to be produced when the chronograph is in the same apartment, so that the regular beats of the magnet are audible. When the interval between the transit threads are approximately multiples of half a second, the tendency is very great so to tap upon the observing key as to produce a rhythmical beat in the armature; and when the interval differs from the multiple of a second, the occurrence of that magnet beat which records an even second often precipitates the tap of the observer, whose nerves are in keen tension awaiting the instant of bisection. Only a strong effort of will can obviate these perturbing influences—which are akin to those exhibited in the measurements just described.

The personal error of noting being then assumed as 0·271s. at Valencia, and 0·335s. at Newfoundland, the sum of these quantities, or 0·606, is to be deducted from our value of $x_1 + x_2$ to obtain the true time of transmission; and half their difference, or 0·032, is to be deducted from the longitude after all other corrections are applied. This correction will be taken into account, in fixing the value to be adopted.

It may be added that the indications are strong that a considerable portion of this "personal error of noting" is not strictly a personal phenomenon, but that it is due to the consumption of a very appreciable interval of time in overcoming the inertia of the needle and in moving the needle through an arc sufficient to attract attention. Indeed, it is my conviction that not less than the tenth of a second is thus lost.

An automatic apparatus might be arranged, all other means failing, for recording the signals received, by adjustment of delicate silver wires on each side of the galvanometer needle, in such a position, and so connected with the battery, that they would be brought in contact whenever the deflection of the needle reached a certain angle, and the signal be thus recorded upon the chronograph. This would definitely decide the question; but, for obvious reasons, no such experiment was undertaken at Valencia. My immediate object was thoroughly attained by the satisfactory results of these measurements of the sum of all delays not due to time consumed in the actual transit of the signals across the Atlantic.

THE BEERIZING OF TIMBER.

Mr. Sigismund Beer, in a communication to the November No. of this *Journal*, page 324, finds himself prompted to criticise some remarks on the "Beerizing Process," in my articles on the preservation of timber.

He states, in the first place, that the description of the process which I had given is very defective, without, however, pointing

out in what these defects consist. To this I would reply that the first knowledge which I gained on the Beerizing of timber was from a pamphlet of the inventor, and after this I noticed an article on it in a German periodical of the Grand Duchy of Hesse, which was copied from there by the *Polytechnic Journal of Dingler*. Having this former paper just at hand, and being satisfied that it contained materially the same information on the subject as the pamphlet of Mr. Beer, I did not hesitate to make use of it, the more so as shortly before I had perused several other articles on the process of Beerizing, which, however, I happened not to have on hand. But, if the description of the German periodicals are defective, I am unable to comprehend why Mr. B. did not complete it, especially when it is known what a large circulation one of them possesses. Still the main point in Mr. B.'s invention consists in "boiling the lumber in a solution of borax," and this I stated. The assertion of Mr. B. that I offered my services as correspondent for American and foreign papers, I positively deny.

In referring to my description he then says:—

"I know too well the uselessness of any coating to preserve wood, because, if the fermentive matter is left in wood, it will decay within; and if the sap is removed from wood then coating is quite unnecessary, as pure wood cannot rot, whatever may be its exposure to water or air, or both together."

If Mr. B. means by "coating" merely an external application, I perfectly agree with him, but on the other hand, wood that is apt to decay may become perfectly imperishable, if the preservative is applied in such a manner that it will surround the fibres themselves. This end may be attained in impregnating the timber with substances that enter with the sap-matter either into an insoluble mixture or chemical compound. Sometimes the tree contains those elements in itself. As to instances of that kind I refer the reader to the third part of my article on Various Processes for Preserving Timber, on page 346 of this *Journal*. With regard to the further statements of Mr. B., quoted above, I am in perfect harmony with him, and not only do I not know of having ever expressed another opinion, but on the contrary, I held it always to be true that pure ligneous fibre is not liable to decay. As a proof of this, it may be allowed me to quote from an article entitled "Timber Rot," published by me in the *Engineering and Mining Journal*, of August 3, 1869. There I say:—

"Sound timber, when immersed in water, without access of air, will withstand decay for almost an unlimited time. This is proved by the piles upon which the

dwellings on the Canaries rest, which were erected in the time of the Conquest, in 1402, they being just as sound now as if they had been freshly felled. Roots of trees that have been submerged in marshes are rarely found decomposed. This is stated to be the case with the utensils discovered in the lake dwellings of Switzerland, Bavaria and the Lombardy, which must be at least two thousand years old. Hartig also describes a cypress stem with over three thousand rings, representing the same number of years, which, though submerged, had only partially turned into brown coal."

"With respect to the action of the atmospheric air, it may be asserted that the same, even when moist, will not produce rot, if the wood has been well steamed, or exposed to the action of running water for a sufficient length of time. In England it is customary to lay the timber destined for threshing-floors and wainscoting in fresh water for several weeks. When again dry and not exposed to damp, such timber will endure for an incaedible period of time."

"This tends to demonstrate the fact that the substance which induces decay must be foreign to the timber itself. This substance is the juice that is chiefly contained in the vascular tissue, which forms a link between the bark and the wood. The composition of this sap varies according to circumstances, as the variety of the tree, climate, season, ground, etc."

