Appendices No. 132.

These projects having been forwarded to the undersigned by Mr. J. Middleton, an American residing in Yokohama, but a short time before the completion of Chapter V, it has been found difficult to thoroughly examine into the correctness of the estimates given therein. And as these estimates have not been made by Mr. Middleton himself, but by his agent in Tokei, and as no opportunity has offered to confer with Mr. Middleton, who is now in New York, the undersigned declines expressing any opinion as to the price asked in these estimates for building the tramways and waterworks, except that they appear to be reasonable so far as the tramways are concerned, and

rather high in regard to the
water works.
Tokei, May 9th 1876.

Chas. W. Le Gendre

Appendix No. 1.

Tramways

We have the honor to present to the Japanese Government the following project for the installation of Street Railways or Tramways in the towns of Tokio, Osacca and Kyoto.

The means of conveyance actually employed in Yedo are jinrikishas and a few public carriages belonging to the company stylet "Sen Ri Kin". Everybody knows the drawbacks of both these means of locomotion. They are striking for any one who has studied ever so little the locomotion system in a large city. This question which greatly preoccupied, both in Europe and America, the administrators of even moderate size cities has finally been solved. In America that "go ahead" country and in Europe where its example has been followed, tramways are to be found in nearly all the towns now a days. This system owes the prefsence it enjoys to the comforts it affords, to its speed

its solidity and its cheapness. Besides what proves best its superiority on any other system is the grand success it has obtained of late years in London and Paris and in all the principal cities of Europe where it actually supersedes the large Omnibus Companies which had enjoyed such a good reputation till the tramways made their appearance. It is therefor the example of the whole world which we now beg to lay before the Japanese Government. The progress made by this country and the success it has achieved lately, make us hope that the Government will favorably receive this project whose object is the welfare and comfort of the inhabitants of its towns.

Before speaking of the advantages of tramways we will examine the drawbacks and nuisances of the actual system and give the means of putting a stop to them.

Tokio, according to the information

we have been able to obtain, possesses:

14682	jinrikishas for 2 persons (annual tax $2.-)	a year,	$29.364.-
9.788	" 1 person (" " 1.)	"	9788.-
24470	paying to the Government a year		$39.152.-

Say 30000 men to pull these vehicles, which figure represents the major part of the male population of Tokio. These men according to medical men's opinion, succumb after 3 years' work to the hardships of their labor and as after all, the savings they are able to realize are insignificant, they retire worn out and incapable of any other work for their life.

One can, without any exaggeration reckon on 30.000 men as annually lost to Japan, and if we suppose that there are 30.000 jinrikis between Osacca and Kyoto, one can estimate the amount of lost men in 10 years, as being 600.000 — figure superior to the largest standing

army of Europe.

Independently of this horrible — human sacrifice made for the sake of a few, the object is not at all obtained. The jinrikisha is, from all points of view abominable. The fearful jolting of that trap together with the piteous sight for the rider, of an unfortunate coolie reeking with perspiration and so painfully bent before one, ought alone to cause the suppression of this mode of locomotion at once so irksome, so cruel and comparatively speaking so expensive.

For many years past the Tokio municipality has made large sacrifices to keep the streets of the town in good order and that without any satisfactory result. This must be attributed to the jinrikishas. Our assertion may seem strange but here is its explanation.

In any road there are weak spots, depressions of the soil which insensibly form a hole in which rain water sojourns and gradually softens the soil; then a jinrikisha passes and with its thin wheels cuts up the ground like a workman's spade; then come a thousand more and in a few days this little excavation becomes a real mud pit and henceforth the road is totally impracticable.

There are still many other inconveniences; for instance in a jinrikisha, one is quite exposed to the rain, the wind and dust. It is nearly impossible to travel in the snow. When the roads are muddy one is constantly splashed, finally it is impossible to travel a certain distance in a jinrikisha without being very tired and exposed to all sorts of annoyance.

The jinrikishas block up the roads to such an extent that the people on foot are always in danger. The danger it

still greater in the case of the "Sen Ri Ken" carriages which are badly fitted up, badly built, very heavy and very badly driven. Can anything more absurt than the big — Omnibus be imagined? When it passes, it blocks up the whole road and indangers the life of all the passers by.

The photograph we beg to annex is the picture of one of the carriages running in San Francisco, (Cal). We will give its dimensions and price further on. People may form an idea of the comfort of these carriages in seeing the manner in which they are worked. They run on two rails placed 6 feet apart from each other sometimes only 3 and 2 and ½. There are even One rail railway systems. The cars are drawn by two horses, some with one horse or even drawn by Steam or compressed air.

