

"Kindle the Christmas brand and then
Till sunne-set let it burne;
Which quencht, then lay it up agen,
Till Christmas next returne."

THE GREAT ARTIFICIAL WATERWAYS OF THE WORLD

IF THE recommendation of the Isthmian commission is to be adopted, sooner or later it would seem that the backbone of the American continent is to be divided and the long promised canal connecting the waters of the Atlantic and Pacific become an accomplished fact. Viewed in the light not only of recent but ancient history, whatever may be the outcome of the latest investigation, there is no doubt that the American interoceanic canal by some route is an eventuality of the future comparatively near, taking into account the gigantic nature of the task and the necessity for careful preparation.

Although it was well within the present century that the United States government had its attention directed to the feasibility of a transisthmian canal and only in 1855 that the famous scientist Von Humboldt declared it practicable, yet nearly 40 years have passed since the search for a waterway connecting the two oceans was first begun. Christopher Columbus was looking for it in 1502, and it was the impelling motive of Vasco Nunez de Balboa, when, Sept. 26, 1513, "silent upon a peak in Darien," he, first of all Europeans, looked upon the waters of the Pacific.

The centennial of canalization in the United States was celebrated in 1892, for it was in 1792 that two short canals were opened on the Connecticut river in Massachusetts. But George Washington has been called the "father of the canal system" in our country, owing to his early and persistent advocacy of an artificial waterway to connect the Potomac and the great lakes, which directly resulted in the Chesapeake and Ohio canal and indirectly, it is claimed, in the Erie. President Madison urged the uniting of the great lakes with the Mississippi river by a ship canal suitable for light draft war vessels, which

was ultimately carried out in the great Chicago drainage canal in more recent times.

While we have, it is estimated, more than 5,000 miles of canals within the limits of the United States, none is large enough to float modern warships of deep draft or vessels intended for transoceanic commerce.

There are more than a dozen canals of over 100 miles each in length which are entitled to the designation "great." Heading the list is the famous Erie, 350 miles, connecting Buffalo and the Hudson river. All these, however, are of comparatively shallow depth, and few are capable of being enlarged to meet the demands of the times as ship canals.

The short but important Sault Ste. Marie, connecting Lakes Superior and Huron, has been enlarged and deepened since its original construction in 1855, and the Canadian canal, the Welland, between Lakes Erie and Ontario, has also been made deep enough for gunboats and most war vessels. In the proposed ship canal connecting the St. Lawrence and Lake Huron by way of the Ottawa and French rivers, the Canadian government will possess a work of inestimable value which may change the balance of trade considerably in its favor.

The really great undertaking for this government to prosecute, many noted engineers have averred, is a ship canal to parallel our Atlantic coast from Boston or the north shore of Cape Cod to New Orleans or Galveston, cutting across the Massachusetts peninsula, passing through Long Island sound, behind the New Jersey coast, Cape Hatteras, etc., through the marsh regions of Georgia and across the peninsula of Florida to the gulf of Mexico. Such a canal, they say, could be provided at comparatively small expense and without a lock the entire distance. At least

one plucky American demonstrated the feasibility of passing from the St. Lawrence to the gulf of Mexico nearly all the way by natural water courses and inlets, when Mr. Nathaniel H. Bishop made his wonderful voyage of nearly 5,000 miles in a paper canoe.

In the old world, attempts at canalization were made many centuries prior to the discovery of the new world, unless we take into consideration the weak efforts of the peoples anciently dwelling here and who are now extinct. Artificial waterways, in fact, are of almost, if not quite, equally ancient origin with roadways on land, having probably been originally constructed for irrigation and secondarily for transportation purposes. The first ship canal or waterway of magnitude was probably Assyrian, but the Egyptians and the Chinese possessed some canals of note, for pretty reliable evidence has been adduced to show that Egypt once united the waters of the Red sea and the Mediterranean by digging across the Isthmus of Suez, while China today possesses its Grand canal, over 1,000 miles long, which is said to have taken 120 years to build.

Passing to other worlds, do not the astronomers tell us that there are canals in the planet Mars, by means of which it is hoped to secure ultimate communication with the remote Martians, using them as the basis of signaling through etheral space?

The largest ship canal in Europe until quite recently was that which placed Amsterdam, Holland, in connection with the North sea. This has a length of 51 miles, a surface width of 124 feet and a depth of 18 feet, permitting the passage of 1,400 ton ships. In Great Britain there are more than 2,000 miles of canals, but until the great waterway was opened to Manchester a few years ago, the largest work of the kind there was the Caledonian canal, which had a

A Jolly Christmas Morning Group.



