7, 1893, its life being quite unaffected by the expiration of the English patent, since the latter was taken out after the American one was granted. It will be seen, therefore, that on the expiration of this patent the broad principle is thrown open, and operative receiving and transmitting instruments can be freely manufactured.

But it should be remembered Alexander Graham Bell took out a second patent on the 30th of January, 1877, covering the important features of the form of receiver generally used in every part of the world. His claims cover the diaphragm of magnetic material, and means of adjusting it to its proper relation with the magnet. This second patent will probably enable the ordinary forms of construction to be held from public use until January 30, 1894, after which day the receiver substantially as now known will become public property. As to the transmitter, the case is somewhat more complicated. The principal patents on the carbon transmitter were granted to Thomas A. Edison, on April 30, 1878, are now controlled by the Bell Telephone Company, and will expire April 30, 1895. The Edison transmitter is successful, but has not been in very general use.

The form of transmitting instrument most widely employed, especially for long distance work, is that patented by Hunnings. It is an English invention, and the American patent, granted August 30, 1881, will expire with the previous English patent on September 16, 1892; it is, however, antedated by the Edison patent, so that the Bell Telephone Company will hold a claim on the carbon transmitter until the expiration of the latter. The Blake form of transmitter is the subject of a group of patents dated November 29, 1881, but is the result of the division of an application filed January 3, 1879, and the entire group patented in England in that year will pass out of legal existence on January 20, 1893.

There is, however, a patent to Berliner, also owned by the Bell Telephone Company, covering the same principle which is used in the Blake transmitter, that of varying contact between two electrodes; this will expire on January 15, 1895, and includes the induction coil apparatus now usually employed. It will thus be seen that while the receiver becomes public property, at least in some of its forms, in 1893, the group of transmitter patents are likely to tie up that part of the telephonic system for nearly two years thereafter. Of course the Bell receiver can be made to work quite successfully as a transmitter, and it is altogether probable that modifications of it will be found to operate far more successfully than is generally supposed. In any contingency a thoroughly successful telephone for anything except long distance lines can be manufactured by any one who chooses, after the expiration of the second Bell patent, January 30, 1894. A single additional contingency with respect to the carbon transmitter may be mentioned.

This instrument has been claimed by the notorious Daniel Drawbaugh, his chief opponent in the Patent Office being Edison. The Drawbaugh application was filed considerably later than Edison's, but possibly might be ruled to come within the statutory limitations if there were no serious opposition. It is within the bounds of possibility then that an effort might be made to tie up the transmitter for another long term of years by establishing a legal priority for Drawbaugh in default of an active opposition in behalf of Edison. Such a combination of circumstances might come about if the Bell Telephone Company were interested in allowing the issue of a patent to the alleged Pennsylvania inventor. This statement of the condition of the telephone patents is necessarily incomplete, since we have made no attempt to discuss all the accessory apparatus that is in use to-day; but it will have served its purpose if it calls public attention to two things: first, the expiration of the fundamental telephone patent, and the way in which this blessing is mitigated by the transmitter patents; and, second, to possible legal machinations for securing a continued monopoly on the carbon transmitter.—*Electrical World.*

Carbonizing Wool and Rags.

In order to remove burrs, especially the mestiza spiral burr, and other vegetable matters from wool, it becomes necessary to use a chemical process to destroy the same without injuring the wool fibers. I will now, says a writer in *Wade's Fiber and Fabric*, endeavor to describe a process as used in Europe:

1. We must have a wooden tub, say 3 feet wide, 6 feet long, and 3 feet deep, covered on the inside with sheet lead. Fill the tub about three-fourths full with cold water, and add sulphuric acid until your thermometer shows 3° R. Enter the wool that has been thoroughly scoured. See that the liquor covers the same all over, and keep it so in the liquor from one to two hours, according to the amount of vegetable matter in the wool. On the back of your tub have a wooden rack, so you can throw your wool upon it, and let the liquor drain back into the tub. Keep the strength of your liquor 3° R. In nailing on the rack use copper nails, as iron ones are destroyed in no time. The men handling the wool in the acid should wear long rubber gloves.

2. From there it goes to the extractor, and is well extracted. The extractor should be made of copper, and the netting covered with lead. I have seen one covered with vulcanized rubber, which I understand gives satisfaction.

3. The wool is now put on an ordinary wool drier, and is thoroughly dried. The netting of the drier should also be leaded.

4. The wool now goes in the carbonizing oven. This is a large wooden box with drawers made from sheet iron, and leaded wire netting about 4 feet wide, 6 feet long, and 6 in height. On these drawers the wool is spread loosely, and kept four to six hours at a temperature of from 180° to 190° F. There should be an electrical arrangement connected with the thermometer that will ring a bell when the temperature of the oven gets too low or too high. As soon as the burrs get black and you can rub them to powder between your fingers, the wool is ready, that is, the burrs are carbonized. The oven has to be well ventilated, so that the fumes of the acid, generated by the heat, are taken away as quickly as they arise. This is done by means of a fan.

5. The wool now goes to a duster, enters the machine by a series of close-set steel rollers that crush the carbonized burrs, which are then shaken out by a pan and sticks.

6. The wool is now all clean, but has still the acid in it, which has to be neutralized with a cold soda ash bath about 3° R. strong. This can be done in a wooden tub, and then rinsed out with cold water or in a scouring machine. The wool is now all ready for the dyehouse.

The process of carbonizing rags is the same, only use a little stronger liquor and let them stay longer in it. After the cotton is thoroughly carbonized, so that if you rub the rags the cotton threads fall out as dust, put them in a wool duster and dust well. Neutralize the acid the same as in the wool.

Cork Worms.

Investigation in France proves the existence of two or three types of moths in wine cellars. The grubs feed on the fungoid growth that forms on the wine vats and mouldy corks. The insect bores and forms galleries in the cork nearest to the glass, and through the holes thus formed air gains access to the wine, spoiling it.

The San Francisco *Chronicle* says: Our chief difficulty in bottling wines has been in obtaining a supply of perfect corks. At least 25 per cent of corks, after examination for fitness, are rejected. An examination of several bins was made at the vineyards, and it was found that the corks were perforated, and in some cases the wine oozed through them. Now we are trying a method to stop the inroads of these grubs. After soaking the corks in hot water and then in brandy they are dried, and when they are put into the bottles the tops are coated with a layer of paraffine wax previous to sealing them with ordinary wax. We hope by the use of the paraffine compound to stop the ravages of these insects. Neither the grubs nor insects feed upon the wine, but simply use the cork as a place to deposit their eggs, and the coating may possibly prevent their entrance.

Snow Worms.

A puzzling phenomenon has been noticed frequently in some parts of Valley Bend District, Randolph County, Va., this winter. The crust of the snow has been covered two or three times with worms, resembling the ordinary cutworms. Where they come from, unless they fall with the snow, is inexplicable. The snow is two feet deep, and the crust is too strong for them to have come up out of the ground. A square foot of snow can scarcely be found some days without a dozen of these worms on it.