The advantages of these cars are that they

run at any speed from 1 Ri 36 chos an hour to 3 and 4 Ris if required. They present no danger whatsoever for people on foot, since they always follow the same track and can be instantaneously stopped by a patent brake in case of danger. The track does not in any way interfere with the circulation on the road, for the rails are flat and bolted down on underground wooden stringers which are themselves rested on sleepers. This forms a solid construction causing no alteration to the road. See the comfort with which the passengers are seated in these cars. These carriages always rolling on rails and at a moderate speed, they experience no shocks whatever, contrary for instance to the European old omnibus. These cars are thoroughly aerated by the sides and the roof. When it rains or the wind blows or when the weather is cold, strong and well closed windows protect the

passenger from any inconvenience. The platforms in front and behind are for the people who wish to smoke or have cumbrous parcels. A bell warns the conductor that a passenger want to get in or out and finally to close the list of the innumerable advantages of these carriages the fare is very moderate, being only Five Sen, for about One Ri and a half, distance generally gone over in about 40 and 45 minutes.

Principal Systems.

System drawn by 2 horses, wide gauge 5 Feet

The rails used weigh 12 english pounds, per english foot.

12 lbs = about one Kwamme and a half.

1 foot = about 1 japanese shaku.

The cars that run on the above rails have the following dimensions:

Outside length	16 feet 4 inches
" width	7 . 6 .

Outside height	9 . .
Inside length	16 . .
" width	7 .
Total weight	2700 lbs.

Two horses are put to this car. From the rear platform to the end of the pole it occupies a space of 30 feet 6 inches. This car requires a conductor to assist the passengers getting in or out, and collect their fares; also a driver who is exclusively in charge of the horses. This car has two platforms, one in front and the other behind. It can carry 26 passengers comfortably seated inside and 8 standing in each platform.

System drawn by one horse - gauge 3 feet and 2 ½ feet.

The rails employed in this system weigh 6 lbs per foot. The dimensions of the car are:

Outside length	12 feet . inches
" width	6 . 10

Outside height 8 feet inches
Inside length 11 .
" width 6 . 4
Total weight 1600 lbs.

This car is drawn by one horse only. From its extremity to the end of the pole it measures 26 feet. This car has only one platform in front and only requires a driver. The fare is deposited in a patent box placed next to the driver who gives the change through a shutter when requested. This car contains 18 persons seated inside and 8 standing on the platform.

The two above systems employ cars of different sizes, some round, some open etc.. The cost price of the large cars pulled by two horses varies according to their shape, from $2000 @ 1500. The smaller one horse cars cost from $1200 @ 800.

They are all very strongly built and last at least 6 years each without requiring

any further repairs than a coating of varnish once yearly.

Steam Systems.

These systems are positively identical to the railway actually running between Yokohama and Tokio. The engines only are a less powerful. These systems employed in Chicago and New Orleans are gradually disappearing on account of the noise of the steam frightening the horses in the streets. They have besides been quite recently abolished in the above mentioned towns.

Compressed air Systems.

These systems have quite lately obtained a great success in Paris. They work like the steam systems, only steam is replaced by compressed air. But a sufficiently long experience has not demonstrated its advantages and we cannot advise its adoption.

One Rail System.

This system is assuredly the most curious employed up to now. as it is used for high speed and ordinary street Railways, we will make, if necessary a special report on it, which we Donbt not will be of interest for Japanese who now need cheap and rapid railways.

System for hilly grounds.

Hills have been for a long time a great impediment to tramways. This difficulty has been solved at last. We will give as an instance of it the tramway running in San Francisco from Kearney to Leavenworth Sts by Clay St. The grade is about 634 feet elevation per mile. The cars are operated by meam of an endless steel wire rope one inch in diameter. This rope running underground does not interfere in any way with the circulation of the other

carriages. The motion power is given by a 35 H.P. engine, situated on the top of the hill. The chain is seized and let loose according to the effect required either motion or stoppage, by gripping clamps attached to a dummy in front of the car which seize the running rope through a center groove made to that effect. When the car is stopped it remains stationnary owing to a brake acting directly on the face of the rails. - The track is 3 feet wide. A 35 h.p. Steam engine holds 18 cars over a Distance of about 1 Ri. This system is perfectly applicable to Kudan, Uyeno, the castle etc... These cars would be advantageously adapted to the transport of goods etc.... which is actually so difficult with the sole help of the Shanki.

We ought now to mention the exceptional advantages that the installation of tramways in Japan would

create in an economical point of view, but we will first give an idea of the monetary profits it will afford. Let us suppose the construction of two lines:

One line from Shiba to Asakusa (via Honkokucho & Asakusabashi)

Distance = 1 Ri. 20 chos 42 Ken

One " " " to Ueno (via meguro bashi) = 1 . 14 . 54 .

