ECONOMICS OF WATER WASTE IN CITIES.

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A PERUSAL of the technical press and of the papers and discussion at the various conventions of engineers will indicate that the subject of water consumption and waste is one of considerable importance.

That water is being wasted in cities is recognized by engineers, and that it cannot be completely eliminated is admitted by all. But the quantity which is used or wasted in *excess* of allowable or unpreventable waste plus that actually consumed for all legitimate purposes, represents a tangible and potential source of wealth. The means by which such wealth can be conserved is dependent on the method adopted and the manner in which it is organized.

The influences which affect the consumption of water are the nature of the industries, the wealth and habits of the people, the extent to which water is used for fountains or other ornamental objects, watering of lawns, street sprinkling and other public purposes. Climate has also a very considerable influence especially as to the amount used for sprinkling purposes, and that which is wasted in winter to prevent freezing. It is probable, however, that the most important factors in determining the consumption of water is the degree of care taken to detect leakage and other waste, and the fact as to whether the water is sold by measure or otherwise. (I)

It will be assumed that the actual consumption of water on the North American continent is on a more generous scale, and that the climate, as a rule, is less humid and consequently the gardens and streets receive more watering than in Europe. This, however, cannot account for the great difference in the average consumption per capita.

Whilst it is not always a sure method of comparison to consider the consumption in any one city with that of another, owing to the different conditions which obtain, yet when several cities are compared, the above statement loses some of its force.

The following is a list of a few Canadian and American cities selected at random from references in various papers and reports:

U.S. gals.							
C' .	per		Source of				
City.	capita.	Population	. information.				
St. John, N.B	250	42,500	Commission of				
Variation D.C.			Conservation				
vancouver, B.C	164	120,000	Commission of				
Halifor N.C.			Conservation				
mamax, N.S	260	46,600	Commission of				
Quebec Que			Conservation				
guebec, gue	101	78,200	Commission of				
Hamilton Ont	0	-	Conservation				
	148	81,000	Commission of				
Ottawa Ont	1 Standard	-	Conservation				
Toronto Ont	220	87,000	Special Report				
1010mto, Ont	120	450,000	Commission of				
Montreal Que			Conservation				
	130	555,000	Hering&Fuller				
New York City N V		. 0	Report, 1910				
TOTA City, N.Y.	111	4,800,000	(2)				

(1) Public Water Supplies, Turneaure and Russell, 1903,
page 16.
(2) De Varona's paper. American Waterworks Accordition

U.S. gals.						
	per		Source of			
City.	capita.	Population	. information.			
Buffalo, N.Y.	321	425,000	(2)			
Chicago, Ill.	235	2,200,000	(2)			
Philadelphia, Pa	203	1,600,000	(2)			
Milwaukee, Wis	115	410,000	1913 Report			
Kansas City, Mo	126	300,000	1913 Report			
Cincinnati, O	131	392,000	1913 Sewerage			
D .			Report			
Pittsburgh, Pa	197	550,000	(2)			
St. Louis, Mo	109	687,000	(2)			
Cleveland, O	102	560,000	Toronto 1912			
the second states and the second states of the			Report			
Detroit, Mich	173	466,000	(2)			
Baltimore, Md	115	560,000	(2)			
St. Paul, Minn	61	210,000				
New Orleans, La	53	370,000	1913 Report			
Boston, Mass	108	733,000	1913 Report			
Albany, N.Y.	242	101,000	Engr. Record,			
			Aug. 3, 1912			
Salt Lake City, Utah	400		Engr. Record,			
			July 25, 1913			
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	per		Source of
City.	capita.	Population	. information.
Vienna, Austria	15	1,800,000.	(3)
Aachen, Germany	25		(4)
Frankfort - on - Maine,			
Germany	46	400,000	(5)
Wiesbaden, Germany.	28	100,000	(3)
Hamburg, Germany	44	757,000	(3)
Munich, Germany	45	524,000	(3)
Berlin, Germany	22	2,100,000	(3)
Basel, Switzerland	42		(4)
Copenhagen, Denmark	27		(4)
London, England	43	6,721,207	1913-14 Report
Liverpool, England	36	960,000	(6)
Newcastle - on - Tyne,			(-)
England	36	590,000	(6)
Hull, England	49	250,000	(6)
Manchester, England.	42	I,200,000	(6)
Devonport, England	51	75,000	(6)
Glasgow, Scotland	72	1,150,000	(6)
Nuneaton, England	21	37,000	(7)
Stirling, Scotland	64	28,000	(7)
Plymouth, England	47	152,500	(8)
Sydney, Australia	48	668.000	(0)
Riga, Russia	25		(4)
Weardale and Consett,	0		(+)
England	22	400,000	Letter

Chicago has about the same population as Vienna but the quantity of water consumed is over 15 times as great; Ottawa is about the same size city as Devonport but uses about $4\frac{1}{2}$ times as much water; Montreal and Newcastle-on-Tyne are nearly similar in size but Montreal uses $3\frac{1}{2}$ times the volume of water used in Newcastle; Milwaukee and Frankfort-on-the-Maine have approxi-

(3) Lehmann's Hygiene, 1909.

- (4) Hütte Engineers' Pocket Book, 1911.
- (5) Stadtische Tiefbauwessen, Frankfort, 1903.

(6) American Waterworks Association, proceedings, 1912.
(7) Proceedings, Institution of Municipal and County
Engineers, Vol. XXXVIII.

(8) Proceedings, Institution of Municipal and County Engineers, Vol. (XXXVII.)

(9) Proceedings, American Waterworks Association, 1911.

⁽²⁾ De Varona's paper, American Waterworks Association, 1913.