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Have it at lunch and at dinner in the
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Pure, Nutritious, Non-Intoxicating.

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The World's Best Beverage

The soft drink with the delicious
taste of hops. At grocers', at
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LEMP Manufacturers ST. LOUIS

G. E. BARBOUR CO., LTD.,

St. John, New Brunswick.

Sole Distributors for New Brunswick.

RENFORTH SUMMER COTTAGE BURNED

Fire Wednesday Night De-
stroyed C. A. Clark's Home
—Only Partly Insured.

A summer cottage at Renforth,
owned by C. A. Clark and occupied
by Frank E. Shea, of the Brayley Drug
Company staff, was destroyed by fire
yesterday morning, with all its con-
tents. Fortunately Mr. Shea and his
family did not spend the night at the
cottage or they might have been burn-
ed with the building. The fire was
noticed by neighbors about 2 o'clock
in the morning, but had gained such

headway before it was seen that no-
thing could be saved.

Mr. Shea said there had not been
any fire in the house since 6 o'clock
Wednesday evening, and the only way
he could account for the fire was that
it was caused from a spark from a
passing locomotive. He and his fam-
ily spent Wednesday evening at the
cottage but came to the city on the
late train. Mr. Clark values the
building at \$800, and he had \$450 in-
surance. Mr. Shea had \$200 on his
furniture, but this will not nearly cov-
er the loss.

SOUTH END LEAGUE.

Diggs pitched the Franklins to vic-
tory on the South End grounds last
evening, when they defeated the Buf-
faloes by a score of 2 to 1. King pitch-
ed for the losers.

DUPLOUX ENGINEER TELLS OF DEVELOPMENT OF OUR HARBOR

Paper Read By Alexander Grey Before Session of
Canadian Engineering Institute in Halifax—
The Work At Courtenay Bay — Engineering
Difficulties.

The following interesting paper de-
scriptive of St. John harbor was read
by Alexander Grey, Chief Resident En-
gineer of the Public Works Depart-
ment, at yesterday's session of the En-
gineering Institute of Canada, now
meeting in Halifax.

St. John Harbor is situated at the
estuary of the River St. John, which
is about 400 miles long, with a drain-
age area of 26,000 square miles, and
an average of about 20,000 c. f. s.

Numerous articles have been pub-
lished on the tidal phenomena in the Bay
of Fundy, and St. John River, but it
is unnecessary to deal with these in
this paper, further than in far as
they affect the engineering features of
harbor development.

The river discharges into the head of
the harbor through a rock gorge about
1300 feet long and 400 feet wide. The
small cross sectional area of the chan-
nel does not admit the flood as fast
as it rises, or discharge the ebb as
fast as it falls into the bay. The
minimum summer level of the water
surface of the river is 15.0 feet above
low water datum of harbor, and the
tidal range in the river is 13 to 20
feet. The variation of the level,
therefore, at high water is from 2 to
14 feet higher than the river, thus
forming at every tide the Reversing
Falls. The extreme high water of the
river during spring freshet rises from
10 to 15 feet above the minimum. Navi-
gation between the harbor and the
river is only possible for a period of
from one-half to one hour, occurring
before and after high water—the time
generally being about two and a half
hours ebb and three and a half hours
flood. At Indian town, about one mile
above the Falls, high water occurs
about one hour six minutes, and low
water occurs two hours twenty min-
utes later than high and low water in
the harbor. The average tidal rise at
Indian town about one-half mile above
the Falls is about 1.3 feet.

The gorge at the head of the harbor
with its submerged reef, forms a slack
water reach, which is navigable for
small craft from St. John to Frederic-
ton, about 84 miles and for a total of
about 80 miles on several tributaries
of the river. This slack water reach
acts as a settling basin, in which the
heavier silt is precipitated.

The exposure of the harbor is from
the southeast to the northwest, the
prevailing winds are from the north-
west, from which quarter the severe
storms generally originate and after-
wards change to the south, causing
considerable inconvenience in the har-
bor. The height of the maximum
waves during these storms is about
10 feet.