There and back 5 . 35 . 12 .

Less double track between Shiba and Honkokucho where the two lines follow the same road viz. 29 chos 54 Ken x 2

= 1 . 23 . 48

Total distance 4 Ris 11 chos 24 Ken

All accounts includes the construction of a track, gauge 5 feet wide, on which cars with double platform, drawn by 2 horses would come to about 24 Dollars per Ken.

The construction of a track, gauge 2 feet six inches gauge, on which single

platform and one horse cars would run, would cost about $6.– per Ken.

Hereafter see the approximative cost of a complete installation.

2 lines: 1 from Shiba to Asakusa:

1 " Shiba " Ueno:

Total length of the track 4 Ris 11 chos 24 Ken

Wide gauge 5 feet

4 Ris 11 chos 24 Ken or 9324 Ken @ $ 24		$ 223776.–
45 omnibus @ $ 2000.–		90.000.–
360 horses @ . 80.–		28.800.–
7 stables		35.000.–
180 harness @ . 30.–		5.400.–
10.000 tsuboes of ground @ $ 2		20.000.–
Tools		5.000.–
1 house for chief manager		4.600.–
Total		$ 412.576.–

Expense a/c

To feeding 360 horses @ $6.– a month		$ 2.160.–
" shoeing " " "		" 360.–
" lighting and medicines "		" 600.–
Employés.		
7 Stable managers @ $25.– "		" 175.–
90 drivers ..... @ 10.– "		" 900.–
90 conductors ..... @ 10.– "		" 900.–
80 hetores ..... @ 6.– "		" 480.–
4 lantores ..... @ 15.– "		" 60.–
12 months @		$ 5635.–
To		$ 67.620.–
1 Chief manager a year	$ 7.200.–	
1 Inspector "	3600.–	
1 bookkeeper "	2400.–	
1 veterinary surgeon "	3000.–	
1 mechanic "	2400.–	" 18.600.–
Interest @ 10% a year on cost of installation	$ 41.257.60	
Depreciation 15% " " value of horses	" 4320.–	
" 25% " " " " cars	" 22.500.–	
" 25% " " " " harness	" 1350.–	" 69 427.60
Contingencies		" 15.000. "
Total		$ 170 647.60

Prospects

45 omnibus from 6 A.M. to 12 P.M. making 10 round trips a day each, taking 75 passengers each round trip

@ 5 sen in 365 days	$ 615.937.50
Expenses	" 170.647.60
Net profit	$ 445.289.90

Approximative cost of the narrow gauge, 2 feet 6 inches.

9324 Men @ $6.–	$ 55.944.–
100 Cars @ $1000.–	" 100.000.–
360 Horses @ " 80.–	" 28.800.–
7 Stables	" 35.000.–
200 harness @ 30.–	" 6000.–
10000 Workes of ground	" 20000.–
Tools	" 5000.–
1 horse for Chief manager	" 5000.–
Total	$ 255.744.–

Expense a/c

To feeding 360 horses @ 6$ a month		$ 2.160.–
" shoeing " " "		" 360.–
" lighting and medicines " "		" 600.–
Employés:		
7 Stable managers		" 175.–
Forward		$ 3 295

Forward		$ 3.295.—
To 200 drivers @ $10.— a month	"	2 000.—
" 80 Setters " 6.— "	"	480.—
" 4 Canton " 15.— "	"	60.—
12 months @	$	5 835.—
		$ 70.020.—
" 1 Chief manager a year	$	7.200.—
" 1 inspector "	"	3.600.—
" 1 bookkeeper "	"	2.400.—
" 1 veterinary surgeon "	"	3.000.—
" 1 mechanic "	"	2.400.—
	"	18.600.—
" Interest 10% on installation cost	"	25.594.40
" Depreciation 15% " value of horses	"	4 320.—
" " 25% " " " Cars	"	25 000.—
" " 25% " " " Harness	"	1 500.—
	"	56394.40
Contingencies	"	15000.—
Total	$	160014.40

Prospects:

100 cars starting from 6 a.m @ 12 p.m. 10 round trips each a day, taking each round trip 40 passengers @ 5 cents, will realize in a year $ 730.000.—

Expenses	" 160.014.40
Net profit	$ 569.985.60

Remarks:

We have supposed 45 cars for the double line of Ueno and Asakusa wide gauge, 5 feet, and 100 for the 2 feet 6 gauge. In the first case one could reserve 5 and in the second case 20, for contingencies such as repairs or increase of travel on holidays etc.

