Correspondence.

Making Water Heat Itself.

To the Editor of the Scientific American:

In your issue of November 7, Mr. O. B. Server files "this his caveat of priority," in that he has conceived the idea that a current of water may be induced to obligingly change its velocity to heat, and thus modify the temperature of adjacent countries.

Mr. Server proposes to avoid the expense of Mr. J. C. Goodridge's proposed dam across the Straits of Belle Isle, and by the erection of a few "waterwheels and friction contrivances" to so heat the water that it will eclipse the Gulf Stream itself as a dispenser of warmth. But has not Mr. Server carried the matter a little too far in his anxiety to secure the proposed benefit to America, and yet avoid any possible cooling of the haunts of the British lion?

What if his "friction contrivances" should heat the water too much, to the boiling point perhaps, and, besides cooking all the fish in the vicinity, should give Canada and New England a tropical climate? It is well indeed that he is to "stop the wheels in summer."

Bantering aside, it is clear that Mr. Server has been reading thermodynamics; but either he has just begun it, or else he has skipped the mathematics. He informs us that he would "change its velocity to heat," but he does not say what will become of the hot water. Perhaps he thinks that it would kindly take itself out of the way without any velocity. Does he think that the numerous icebergs which Mr. Goodridge mentions are going to be scared by his "friction contrivances," so that they will steer clear of the Straits?

But these and a few other little matters we will leave for Mr. Server to figure on, and suppose his "waterwheels, friction contrivances," etc., to be all set up in working order, churning the vast stream, ten miles wide and fifty to one hundred feet deep, to a mass of foam, and that, as the water passes them, its whole velocity is transformed to heat; now, what is the energy of the current, or rather of each pound of it, moving at a velocity of two knots per hour, or less than four feet per second? By the well known formula for energy $=\frac{Wv^2}{2g}$, we have the energy of each pound of water equal to about ¼ of one foot-pound. Further, the amount of energy which, transformed to heat, will warm a pound of water one Fahrenheit degree is 772 foot-pounds. Hence, our quarter of a foot pound of energy will warm the water just $\frac{1}{3088}$ of a degree.

We can imagine Mr. Server feeling of the water on the "hot side" of his "friction contrivances," to see if it will burn his fingers! But while he is looking about for a thermometer that will register his $\frac{1}{3088}$ of a degree, we would advise people to lay in as usual their winter's supply of coal.

CHAS. W. BAKER.

University of Vermont.

The New York Pneumonia Epidemic.—A Probable Cause.

To the Editor of the Scientific American:

The article on "Pneumonia and Ozone," in your issue of Oct. 3, was read by me with considerable interest, and is suggestive of important inquiry.

The careful observations of Dr. Draper, of the Meteorological Observatory, Central Park, extending over a period of eight years, touching the contemporaneous prevalence of pneumonia and the presence of ozone in the atmosphere in excess, are worthy of note; and it would have been additionally instructive to have been able to ascertain whether the two occurred more especially in cold weather.

The majority of observers state that ozone is found more abundantly in winter than in summer. Its comparative scarcity during the summer has been accounted for by supposing that more of it is consumed in oxidizing the organic impurities of the air, which are, of course, more abundant during hot weather. Others have believed that less ozone is produced in summer in consequence of the occurrence of only one maximum of atmospheric electricity in the twenty-four hours during that period of the year.

Several observers have noticed an excess of ozone during the night. Mr. Lowe, of the Boston Observatory, also found that the excess of ozone at night over the day varies during the different seasons of the year (Brit. Assoc. Rep., 1862), and this appears, very generally, to correspond with the cold season and early spring (*vide* "Ozone and Antozone, their History and Nature," by Cornelius Fox, M.D.; I. and A. Churchill, London, 1873.)

This prevalence of pneumonia in New York would, it might be supposed, correspond largely with the continuance of cold weather, at whose door we are accustomed to lay much of evil connected with diseases of the respiratory organs.