And further on:—

"When air-dried, steamed, or chemically treated and afterward dried wood commences to rot, it is a sign that the sap had not been entirely removed, and that moisture has again penetrated. Timber decomposes the easier, the more sap it contains, and if green trees are hewn when the vessels are overflowing with juice, one may look with certainty for diminished durability of the timber."

Still, though all this may be granted, the question arises, will Beerized or any other wood that has been freed from sap-matter be secured against the ravages of that large class of boring worms that threatened the existence of Holland more than once,* in destroying the wooden levees along the coast, and that cause so much loss to the shipping trade and submarine constructions? I will remark that the damages of the naval worm have called forth repeated investigations from the part of men of science, the earliest of these being laid down by Sellius, of Utrecht, in 1733, in a 4to. volume of 350 pages. Those worms, and, perhaps, a great many more, *live from the woody fibre*, attacking it whether it is free from sap-matter or not. Still, Mr. B., in his pamphlet, *Our Malpractice in Curing Timber*, asserts that wood prepared by his process is vermin-proof. Further on, Mr. B. states that "borax" as well as "pure wood" are antiseptics. This is a new discovery, which I gladly leave to Mr. B.; but, without entering into such minor points, a discussion of which could scarcely benefit the reader of this *Journal*, I will now give the authorities for my statement that borax will likely attack

* In the years 1660, 1731, 1759, 1770, 1827, and 1858.

wood, or, rather, the material covering the cellular substance of ligneous tissues. This substance predominates especially in hard woods, and has been called, by PAYEN, "*matière incrustante;*" HARTIG denominates it "*intercellular substance;*" while Messrs. FREMY and PELOUZE embrace the elements constituting them under the term "*corps épiangiotigues,*" from ἐπί, upon; ἀγγεῖον, vessel.

I translate from Vol. IV., page 746, of the "*Traité de Chimie génerale, analytique, industrielle et agricole*" of MM. PELOUZE and FREMY, the following passage:—

"Mr. PAYEN has not found the same elementary composition for the incrustating substance (*substance incrustante*) of different kinds of wood: he recognized four distinct bodies, which he designated by the terms *lignose*, *lignone*, *lignin* and *ligniréose*.

1. The *lignose* is insoluble in water, alcohol, ether and ammonia, but soluble in potassa and soda.

2. The *lignone* is insoluble in water, alcohol and ether, but soluble in ammonia, potassa and soda.

3. The *lignin* is insoluble in water and ether; soluble in alcohol, potassa, soda and ammonia.

4. *Ligniréose* is not soluble in water, and soluble in alcohol, ether, potassa, soda and ammonia."

From this it appears that the intercellular substance is soluble in alkalies: one of its parts is even taken up by alcohol and ether. Borax being of a slightly alkaline nature, I therefore thought to be justified in drawing the conclusion that the treatment of wood, as practiced by Mr. B., would affect the ligneous tissue.

The inventor says, further:—

"Paper-makers, who use wood, would do well to dispense with potash or soda, and obtain a license to use borax, or a like compound, to purify wood from its non-fibrous matter, and I had them mainly in view in claiming the right of my process for purifying wood also."

This passage I find rather unexpectedly in the pen of Mr. B.; whether he means to make the statement that borax is alike to the alkalies in its efficacy in preparing paper-pulp from wood, or whether he supposes that this operation consists simply in the removal of the sap and silica, I am unable to say.

The experiment of Mr. B., illustrating the deportment of a borax solution towards the white of an egg, undoubtedly has incited interest; however, I cannot adopt it as a proof against my view of the

subject, as animal membrane can scarcely be compared with the vegetable material referred to.

As regards my statement that a part of the albumen, originally contained in wood, has been retained in it after treating the same with borax, I hesitate not to mention that I owe it to a gentleman in whose veracity I formerly never had reason to doubt; still, I am glad to be informed that no albumen is retained, and that the main feature of the Beerizing Process is an undeniable fact.

ADOLPH OTT.

New York, December 1st, 1869.

ON THE NEW CHEMICAL NOMENCLATURE.

BY DR. ADOLPH OTT.

(Continued from Vol. LVIII., page 333.)

HUMPHRY DAVY, in 1812,* proposed to denominate the lower chlorinated compounds by the termination *ane*, and the higher ones by *ana*, if only one distinct combination was known by *ane*. Common salt was called *sodane*, the protochloride of iron *ferrane*, the perchloride of arsenic *arsenicana*. "Some persons," he says, "may choose rather to use the word chloride, following the analogy of oxide; but, as I have expressed in the introduction, our nomenclature would have been more simple and useful without any attempt at theoretical expressions of the composition of bodies; and as the fixed alkalies, earths and oxides, are similar bodies, and the termination *a* has been applied to the two first, it might be properly extended to the last."—The only relic of this scheme which we meet with in the literature of the present day, is *Azotan*, which is alluded to in Watts' Dictionary of Chemistry, as "a name not much used, for chloride of nitrogen."

Albeit some similarity is found among the old names of the elementary bodies, of which we propose to speak first, yet they are, on the whole, entirely arbitrary. But few of these elements were known to the ancients and these are easily preserved in a separate state, such as gold, silver, iron, copper, sulphur, carbon, &c. The names of some of the more recently discovered elements have been rendered significant by deriving them from the Greek ety-

* Elements of Chemical Philosophy, Vol. I., p.6.