By running 20 cars on the wide track or 40 on the narrow one, we would always have 10 on the former and 20 on the latter up and down and situated 5 or 2½ chos between one another or yet at a distance of 5 or 2½ minutes, supposing the round trip to last about 1 hour 36'. Thus, one could easily accomplish 10 round trips from 6 a.m @ 12 p.m San Fcv cars have but one hour 15' to run over a longer distance and that over hilly grounds (Lone mountain, Sutter St. cars).

With 4 to horses for 45 cars one has exactly 8 horses per car and per day or 4 teams doing each 4 hours' work or a little more than 3 round trips during which they would go over a distance of 9 Ris. This is very little compared with america where on ground similar to that of Yedo the horses make over 12 Ris a day. The narrow gauge cars requiring only one horse, one can make a similar calculation.

An average of 75 passengers per car on the wide gauge and of 40 on the narrow gauge per round trip, is very moderate. One can easily be convinced of that in going over once the distance of the projected lines. In an hour one will cross no less than 600 gin-rikishas.

Everybody will easily understand that the two lines of Uyeno and asakusa are quite insufficient for the population of Tokio and that there is yet much element for a profitable establishment of several more lines, viz..

1 Line from Shinagawa to Nihonbashi (via Mita)
1 " " Shinjiku " Nihonbashi (via Ichigai + Hongo).
1 " " Shiba " Meganebashi (via O'Gisio)
1 " " Yotsuya " O'bashi (straight line),

The erection of these lines with the rolling stock would cost about twice the amount required for the double line of Asakusa and Uyeno viz. $ 825.000.— for the wide gauge and $ 511.488. for the narrow gauge. The profits would increase accordingly. Thus:

6 Lines in Tokio (wide gauge) would cost $ 1.237.728.—
6 " " " (narrow gauge) " " 767.232.—
6 " " " (wide gauge) would realize $ 1.335.869.70
6 " " " narrow gauge " " 1.709.956.80

We can make the same calculations for Kyoto and Osacca resume the transaction as follows:

6 Lines in Tokio costing (wide gauge) $ 1.237.728.- small gauge $ 767.232.—
2 " Kyoto " " " 412.576.— " 255.744.—
2 " Osacca " " " 412.576.— " 255.744.—
Total cost $ 2.062.880.—, $ 1278.720.—

6 lines in Tokio	5th gauge	$ 1.335.869.70	narrow gauge $ 1.709.956.80
2 " Kyoto	"	" 445.289.90	" " 569.985.60
2 " Osacca	"	" 445.289.90	" " 569.985.60
Net profit		$ 2.226.449.50	" $ 2.849.928.—

The cheapest line gives a larger profit than the wide gauge, but one must also consider that its construction would be far less perfect than that of the wide gauge and consequently would last for a shorter period of time.

The above figures may seem enormous but it is easy to demonstrate their possibility.

There are in Tokio 30.000 ginrikis
Osacca and Kyoto 30.000 "
Total 60.000 "

on an average these men must earn at least $ 10.- per month each or about 34 sen per day or collectively $ 600.000.— per month
or in 12 months $ 7.200.000.—

This amount is an other argument against the ginrikishas and proves the economical

disorder in the ginrikis' work. Are they not a plague for the inhabitants of the three largest cities of Japan? The individual gain that a ginrikis can annually make up is insignificant and does not by far afford him the ease and comfort deserved by any assiduous and well carried out task, and, in point of view of health and intelligence it ruins yearly Sixty Thousands men. The enormous amount of $ 7.200.000 Dollars earned by the ginrikis is a tremendous tax drown out of the public's purse who in return for the heavy price it pays, has only as means of conveyance slow, ill conditioned and inhuman system.

It is time that Japan should remediate to this sad state of things! The tramways will do it. Their installation is not expensive and the profits of the undertaking are Considerable. We think we have sufficiently demonstrated the monetary advantages resulting from a serious —

installation of Street Railways. It only remains for us to demonstrate their Special advantages.

Special advantages of Street Railways

1°. Progressive and insensible disappearance of the jinrikis who, unable to compete with the cars will, of their own accord return to the country where they generally come from, and help the development that agriculture is likely to obtain in this period of peace and progress in Japan.

2°. Preservation of the Streets of the city which would thence forth cease to be cut up by the thin wheels of the jinrikishas.

