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NEW YORK, SATURDAY, OCTOBER 6, 1900.

THE REPORT OF THE MERCHANTS' ASSOCIATION ON THE NEW YORK WATER SUPPLY.

The report of the committee of the Merchants' Association on the question of New York's water supply throws a flood of much-needed light upon one of the most, if not the most, important question affecting the welfare of this city. The highly creditable labors of the committee were prompted, as everybody knows, by a daring and reprehensible attempt by what is known as the Ramapo Water Company to obtain a monopoly of the available sources of water supply for New York; and the report before us achieves the double result of exposing the preposterous nature of the Ramapo scheme and presenting to the people of New York a clear view of the present status and future possibilities of this great question. It is almost superfluous to state that the high standing of the members of the committee, who are in every case prominent in the engineering, commercial and legal circles of the city, is such as to render the findings of the report absolutely reliable and authoritative.

In the first place, on the question of the necessity of at once taking steps to obtain a new source of water supply, the present report concurs with all reports that have preceded it, in pointing out the urgent need for taking immediate action in this direction. It is shown that unless some method of preventing the present waste of water is adopted, by 1903 the supply in Manhattan and the Bronx will be unequal to the demand; and although the use of water meters and other restrictive measures might render the present supply sufficient to meet the demands up to the year 1910, it is not considered likely that such restrictive measures would be acceptable, or even practicable. In looking for a new source of supply, the report throws out of the calculation altogether what is known as the Housatonic and Ten Mile River supply, chiefly because of the extensive legal complications which would be involved in a scheme contemplating the use of these waters.

The scheme recommended by the committee contemplates the construction of pumping stations and filter beds at Poughkeepsie, on the east side of the Hudson River, where the water would be led into a forebay, from which it would be lifted by high duty pumps to a settling basin of 25,000,000 gallons capacity, located about a mile and a half northeast of that city. From the settling basin the water would pass through 136 filter beds, each with an area of about three-quarters of an acre, and thence would be led into an aqueduct, 63 miles in length, and conveyed to a new covered reservoir of 250,000,000 gallons capacity, adjoining the new Jerome Park reservoir at New York. With a view to prevent the river above Poughkeepsie from becoming brackish from the tide because of the withdrawal of such large amounts of fresh water, it is proposed to construct compensating reservoirs in the Adirondacks, in which the flood waters would be held for delivery into the river during the dry season. An alternative scheme to this is the construction of a great aqueduct from Hadley in the Adirondacks, by which the waters of the North Hudson would be conveyed directly to New York city. It is estimated that 250,000,000 gallons daily of filtered water could be delivered from Poughkeepsie, at the city line at the level of the Jerome Park reservoir, at a cost of $28.33 per million gallons. The cost of an equal supply by aqueduct direct from the Adirondacks would be $30 per million gallons.

With regard to finance, it is encouraging to learn from the report that, during the sixty-seven years of its existence, the New York Waterworks Department has yielded a large revenue, the total net profits during that period having been over $21,000,000. The maximum cost of water per million gallons was $54.20 in 1849, and from 1866 to 1898 it was $35.06. At present the approximate cost of water at the city line is $29.07.

Having these figures in view, one can appreciate the astounding nature of the proposed contract with the Ramapo Water Company, by the terms of which the company is to build and maintain at its own expense works capable of delivering 200,000,000 gallons of water daily at the city line, under a head of 300 feet, and the city, commencing from 1902, is to pay $70 per million gallons for the water, the supply to be kept up for forty years. At the end of that time the works are to belong, not to the city, but to the company. As compared with the Ramapo proposition, it is to be noted that under the proposed scheme of the Merchants' Association Committee, by the year 1937 the city would be in possession of its own plant, free from all debt, whereas under the Ramapo system it would own nothing at all; for although between the years 1906 and 1917 the new system, under municipal ownership, would have an annual deficit, from 1917 on, the city would commence to realize an annually increasing profit, which would constantly increase until, in the year 1945 (the date of the termination of the proposed Ramapo contract), it would amount to $3,100,000 annually. The total excess of this profit over the deficit in forty years from 1906 to 1945 would be about $48,000,000. Again, the payment to the Ramapo Company of $70 per million gallons, after deducting the revenue from consumers of $50.29 per million gallons, would leave the city with a deficit of over $60,000,000, the total loss thus incurred reaching the sum of $108,000,000 in forty years of operation. In considering this loss, we must bear in mind that the city would possess no plant of its own.