Photo by Melton, Chicago.

route, of the Nicaragua may be safely asserted that it is comparatively healthful. The chief objections to it are its length and the elevation of the country through which the canal must pass. As against only 35 miles and the possibility of a sea level canal at Panama, there are the distance of 195 miles and an altitude of 110 feet, necessitating numerous locks, in Nicaragua. There are no physical obstacles that cannot be overcome, as all the various commissions have reported, but enormous expenditures will be required, estimates varying all the way from \$120,000,000 to \$200,000,000, which latter is that of the last and most exhaustive survey ever carried out. This estimate, however, was based upon a canal to be 35 feet deep, in anticipation of future exigencies; but if the depth were to be reduced to 30 feet a saving of perhaps \$20,000,000 could be effected. The necessary locks and an immense dam for impounding the waters of the San Juan river make this route the most expensive, probably that could be selected; but, on the other hand, its hydrographic and topographic, as well as climatic advantages, are indisputable, with a large and deep lake (Nicaragua) at an elevation of over 100 feet above sea level and a perpetual supply of water easily controlled.

Taken all in all and after reviewing the evidence pro and con, it appears that the ship canal to connect the two great oceans of the future will probably pass over the Nicaragua route.

The following table of comparative distances shows the number of miles in water travel saved by the use of canal routes built and projected:

Distance saved between—	Miles.
London and Bombay.....	4,853
New York and San Francisco.....	2,029
New York and Hongkong.....	8,240
New Orleans and Hongkong.....	9,900
New Orleans and San Francisco.....	11,500
New York and San Francisco.....	10,043
New York and Yokohama.....	7,090
New York and Melbourne.....	8,500
Liverpool and San Francisco.....	7,050
Liverpool and Hongkong.....	11,100
Liverpool and Yokohama.....	4,500
Liverpool and Hawaii.....	5,000
New York to.....	2,000
San Francisco to.....	2,700
Honolulu to.....	1,300
Manila to.....	5,000

TRUMAN L. ELTON.

ROMAN LONDON.

The London of the Romans lies buried about 15 feet below the level of Chesham, and still deeper than that is buried the earlier London of the Britons. In nearly all parts of the city there have been discovered tessellated pavements, Roman baths, tombs, lamps, coins, sandals, keys, weapons, coins and statues of the ancient Roman gods.

THE POOR MAN'S CHRIST

A Christmas Poem by Neil Macdonald

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When princely gifts upon His cot were laid
By star-lit sages from a distant clime,
And choir angelic airs seraphic played,
No signs forecast the ills of coming time.

There was no presage of that fateful year,
The crucifixion, or the stranger's tomb,
Of the dismay that filled all hearts with fear
When the earth shook, mid universal gloom.

The veil that hides the future from our ken
Obscures in love, for who would dare pursue
The toilsome journey that's outlined for men,
If all the future ills of life they knew?

But He, the sinless one, foresaw them all—
The fiery ordeal which before Him lay,
And, though He shrank from ills that would befall,
He went where love and duty led the way.

He taught us love should dominate the mind,
Love that forgives, would fain forget a wrong,
And that the kind and tender ever find
Joys which to selfish persons ne'er belong.

If wealth were requisite for highest need,
Or ease untroubled led us near to God,
Christ would have traced some other path to lead
Our halting footsteps than the road He trod.

The rank and pride and grandeur of the great,
The Mammon power to which the servile kneel,
Were naught to Him who chose a low estate
And on man's toil put His approving seal.

The poor man's Christ, for poverty He knew
In birth, in life, in death, rebuked the pride
That measures men by standard of the few,
Not by the worth which will God's test abide.

total length of 60 miles and a depth of 26 feet.

The Manchester canal stands unique in the history of artificial waterways, since it was dug to connect with the sea a city without a harbor. It is 30 miles long, has an unobstructed channel 26 feet deep and cost more than \$15,000,000. As the estimate having been \$45,000,000, an example of enterprise on the part of merchants and manufacturers, this attempt to convert an inland city into a maritime metropolis to bring the ships to the factories rather than remove the latter to the coast is almost unprecedented.

In France the Canal du Midi, constructed more than 200 years ago, is 150 miles long and 6 feet wide, but not over seven feet deep. A ship canal is, however, projected to unite the waters of the Loire and the Rhone, thus connecting the Atlantic and the Mediterranean. It will shorten the distance, say, between London and India, by at least 1,000 miles, but it will also take away British prestige by leaving Gibraltar high and dry and no longer the key to the Mediterranean.

What is likely to be the longest canal in the world is that projected across Russia from the Baltic to the Black sea, a distance of 700 miles as the crow flies and about 1,000 as canal and rivers must run. By means of this canal Russia would be made independent of Turkey and all other powers in fact, for it is intended to cut it to a depth sufficient to permit the passage of the largest battleships. It is to be 300 feet wide at surface, 115 at bottom and 27 feet in depth. Its cost is estimated at from \$85,000,000 to \$100,000,000, but will probably exceed even the larger figures. The German government, as is well known, has been indefatigable in canal digging, its latest great work being the famous Kiel-North sea canal, which is 64 miles in length and about 30 feet deep and cost nearly \$10,000,000. It was opened in 1895 with brilliant ceremonies, the emperor himself presiding, when a procession of merchant steamers and warships sailed through, taking five hours to pass a given point.