3°. Cheapness of trips through the town. For 5 sen one will be able to go to any part of the town, for, each line will give transfer tickets for the various parts of the town. For instance, a man wishes to go from Shiba to Shinjiku? He rides on the Ueno cars up to Meganebashi

and from there with a transfer ticket given by the Conductor he takes the Shinjiku cars without any extra fare being paid and for 5 Sen he will have ridden about 2 Ris. For 5 more Sen he will be able to come back and will thus, have ridden 6 Ris for the small Sum of 1 Kwan. By a similar process one can go to any other part of the town.

4°. Economy and comfort for the inhabitants.

Actually the towns of Tokio, Kyoto and Osacca pay as I have shown it above, $ 7.200.000. — yearly to the jinrikis who transport their inhabitants into the different quarters. Henceforth they will only pay One Third of this enormous Sum, and they will travel rapidly, in Summer, Sheltered from the dust, the wind and the heat of the Sun, in winter sheltered from the Snow the rain and all the discomforts of the Season.

5° Increase of value of Real Estate.

The cars will give to distant lots of ground a value nearly equal to that of the lots situated in the center of the town and the distances being, we may say nearly annulled by the facilities of transport, rich and poor, the former, for their pleasure, the latter for reasons of economy, will be able to go and reside in the remotest parts of the town.

6° The earnings of the cars will pay the first year the expenses of their installation and will, besides, all other expenses being paid, leave a large profit. The second year the earnings can be affected to the repairs of the town roads and finally the third year after having been a considerable boon to the cities in which they will have been running, the tramways will bring into Japan a net Income of $ 2.226.449.50 which @ 10% represents

a capital of more than Twenty two millions of Dollars. According to the second estimate the yearly net income will be $ 2.849.928.— which represents a capital of Twenty eight millions, or half the total Revenue of the Empire of Japan.

There are many other advantages that could be indicated, but we address too intelligent persons to require any further details.

It therefore only remains for us to assure the Government that we are ready to entertain whatever proposition it may think fit to make us on the subject.

Tokio 22nd April 1876

Appendix No. 2.

Project
For the Establishment of
Water Works
at Yedo- Osacca - &c. &c.
on
a Foreign Principle -

Numerous works have been published on the effects of Water upon the constitution of Man and Animals; and the several researches made by the greatest scientific men have proved to us that Spring or running and well aërated waters, are by far the best for human consumption, and even for all domestic purposes - For these waters only have the requisite qualities for good drinkable waters - viz -

" They are cool, limpid, odorless, very
" slightly flavored, not tasteless or saltish or sweetish.
" They can boil vegetables whilst softening them, and
" they also dissolve soaps. (Medical chemistry, ad. Wurtz. 1st Vol. p. 66.)

Well waters are of a great variety in quality owing to the various kind of soils and materials through which they circulate and sojourn. The want of aëration generally gives them a nauseous and savourless taste. All gardeners well know that if they water their plants with water just drawn from the well and not aërated, the vegetation languishes, whilst if they use thoroughly well

shallow and aerated water, vegetation becomes more active.

It is in large towns that one principally finds that well water is unhealthy. In Paris for instance besides a very large proportion of Sulphate of lime that renders the well water undrinkable and useless for kitchen and washing purposes they contain a considerable quantity of nitre and sulphur which show in this water the presence of organic elements originating from the slop waters and infiltrations from the water closets that they meet in their course underground. These waters are unfit for the fabrication of bread. There is a great similarity between the Paris & Yedo water, consequently the Yedo water must be unfit for the cooking of rice and it is probable that the difference in the taste and the quality of the bread made in Tokio by native and foreign bakers arises from this: the latter use filtered water taken from the Tamagawa at Kawasaki; whilst the former use Tokio well water.

It may be told that the Tamagawa

water is brought in abundance to Yedo through a Canal 44 Kis in length, but our investigations and studies on the matter have clearly demonstrated to us, that the canal does not fulfil the expectations of its promoters.

The following analysis will show to the most unbelieving the truth of our statement.

The Tamagawa Jôsui (Water-taken in the Tamagawa River)

The water was very clear and had no smell; no precipitate with baric chloride and with argentic nitrate; no changes with ammonic oxalate.

Solid contents in 10 litres.

	Grammes.
Sodic carbonate	0·10758
Potassic carbonate	0·00156
Calcic carbonate	0·23750
Ferreous carbonate	0·00493
Total	0·35157.

Tamagawa Jôsui (Water taken at a well near Horibashi-Tokio)

A sample of this water analized was turbid;

did not become clear after a few days standing but when boiled a grey sediment was quickly deposited, which consisted chiefly of aluminic silicate, ferric oxide and calcic carbonate.