The Negro Point Breakwater, 2250
feet long, is of the rubble mound type,
with stones placed at random on the
outer slope, weighing to 8 tons, with
concrete superstructure for about 346
feet. It was originally designed with a
crib-work core, commenced in the
spring of 1875 and completed in Sep-
tember, 1877. A heavy storm, how-
ever, on the 11th and 12th of Febru-
ary, 1879, carried away 1300 feet of the
crib-work, from 10 to 15 feet below
high water. From that date to about
1887, work was continued by placing
stone to bring the seaward side to a
uniform slope of 3 to 1. There is
now a concrete superstructure 15
feet wide for a length of 346 feet. The
seaward slope at concrete superstruc-
ture is 2 to 1. The portion of break-
water, without concrete superstructure
has been raked down by storms to a
slope of about 1 to 1, and the crest
has been moved towards the harbor
about 35 feet of centre line. Around
the lighthouse are placed concrete
blocks, weighing 50 to 80 tons each;
they are founded a little above low
water level. Mr. Shewen, who design-
ed these blocks and the method of con-
struction, arranged the work so that
the pouring of concrete was begun as
soon as the foundation was dry, and
proceeded with at such speed as to
keep the top of block above the rising
tide—the covering of the piling be-
ing pressed down by the tide, and
jute, stuffed with oakum, before the
tide rose to the top of the block. At-
ter extreme storms, marks on the
stones, the disappearance of several
from the surface, and the displace-
ment of the larger stones indicate the
considerable forces exerted. The con-
crete work in the breakwater is in
first class condition and offers en-
couragement for concrete in salt water,
providing sufficient care is exercised
in mixing and placing.

Observations with a marine dynam-
ometer give the force of waves at break-
water, a pressure of upwards of 4000
lbs. per square foot. Part of the
concrete work and the dynamometer
observations were carried out under
the direction of Major H. T. P. Shewen,
M. E. I. C., who was for a number of
years District Engineer for the Depart-
ment of Public Works.

Through the opening of about 1500
feet between the end of the breakwater
and Partridge Island, heavy southerly
waves break and expand, following the
ragged face inside the shore, and con-
tinues to roll towards the harbor, caus-
ing such extensive erosion of the coast
line that protective measures had to be
taken in building a revetment wall
along the foot of Fort Dufferin.

The principal development in the
harbor to date has been on the West
Side, on which there are at present ten
berths, with 32 foot draft, and room
for fifteen additional berths as soon
as Negro Point Breakwater is extended
to Partridge Island, and railway fa-
cilities re-arranged. On account of the
limited frontage, and the railway ter-
minal situation, however, the harbor is
being developed from both sides.

The entrance channel is 13,000
feet in length, and 600 feet in width, and
33 feet clear depth at low water is
maintained by annual dredging—the
annual situation varies, but generally
amounts to about 100,000 cubic yards.
When the Negro Point Breakwater is
extended to Partridge Island (about

1500 feet) the littoral drift from the
southwest will be arrested, and the
flow more concentrated in the channel
will increase the scour and assist in
maintaining the channel depth.

The materials dredged in the har-
bor are principally clay, sand, gravel
and silt. There is considerable quan-
tity of submarine rock to be removed
in order to straighten the channel, but
on account of the extreme cost of same,
this work is being delayed.

During the year there are general-
ly only two to eight tides below zero,
forty 0.5 tides, and sixty tides 1.5 feet
above zero, the remainder of the tides
range from 2.5 to 5.7 feet above zero.
Boats generally prefer to berth at slack
water—it is, therefore, evident that the
channel is navigable for the largest
steamers.

The wharves are built to provide 32
feet at low water. The harbor fortu-
nately is free from the teredo, Hima-
nora and other sea worms. The type
of construction up to the present has
been timber crib-work and concrete
with crib-work substructure. On ac-
count of the scarcity and high cost of
timber and the necessary extreme
height of the wharves, about 65 feet,
other types of structures are being in-
vestigated.

The outstanding features in St. John
Harbor are the extreme range of tide
and the consequent currents.

The inward mean tidal flow is about
20,000 c. f. s. and the outward is about
40,000 c. f. s. (The maximum surface
current velocity at the minimum sec-
tion in the harbor is about four miles
per hour.)

Unfortunately, no systematic meter-
ings have been made of the
river, and consequently the river flow
is only an estimate. A series of float
observations have been taken at var-
ious stages of the tide, and at various
depths below surface. These show
very erratic current conditions. The
fresh water from the river flows out
underneath the tide rises and falls
regularly.