The scheme outlined by the Merchants' Association Committee contemplates increasing the supply from the Hudson River by an additional supply of 250,000,000 gallons daily, to be added to, every fifteen or twenty years, as the growth of the population of the city may demand. The estimates, based upon the past very profitable operations of the New York Waterworks Department, make it certain that the supplying of water to the city, if it be carried out upon the lines suggested, will become increasingly profitable. No one can turn over the pages of the very able report which we have now before us, without concurring in the conclusion that immediate steps should be taken by the city of New York to acquire an additional supply of 250,000,000 gallons of water daily from the Adirondack watershed, by one of the two systems proposed.

GALVANIC ACTION OF COPPER SHEATHING.

The opponents of copper sheathing for our warships will find strong confirmation of their criticisms in the very ugly discovery that was made the other day on the British cruiser "Ariadne," and later on another cruiser, the "Spartiate." Copper sheathing was introduced to enable ships to remain at sea for longer periods than is possible when the steel plating of the hull is unprotected. The theory is good, and the practice of it would be equally so were it not for the disadvantage that the galvanic action of copper on other metals in the presence of salt water is liable to be very destructive. As long as the metal bolts which fasten the wood sheathing to the inner steel hull can be kept perfectly water-tight, and the salt water prevented from getting in contact with the steel hull, sheathing is no doubt an excellent device; but experience seems to prove that it is extremely difficult to preclude conditions favorable to galvanic action. In some cases the steel plating has been badly attacked, while in others, the fittings of the sea valves and other outboard connections have been seriously damaged. During the latter part of August, the "Ariadne," a new British cruiser of 11,000 tons displacement and 21 knots speed, was found to be leaking rapidly while at her moorings. The leak was of such dimensions that it was assumed that a Kingston valve had inadvertently been left open. After the vessel had been hurriedly docked, it was ascertained that the corrosion of the bolts, both inside and outside of the ship, had been so extensive that the mounting of one of the under-water fittings had fallen off, allowing a great inrush of water. The corrosion of the outer bolts of the "Spartiate," a sister ship, had previously been detected, and on docking the vessel it was found that the inner bolts had also been corroded. Referring to this most serious incident, The Naval and Military Record pertinently remarks: "One cannot fail to smile at the comic side of the question, since here we have ships copper-sheathed in order that they may keep the sea for lengthened periods, and yet because they are copper-sheathed, they cannot go through the peace maneuvers without becoming so leaky as to threaten their own safety."

We understand that signs of similar corrosion at the same point have appeared in our own sheathed cruiser "New Orleans;" and in view of these facts, we think that a most searching investigation of the whole subject should be made before we proceed with the proposed copper-sheathing of our own cruisers and battleships. Certainly the incident will greatly strengthen the position of the opponents of copper sheathing.

SPECTRUM OF RADIUM.

M. Demarçay has made another observation of the spectrum of radium, by which he finds that the chloride of radium has been prepared in an almost pure state; the sample was furnished by Madame Curie. The spectrum of its solution in hydrochloric acid has given three sets of rays: first, those of the platinum electrodes; second, a feeble spectrum of barium, reduced to its three principal rays; and third, the rays of radium, which have been already enumerated in a note presented to the Académie des Sciences some time since. The spectrum of radium is in this case very strongly marked, while that of barium has almost disappeared. No new lines have been found for radium, but the two nebular bands, which were somewhat faint in the previous spectrum, are now much stronger; the first of these commences somewhat sharply about 4621·9, with a maximum near 4627·5; it is nearly symmetrical with respect to this maximum, finishing near 4631·0. The second band is somewhat stronger; it begins sharply about 4463·7, with a maximum at 4455·2, becoming diffused toward the ultra-violet; it seems to end near 4390·0. As to the stronger rays of radium, they appear in this spectrum with great power and intensity, equaling the strongest ever observed, especially the rays 3814·7, 4340·8, and 4683·2. It is remarkable to observe that the spectrum of radium gives it as strong an analogy to the metals of the alkaline earths as is shown by the chemical reactions. The experiments were made entirely by the photographic method, as the quantity of material was too small to permit observation by the eye. It will be seen that the chloride of radium is now obtained in an almost pure state.