The solid contents in 10 litres

	Grammes
Sodic chloride	0·07356
Potassic chloride	0·01144
Calcic carbonate	0·21700
Magnetic carbonate	0·00470
Silicic acid	0·09320
Ferri oxide	0·00360
Phosphoric acid	0·00520
Aluminic oxide	0·00750
Nitric acid	0·04600
Organic matter	0·00080
Total	0·46300

It will also mention the Kanda Jōsui, which is one of the great sources (2) that supply Tokio with water, as it is at "Inokashira" where it comes from. I shall only write down the analysis of this water as it is at its arrival in Yedo close to "Surugadai"

The following analysis proves that the "Kanda Jōsui" is even inferior to that of the "Tamagawa".

Kanda Josui

The solid contents in 10 litres

	Grammes
Calcic carbonate	0·01758.
Ferrous carbonate	0·00823
Calcic sulphate	0·17243.
Magnesic sulphate	0·06138
Calcic phosphate	0·04000
Sodic & potassic chloride	0·04386
Ammonic nitrate	0·07900
Silicic acid	0·10075
Aluminic oxide	0·00900.
Organic matter & loss	0·07373.
Total	0·60576.

By the perusal of the above, the reader will

have convinced himself that the water though good when taken in the bed of the "Tamagawa" or at "Inokashira" lake, becomes bad in its course through the canals which are left unprotected against dust, dead leaves, even branches of trees, etc etc. We will have understood also the detrimental effects of that water on the human constitution by its contents. The only way of suppressing this direful state of things would be to employ foreign process, such as filtering beds, reservoirs, etc, etc. This would at once remedy the fatal consequences inherent to the actual process of the distribution of the water.

At present the native pipes simply feed the wells of Yedo, and the Tamagawa water being thus mixed with the water of Tokio, which is naturally brackish owing to the level of the town and its topographical situation, is totally spoiled. An installation on a foreign principle would convey the water without any interruptions from the filters into each house, garden, etc. through the means

of water cocks etc. This process at first might cost more than the actual native works, but it would turn out to be much cheaper in the end than the Japanese Works, since it would not necessitate constant and expensive repairs, and the piping would last for hundreds of years, while the Government has to renew the native pipes every four or seven years, according to the nature of the soils through which they pass. I will minutely explain further on, all the principal advantages of this scheme.

The Water question must have often preoccupied the Economists of Japan, and doubtless up to now they have done their best to ameliorate the hygienic conditions of water, but owing perhaps to the absence of hydraulic implements they have not as yet been able to fully realize their humanitarian designs.

Struck by all these considerations and disposing at the present date of an American patented Water Pipes, presenting the most perfect

combination yet discovered of durability, strength, purity, and economy, we have the honor to propose it to the Government of Japan.

This pipe for most purposes, is equal, and for many purposes, it is superior to the best cast or wrought iron pipe.

In making this broad claim for the superiority of our pipe, we are well aware that we shall be considered unreasonable by all who have not examined it, and can only judge of wooden pipes by what they have previously seen in Japan or elsewhere. But if parties who are interested will give this pipe a critical examination we feel assured that such persons will be convinced that we do not make such claims without sufficient reason.

In the very outset we wish it distinctly understood that we guarantee all our work to be in every respect as we represent.

For the information of persons who have no opportunity of examining this pipe

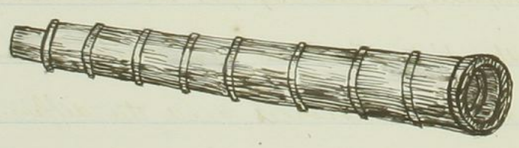
personally, we will give a description of its manufacture. In the first place the greatest care is bestowed upon the selection of timber, and only the red fir of Puget Sound being used. This timber was thoroughly tested by a Committee of Govert Officers appointed for the purpose of testing the Pacific Coast timbers at Mare Island, and was pronounced to be superior to oak. Only the bodies of the trees below the limbs are used and all sap wood is removed.

The logs are cut in lengths of 8 feet and are bored with a Patent augur which leaves a core. This core is bored for a smaller pipe and so on until the log is all used up. After being bored the log is placed in a lathe and turned on the outside slightly smaller at one end than the other, so that it may be more easily banded with iron, where the pipe is required to stand more pressure than the wood alone will bear, the number of bands being

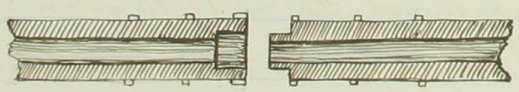
proportioned to the amount of pressure the pipe is required to stand, which is calculated from the height of the head of water from which the pipe is supplied. It is then placed in a steam chamber, where it is thoroughly seasoned and banded with iron if required. Lastly it is thoroughly coated with asphaltum, which renders it perfectly proof against decay from the outside, while the water acts as a preserver inside. It is also covered with sawdust so that it may be handled at all times.