The principal wharves are of crib-
work with concrete superstructure. The
cribs being placed on a prepared dredg-
ing, the average depth of the water
of 5 feet with broken rock. Behind
the cribs, selected dredged material is
filled in, on which the necessary rail-
way sidings and sheds are built. The
sheds are one storey, of timber con-
struction. At a number of the wharves
grain conveyors are built from which
boats can be loaded with grain at any
stages of the tide. In addition to ver-
tical fenders of 12" x 12" hard pine,
floating fenders about 36" diameter
and 33 feet long are placed about 80
feet centres. It may be noted that in
berths 15 and 16, which are more ex-
posed to wave action, the life of these
floating fenders does not exceed two
years.

The Courtenay Bay development, on
the east side of the harbor, comprises
the building of a dry dock 1150 feet
long, 125 feet wide, with 40 feet
of water on sill at high water, ordin-
ary spring tides, and elevation of 14
feet below low water, spring tides;
the building of a breakwater 7070 feet
long, of which 4570 feet have been com-
pleted, the dredging of a basin 32
feet below zero, and channel 22 feet
below zero, (zero being extreme mean
low water.) The details and layout of
the wharves have not yet been de-
cided. The breakwater is of the rub-
ble mound type, top width 20 feet, se-
award slope varying from two to one
to three to one, according to location.

The breakwater does not have the
exposure of Negro Point Breakwater,
and it is therefore not expected that
the slopes will suffer the raking down
experienced at the latter place.
There are no stones at the outer
end, weighing upwards of 10 tons,
lifted from their beds and moved about
fifty feet, during a storm in October
last. The rock for the breakwater is
obtained from the dry dock site, loaded
by steam shovels and hauled by loco-
motive on standard track on trestle,
and dumped in the work. At the out-
er end of the breakwater, where the
embankment is wide on account of
slope and depth, two trestles will be
used to ensure the larger stones be-
ing placed outside.

On account of geographic
situation and consequent low railway
haul, to date is principally a winter-
port. The traffic in 1905 amounts to
three and a half million dollars im-
ports, and three million dollars ex-
ports, whereas during the year 1917
the traffic amounted to sixteen and
three-quarter millions imports, and
two hundred million dollars exports.

Mr. George Gupit of Castalia, Char-
lotte County, is in the city today on
his way home, after spending the sum-
mer on the Magdalen Islands.

NUXATED IRON



Dr. Franklin King, New York Physician
and Medical Author, says: "Nuxated Iron—
the most powerful and reliable of all iron prepa-
rations—has been used for many years in the
treatment of all cases of iron deficiency—
anemia—the greatest cause of the health,
strength, vitality and beauty of the human
race. It is the only iron preparation which
does not irritate the stomach, and which
does not cause constipation. It is the only
iron preparation which is easily absorbed,
and which is the only iron preparation which
will increase the strength and endurance of
weak, nervous, run-down people, and will
improve the complexion of all pale women."
Nuxated Iron—Keeps in all good drug stores.

ST. JOHN SOLDIERS KILLED IN ACTION

Lieut. Smith, Sergt. Bastain
and Pte. Ashley Die For
Country — Other Men
Wounded.

Lieut. Charles Smith.

Mr. and Mrs. Harry Smith, of St.
Patrick street, yesterday received the
sad news that their son, Lieut. Chas.
Smith, had been killed in action on
September 2nd. Lieut. Smith enlisted
in No. 5 Army Service Corps un-
der Lieut.-Col. Masie, as a private,
and did good work with that unit until
about a year ago, when he was re-
commended for a commission and
placed with an infantry unit. He was
twenty-three years of age. Beside
his parents one brother, Frederick,
with a siege battery unit and one sis-
ter, survive.

Sergt. J. F. Bastain.

Mrs. John Bastain, Rogersville, has
been notified that her son, Sergt. John
F. Bastain, was killed in action Aug.
28th.

Besides his parents, he leaves to
mourn four brothers, of St. John,
Charles now in hospital in Eng-
land; William and Ernest at home,
and four sisters—Mrs. John Wells and
Mrs. Harry Scott, St. John West; Mrs.
R. Wood, Acadville, N.B., and Mrs.
R. Wood, Campbellton.

Pte. D. Astley.

Mrs. Martin Doyle, 54 Brook street,
has received word that her brother,
Pte. Daniel Astley, had died of wounds
on August 14. This is the second
brother of Mrs. Doyle's to lay down
his life in the war. Pte. Albert Astley,
having been killed at Vimy Ridge.