Dr. Felix von Niemeyer, of Tubingen, in his "Text Book of Practical Medicine," remarks: "We particularly observe the epidemic occurrence of pneumonia in severe and protracted winters during the prevalence of a northeast wind; sometimes, however, it arises under conditions precisely the reverse." With regard to the influence of cold, he continues: "It is difficult to decide in individual instances whether the attack has been preceded by an exposure to cold more severe than that to which the patient has repeatedly exposed himself with impunity. Opinions, therefore, are divided as to the effect of cold in producing pneumonia."

Supposing the fatality from the disease to have occurred chiefly in the winter months, while noting the observation of the prevalence of ozone in excess, under such circumstances, I am inclined to think, with you, even if the connection between the two be not purely accidental, that they can scarcely stand in the relation of cause and effect; and especially as there does appear to me to exist a more than probable cause for the greater prevalence of pneumonia in the city of New York which has been noted recently.

In the English *Lancet* of Sept. 20, 1884, I communicated an article "On Some Probable Points in the Etiology of Pneumonia," etc., as the result of experience in private medical practice, succeeded by observation afforded during a period of service in the Public Health Department in the northwest of England, in which are detailed numerous instances of the fatal occurrence of pneumonia where there had been detected a palpable contamination of the atmosphere of the dwelling with filth emanations.

The instances there detailed are the result of but one year's observation (the last of my tenure of office, the notes being at hand), yet amply sufficient, as it appears to me, to prove unmistakably that there is more than a probable causative influence at work in the production of the disease in the manifest defilement of the air within the dwelling.

The relation of pneumonia with typhoid fever has long been observed by medical writers, and the cause of the former, which I have pointed out, would coincide with the presence of bacteria in the system, when suffering from it, without necessarily committing ourselves to a causative specific bacillus.

It might appear to savor of conceit when I state that, when I saw the communication in your columns of the 3d Oct., alluding to the great prevalence of pneumonia in New York during the present year, the circumstance at once occurred to me that, when in that city in the late spring of last year, in the company of a gentleman from Detroit, Mich., and noticing the deep sewerage works which were in process of construction, and contemplating the increased dangers caused by their junctions communication with the buildings adjacent, more particularly with their deep basements, which it would appear they were intended to sewer, I remarked to my friend that I feared these deeper sewerage works would not prove an unqualified benefit, and we might expect to hear of the prevalence of such diseases as pneumonia; and on my return home I mentioned the same thing to my family, touching the danger to the health of the inhabitants of the Empire City.

The problem of efficient sewerage is as yet unsolved, more especially with reference to the thorough cleansing and ventilation of the sewers; and where deep sections from the mains are brought within the very walls of our dwellings, efficient ventilation being then so difficult, the pernicious gases therefrom have a tendency to diffuse themselves through the building, attracted by the lighter, warmer air within, in spite of concrete, water trapping, and other precautions.

If the basements of the large structures in the city, now being erected, must be drained into the sewers, it would seem imperative to devise some means of diverting the gases from diffusion within, such as by raising the temperature of the air of the ventilating shafts to a higher degree than that of the air inside the building, and carefully maintaining its excess; while the thorough and systematic flushing and disinfection of the main sewers, and of the branches to individual properties, where greasy house waste or other deposit adheres so tenaciously, becomes all the more imperatively necessary. Where practicable, all house waste pipes should discharge into exposed outside channels, and the sewer sectional inlets should be several feet distant from the foundation walls.

Where sewers are, of necessity, in near contiguity, the advisability of providing a stratum of impervious, moist clay or stiff soil around the foundation exteriorly, for some feet in width, so as to preserve the ground air of the foundation free from defilement, will be apparent.

The drainage of water closets presents difficulties requiring special precautions, the object being to isolate their position as far as possible from the house atmosphere. This has been more or less attempted by placing the soil fall pipe external to the building, and freely ventilating its base and apex, taking care that no filth containers are permitted in the structural arrangements, and securing ample flushing provisions. The higher up in the building the water closets are placed, the better it would appear for securing the purity of the indoor air of the rooms on the lower stories, provided it be free from other sources of sewer defilement.