The mode of connecting the pipe will be readily seen by examining the accompanying cut — A showing the outside appearance of a single log, and B showing the section of two logs slightly separated at the joints.

A



B



Dimensions of our pipe

Size of Bore.	Exterior diameter
— Inches —	— Inches —
2	6
3	7
4	8
6	11
8	14
10	16
14	20

Samples.

The samples here adjoined are 3 inch. size of bore and 7 in. exterior diameter. We are sorry that we do not have at present the other sizes in hand, as well as the samples of turns, elbows, crosses and everything necessary for the successful working of the pipe, but one can easily form an idea of all the accessories and the different dimensions. If they were required, they could be got over at once. This pipe was tested in San Francisco

Cal. August 23rd 1873, by Mr Charles Elliot, Engineer, and Mr George T. Herrick, Superintendant of the Spring Valley Water Co, and so well satisfied were these gentlemen with the results of their tests, that they at once agreed to permit their use in connection with the mains of the Spring Valley Water Company.

It is a well known fact that wood, if kept constantly submerged in water, will not decay, while iron in like condition will soon be destroyed by corrosion. The mineral properties of water (and all natural water contains more or less mineral) make but very little difference in its action on wood; while upon iron its action is vastly different; even with a slight change of its mineral properties. For instance, fresh or salt water will have about the same action on wood, while slightly saline water will destroy iron many times faster than water containing no salt.

We will here enumerate some of the

advantages which our pipe has over iron.

1st The ease and rapidity with which it may be laid, three men being able to lay 4,000 feet in a day, after the trench is dug, and the trench does not have to be so large as for the laying of cast or wrought iron pipe.

2d The joints being simply driven together to become perfectly tight, it requires no skilled labor to lay the pipe.

3d It can be tapped at any time, or place, by any laborer, and all the tools he requires is a common auger.

4th It is free from contraction and expansion. It gives cool water in summer and does not freeze in winter.

5th Wood being a non conductor, it need not be laid so deep in the ground.

6th It is free from condensations. It is used for gas piping in a good many of the States of America.

Having so far proved the superiority

of our wooden pipe over iron pipes, we do not think it necessary to make a comparison between the wooden pipe actually used in Yedo and our patented process.

History of our Patent Imperishable Pipe

We are relieved from the difficulty of introducing a new and untried article. Our water pipe has now been in actual use for Sixteen years, and has been laid in the majority of the states of the Union. Wherever it has been tried, so far as we know, it has given unqualified satisfaction. It was first used at Elmira N. Y. the residence of the inventor, where it was put down in 1860. At the present time, there are at that place about Eighteen miles of mains the largest of 12 inches bore. Some of this pipe which had been longest in the ground has been taken up, where gates have been required and examined with a view of ascertaining whether any decay had

taken place, and not the least can be detected. Hollydaysburgh, in Pennsylvania, in the midst of the iron manufactures, preferred to use the pipe we are now offering the Japanese Government, for her Water Works, and has laid down about eleven miles of mains of it exclusively. How it has succeeded there, the following testimonial addressed to the Pipe Co will show:

Elmira N. Y. July 5th 1869.

"Gentlemen.

"It is now nine years since our water "works were put down, and there is no question "whatever, but what the wood pipe is just as "sound as ever it was. Under the circumstances "we have no means of calculating how long "it will last, although I think it good for "'hundreds of years' service.

"The following named gentlemen will "cheerfully testify to the lengths of time the "pipes have been laid and their durability

" George M. Diven — Prop^r E.W.W.
" C. P. Brooks — Exc. County Judge
" Jarvis Langdon
" Edwin Eldridge
" L.A.+C. Gazard — Prop^rs Elmira Daily Gazette
" Fanman + Thurston — Prop^rs " " Advertiser
" A. S. Thurston — Exc. County Judge
" Thomas Spaulding — County Judge
" John Arnot — Banker
" H. C. Spaulding
" Wyles Aymar — Ex Supt E.W.W.
" Hon. Asher Tyler
" E. W. Rathbone — Supt Elmira Rolling Mills
" Hon. John Rathbun.
" Very truly yours
" James Pedrid

We could give other numerous testimonials were we not afraid of intruding on valuable time

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Advantages and legitimate inducements for the Government and the Japanese people.

Any Japanese having travelled in Europe or America, must have been struck by the great facility with which one obtains water in all the Establishments, public or private. One simply has to open a water cock and water flows in abundance. Kitchens, bed rooms and bath rooms are similarly supplied, and the gardens have equally water cocks in order to irigate during the dry season either the flowers or the vegetables. In the stables, in the Barracks, the same system supplies men and horses with all the required water for drinking and all other purposes.