Pte. John Spellman.

The Pte. John Spellman, had been
admitted to hospital on September 5,
suffering from gunshot wound in the
left hand, was the word received by
Mrs. Walter Whipple, 47 Clarence St.
Pte. Spellman was a member of the
first contingent.

Pte. T. J. L. McLaughlin.

John McLaughlin, Millidge Avenue,
yesterday received word that his son,
Pte. Thomas J. L. McLaughlin, was
admitted to hospital on Sept. 6th, suf-
fering from gunshot wound in the left
thigh. Pte. McLaughlin enlisted with
an Ottawa unit.

FUNERALS.

The funeral of Timothy Collins,
North Market street merchant, took
place from his late residence, 20 Rich-
mond street, yesterday morning, at
10 o'clock. The remains were taken
to the Cathedral of the Immaculate
Conception, where a Solemn High
Mass of Requiem, preceded by the re-
citation of the office, was sung. Rev.
R. B. Fraser was the celebrant; Rev.
F. F. Walker, deacon; Rev. W. L.
Moore, sub-deacon, and Rev. Wm. M.
Duke, master of ceremonies. His
Lordship Bishop LeBlanc, who pre-
sided, gave the Final Absolution. The
pall-bearers were George Blake, Jas.
B. Daly, John Crowley, D. W. Harper,
Hon. R. J. Ritchie, Edward Haney,
Michael Ryan and T. M. Burns. The
members of St. John Council, Knights
of Columbus, No. 937, attended in a
body.

Kink in the Back

You bend over and can
scarcely get straightened up
again. This comes on you
so suddenly you can't un-
derstand it.

This is lumbago. Like
backache and rheumatism,
it is the result of poisons in
the blood. The kidneys are
deranged, but the use of Dr.
Chase's Kidney-Liver Pills
will soon set them right.
The pains and aches will
disappear with the poisons
when the kidneys do their
work properly.



Painless Extraction

Only 25c.

Boston Dental Parlors.

Head Office 527 Main Street
Branch Office 35 Charlotte St.
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DR. J. D. MAHER, Proprietor.
Open 9 a. m. Until 9 p. m.

NOTICE

On February 1st we change our
method of business and will sell
for CASH. All telephone orders
must be C. O. D.

Smith's Fish Market

25 Sydney St. Phone 1704

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ADVANCE SHOWING
OF EARLY
FALL FOOTWEAR

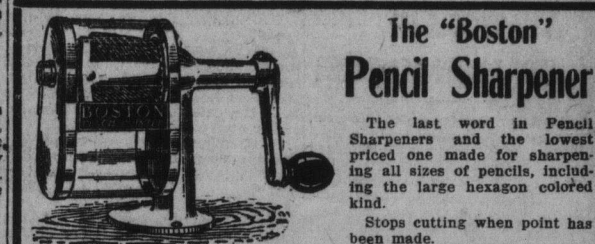
We are just receiving our
first shipments of Fall goods
from the manufacturers and
we are more than pleased
with them, having the latest tinge of Fashion and the
quality is of the best, being such popular and reliable
brands as "Dorothy Dodd," "J. & T. Bell" and "Win-
nie Walker" and our own "W. & R. Special."

We already have a choice selection of Colored
Boots for Ladies with High and Low Heels and would
advise your Early Inspection and Purchase of these, as
later in the season there will be a scarcity of them; so
of the shades we will be unable to re-order on.

"The Home of Good Shoes."

Waterbury & Rising, Limited

61 King St. 212 Union C. 677 Main St.



BARNES & CO., Ltd., 84 Prince Wm. St.

Siberian Expeditionary Force

VOLUNTEERS WANTED

FOR

ONE ENGINEER FIELD COMPANY

AND

ONE DIVISIONAL SIGNAL COMPANY

Any man in Category A2 can join.

Apply to LIEUT. C. H. CURRY, C. E.,
103 Prince Wm. Street, St. John.

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If not, you are neglecting a sacred duty.
In all fairness to your family and friends you should make im-
mediate provision for the proper management of your Estate.
We have often seen distressing results from the neglect to make a
WILL.

We are always pleased to give advice to those who contemplate
making their Wills, and to quote our fees for acting as Executor or
Trustee.

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