But with cellar drains, communicating with the sewers, the difficulty of securing this first essential of physical health is greatly increased, and the danger to the inhabitants correspondingly augmented; the problem is, confessedly, a difficult one to solve, if indeed it be capable of satisfactory solution, and we find the assurances of so-called experts balk us in the repeated inroads of deadly disease.

While yielding to the demands of so-called civilization, we are in danger of renouncing the first principles of health.

By multiplying conveniences for the disposal of house waste, by means of communication with the sewers, all alive with their pestilential *contagium*, we are inviting deadly disease to enter our dwellings; and by perpetuating systems which rob the soil of its due quota of waste material, for transformation and reconstruction, we are alike impoverishing our exchequer and encompassing too readily our own destruction.

JOHN WARD, M.D.

Sutton, Birmingham, England, Oct. 22, 1885.

The Telephone Question.

To the Editor of the Scientific American:

I trust you will permit a brief summary in your columns of facts on the other side of the telephone question. They are as follows:

1. Reis telephones, when used *as described by him*, will not transmit speech.

2. He who invents a new *art* is entitled to the fame and financial success based upon a patent for such an art.

3. If the assertions that Reis *did* occasionally understand spoken words be true, that did not constitute the art of speaking, because an art is something that can be *controlled*, and Reis then only spoke because the action of his transmitter occasionally was *beyond* his control.

4. Five years before Reis made his instruments, their principle was *fully published in a prominent scientific paper in the city where he then lived, under the name "telephony," and he was then an active member of the physical society of that place.* Those principles were first accurately expounded by Charles Bourseul, of whom said publication spoke.

5. The method of producing undulations by immersing an electrode in liquid, which is the subject of Mr. Gray's caveat, was described in Mr. Bell's original application, which was sworn to several weeks before Mr. Gray's caveat was *written*. Hence, it is absurd to assert that Mr. Bell obtained that idea from Mr. Gray's caveat.

6. That we can *now* speak with the Reis instruments is no more proof in favor of Reis than the fact that we can also *now* speak with a Morse key and sounder is a proof that Morse invented the art of speaking by electricity. Both, together with other electrical instruments, can to-day be manipulated on Bell's principles so as to transmit and receive speech.

E. BERLINER.

Washington, D. C., November 27, 1885.

The statement made by our correspondent in his fifth paragraph, we believe, is now for the first time brought out, and is of especial interest in view of the testimony of Professor Gray.—EDS.

The Preservation of Ropes.

The preservation of scaffold ropes is a matter of great practical importance when scaffolding remains erected for any considerable time, especially in localities where the atmosphere is destructive of hemp fiber. It has been suggested that in these cases the ropes should be dipped, when dry, into a bath containing 20 grammes of sulphate of copper per liter of water, and kept in soak in this solution for four days, afterward being dried. The ropes will thus have absorbed a certain quantity of sulphate of copper, which will preserve them from the attacks of animal parasites and from rot. The copper salt may be fixed in the fiber by a coating of tar or by soapy water. For tarring the rope it is best to pass it through a bath of boiled tar, hot, drawing it through a thimble to press back the excess of tar, and suspending it afterward on a staging to dry and harden. In the second method, the rope is soaked in a solution of 100 grammes of soap per liter of water. The copper soap thus formed in the fiber of the rope preserves it from rot even better than the tar, which acts mechanically to imprison the sulphate of copper, which is the real preservative. It is not stated whether the copper treatment is equally serviceable with dressed as with plain hemp ropes.

Borax as an Internal Disinfectant.

In the *Union Medicale*, Dr. Cyon confirms the statement made by Dumas in 1878, that borax is possessed of most valuable antiseptic powers. Independently of its value for the preservation of food, it is a great preventive of infectious diseases, and may be employed internally to ward off epidemics. It may be taken for months or years with impunity, and constitutes a valuable prophylactic. Dr. Cyon states that it is a remarkable fact that in all epidemics of cholera the workmen in boracic acid factories have always escaped the disease. The usual dose is five or six grammes (75 to 90 grains) daily, taken for an indefinite time.