PALLADO-OXALATES.

In a communication recently made to the Académie des Sciences, M. H. Loiseleur describes the experiments by which he has formed a series of new compounds, the pallado-oxalic acid and its salts. M. Vezes had previously shown that oxalic acid transforms the pallado-nitrite of potassium, $Pd\ (NO_2)_4\ K_2$, to a salt which crystallizes in fine yellow needles, corresponding to the formula, $Pd\ (C_2O_4)_2\ K_2, 3\ H_2O$. To this salt he gave the name of pallado-oxalate of potassium. It is obtained more easily by the double decomposition of chloropalladite of potassium, $Pd\ Cl_4\ K_2$, and the neutral oxalate of the same metal. On account of the close analogy between the compounds of platinum and palladium, the experimenter supposed that the pallado-oxalate might be made the starting point for a series of compounds analogous to the plato-oxalates, which have been well studied by Söderbaum, and wished to obtain an acid corresponding to the plato-oxalic acid, $Pt\ (C_2O_4)_2\ H_2 + Aq$, described by the latter. He has been successful in producing this acid and a number of its salts, and describes the method employed. If a hot concentrated solution of pallado-oxalate of potassium is poured into a hot solution of nitrate of silver, the formation of a yellow precipitate is observed. The liquid, after filtering, deposits upon cooling golden-yellow needles which act upon polarized light. The precipitate is redissolved in boiling water, and this solution also deposits yellow crystals of the same form. Analysis of the crystals gives the formula of a pallado-oxalate of silver, hydrated: $Pd\ (C_2O_4)_2\ Aq_2, 3\ H_2O$. This salt is but slightly soluble in water, taking 180 times its volume of boiling water to dissolve it; the solution is not very stable, and in time decomposes with a black deposit of palladium at the surface and on the walls of the vessel. The dry salt is also decomposed by the action of light, and must be preserved in the dark. In the second expriment, a solution of the latter salt is treated by an exact equivalent of hydrochloric acid; a precipitate of silver chloride is formed, and when this is separated, a yellow-brown liquid is obtained. This liquid is unstable, but with some precautions it may be evaporated in an oven and thus concentrated; upon cooling, it deposits crystals of the pallado-oxalic acid, which take the form of needles more or less fine as the cooling has been done rapidly or slowly; these crystals are of a yellow or yellow-brown color, and act strongly on polarized light; they are quite soluble in water and the solution is strongly acid. Analysis gives the formula, $Pd\ (C_2O_4)_2\ H_2, 6\ H_2O$. With the acid thus obtained, a number of salts have been formed. The sodium salt crystallizes in yellow needles, which are larger than those of the potassium salt. They are very efflorescent in air and lose their luster, becoming a yellowish white. The barium salt is formed by adding bromide of barium to a cold solution of the acid. It is an orange-white powder, but slightly soluble in water; boiling water dissolves only 1-2000 part. By cooling the yellow-green liquid thus formed, small yellow crystals are deposited, which act upon polarized light; the bromide has the formula, $Pd\ (C_2O_4)_2\ Ba, 3\ H_2O$. In these experiments, four new bodies have been obtained, the pallado-oxalic acid and three of its salts, those of silver, barium and sodium. It should be remarked that this is the only complex acid of palladium which has been obtained up to the present. Since the researches of Roessler in 1886, who tried unsuccessfully to produce the pallado-cyanhydric acid, palladium was considered as incapable of forming complex acids, thus showing but little of the metalloid character exhibited by platinum in most of its compounds. The experiments show that this is not the case, and the metalloid character is even more strongly shown in the case of palladium, as will be remarked from the fact that the crystals of pallado-oxalic acid are very well defined, but those of the plato-oxalic acid have been obtained by Söderbaum only in masses of confused crystals.