The primary cost is we will admit, high at first, though it will cost cheaper than the actual Japanese W.W. but it is thoroughly compensated, by the various comforts, the great saving of time and labor

it creates. Every-body here knows the enormous and tedious labor occasioned by the water carriage. During winter, rain, snow, and ice, endanger the health of the strongest water carriers, and in the summer, as the water supply is irregular and many of the wells are dry, distance and heat extenuate the strongest.

The introduction of our system will remove all these evils. We would therefore beg to propose its Establishment in Tokio, Osacca, and any other large or small town that the Government may designate. We have heard it said that ufs to now, Osacca had been insufficiently supplied with good water. We trust that the Government which daily gives proofs of its kindness for the people will avail itself of the following numerous advantages we have the honor to present.

1° Economy — Every Tokio inhabitant

knows the numerous and expensive repairs constantly needed by the actual water works. This will cease with our system and should any repairs be required, which is unlikely to happen, they will be insignificant. A letter addressed by Mr John Brawley, Dupt of Hollydaysburgh (Pa) Water Works tells us:

"That for two and a half years the "repairs to pipes on the entire line of eleven "miles (4 ris, 17 chos, 20 ken) reached only the "sum of one hundred and sixty two Dollars "and fifty one cents ($162.51).

2° Durability — By looking at James Petrie's testimonial, one can see that our pipe well deserves its name of Imperishable.

3° Priceless advantages for all manufacturing establishments and for every industrial undertaking in general.

4° Dis-appearance of the nauseous smells coming from the sewers. They can be

easily cleansed by a powerful rush of water being sent through them.

5°. Great help for extinguishing fires. Owing to the height of the head of water which is about 110 ft., the natural pressure of the water in the pipes with the existance of watering valves at short intervals, water can be obtained at once to master the fire until the firemen and their engines have arrived.

6°. Our pipe is 50% cheaper than iron pipe and unlike iron pipe it cannot be influenced by the incrustations which are formed on the inside of iron pipes by the carbonates, etc, which are so plentiful in the Tokei water. The adoption of our pipe would remove this great difficulty, which has been so annoying in Boston where iron pipe became clogged in 7 years.

Large Income for the Japanese Govt.

We are not aware if the Government or the Municipality or even a private company own the present Water Works of Tokio and if such owner derives any monetary profit from the undertaking. But our opinion is that the Govt. or the municipality should monopolize such an important enterprise on account of the many profits it can give and which can be applied as in Europe to the improvement of the town, etc, We have heard it stated that the inhabitants of Konjo and Fukagawa had made several applications to the Govt. in order to get water in their districts and such an application is quite reasonable since these citizens have always been deprived of drinkable water.

We have also heard that <u>each inhabitant</u> pays for his water <u>one cent per day</u>. As there are (census Dec 1875) 152.329 inhabitants in Konjo and Fukagawa, they pay a daily amount of $1523.29 and a yearly aggre-

-gate amount of $ 556.000.85

Supposing that in adopting our system the work were to cost $ 600.000 (approximative amount we would contract for), for 12 Kis of pipping, and the requisite filters, which would be quite sufficient to supply 250 litres of good water a day to each inhabitant of the 36850 dwellings of these districts, the same works and expenses of keeping them in order, would be amply paid in 18 months by the actual price of water

Potrio being about 6 times larger the erection of its water works would be proportionate, say for 72 Kis $ 3.600.000 This would be repaid in a very short lapse of time

A total installation of water works for the whole town, costing, with necessary reservoirs and filters, for 84 Kis of pipping $ 4.200.000 - would make the compara-

-tively small amount of $ 4.20 per inhabitant, whilst in Europe and America the average amount per man is about 9 Dollars and seventy cents.

Of course the Govt. administrators may contend that such an amount would be a very heavy tax on a population of One Million inhabitants, but the Govt. could make arrangements in order to only repay the contractor in Five Years-thus reducing the amount of annual water tax to $ 840.000 - which with interest, would make only the very small amount of 8 cents ½ per month, or $ 1. - a year per man.

The works being completely paid for at the end of Five Years, the Govt would be in possession of same works, and supposing that it lowers the water tax to 5 cents per mensem and inhabitant, or $ 0.60 a year per inhabitant, the income for the Government

will be $ 600.000 per annum, which at the rate of 10% a year, represents a capital of Six Millions of Dollars.

And this can be carried out without drawing one cent from the Government Treasury.

The above being only a suggestion which we beg to make, we will be happy to entertain any proposal made.

Tokio. 4th March 1876.