It is believed that all the greater works of this character have been cited, except, of course, that most famous of all, the Suez canal, the history of which is well known. A ship canal may have anciently connected the waters of the Mediterranean and the Red sea; but if so it had been filled up and abandoned for nearly 1,100 years when De Lesseps took hold of the more modern enterprise. The first of modern surveys of this route for a canal were made under orders of Napoleon I during his invasion of Egypt, but the reports of his engineers in making the level of the

Red sea 30 feet higher than that of the Mediterranean were found to be erroneous by a combined survey of French, English and Austrian engineers in 1817, when the true level was ascertained. M. De Lesseps secured a concession for the canal in 1854, and a company was organized in 1858, with exclusive guarantees for 99 years. His original estimate was \$40,000,000 for the total work, but when it was completed, in 1869, its real cost amounted to \$99,000,000. Yet even on this vast sum it is said to have paid a good profit, though the original stockholders may not have shared in it. In its length of about 100 miles about 75 miles were land excavation and 25 miles traversed the lakes. Its width at surface averages 325 feet, at bottom 72, while the depth is 26 feet.

Recurring now to the ship canal that comes nearest home—to the prospective cut across some portion of Central America—it may be noted that four routes have been in view for many years. These were, first, across the Isthmus of Tehuantepec, in Mexico; second, along the northern frontier of Nicaragua; third, across the Isthmus of Panama; and, fourth, across Darien. The first has been pronounced impracticable owing to diplomatic as well as physical obstacles in the way, though it is in some respects admirable. It is 130 miles from east to west side, with an ascent to 630 feet, and the river Coatzacoalcas extends three-fourths the way across.

Surveys have been carried on in a desultory manner by the United States government during the past 40 or 50 years, and the engineers have finally settled upon the very routes chosen more than 200 years ago. Though a route across Darien, to the south of Panama, has been frequently advocated, the final choice now lies between Nicaragua and Panama. The distances between ports of the north Atlantic and Pacific coasts are approximately the same via either Panama or Nicaragua, each section having its compensations and disadvantages. Panama, as all the world knows, has already been exploited to a greater extent than Nicaragua. De Lesseps' original estimate was \$240,000,000, and actual work was begun in 1881, but it is said that from \$250,000,000 to \$300,000,000 have already been expended, and that at least \$150,000,000 will be necessary to finish the work, which is not more than half or two-thirds completed. In Panama the Culebra mountain, 460 feet high, and the intermittently torrential Chagres river, with its deadly fevers, are the two chief deterrents to successful operations.

Without entering into a discussion of the respective advantages of either



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"WASN'T SANTA CLAUS GOOD TO ME?"

THINGS OF THE MOMENT.

Greenland exports oil of seals and walrus, fox, seal and reindeer skins, siber down, feathers and eryllite. Its chief trade is with Denmark.
An African who had visited England described snow as "rain gone to sleep."
Corpses of paupers are being used as targets in testing rifles and field guns by German experts.
An act for the prevention of cruelty

to wild animals has just become law in England. It extends the provisions of the "cruelty to (domestic) animals act" to all birds, fishes and reptiles not included in that act.

Frederick Stearns of Detroit, who gave the Stearns collection of musical instruments to the University of Michigan, has purchased 200 more instruments to be added to the collection.

Among these is a three keyboard harpsichord made in 1703 by Christoffel, the inventor of the pianoforte.

A statue of Peter Henlein, who is said to have invented the watch toward the close of the fifteenth century, is to be erected in Nuremberg. Henlein's pocket timepieces were oval in shape, and hence were known as "Nuremberg eggs." A model of the statue, which is of life size and was executed by the well-known sculptor, Moritz Schultze of Berlin, was exhibited at the Paris exposition.

The census returns of Texas present some curious facts. For instance, Bailey county has but 4 residents, Cockran has 25, Andrews has 37, Lynn has 17 and Dawson has 36. Twenty-five other counties have populations of less than 500 each. Some counties have no running stream within their borders, and are hundreds of miles from a railroad and are almost wholly uninhabited.

by prairie dogs, jack rabbits and rattlesnakes. Tom Green county, the largest in the state, is larger than the whole state of Ohio and has but 6,804 inhabitants.

Heathfield, a village near Tunbridge Wells, England, has been looking for water and discovered gas. It was announced some time ago that the workmen at the end of the artesian tube were astonished by a sport of gas, which, on being lighted, burned with a

flame several feet in height. The railway company has accepted this unexpected gift of nature and applied it to the lighting of the station.

The coffee growing industry in tropical Africa is developing tremendously. The seed was introduced into that country about five years ago by some English missionaries with the object of ascertaining whether the resources of Africa were favorable to the culture of the berry. The ground appears to be

peculiarly adapted to the industry, as 100 tons of coffee were exported from Uganda alone last year. The result of this year's production will be even greater.

Andreas and Anton Lang visited the pope of Rome a few weeks ago in their Oberammergau costumes. The pope received them very kindly, gave them golden medals and would not allow the impersonator of Christ to kneel before him.